

# 2014 Ohio State University Combined Research and Extension Annual Report of Accomplishments and Results

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## I. Report Overview

### 1. Executive Summary

The Ohio Agricultural Research and Development Center (OARDC) and Ohio State University Extension (OSUE) are symbiotic components of The Ohio State University's (OSU) College of Food, Agricultural, and Environmental Sciences (CFAES). OARDC serves as the research arm of CFAES, whereas OSUE is the public interface that delivers research-based education to Ohioans to better lives, businesses, and communities. The mission of the college is simply but profoundly stated, "We Bring Knowledge to Life."

Dr. Bruce A. McPheron serves as Vice President and Dean of CFAES. Dr. Keith Smith is Associate Vice President and Director of OSUE and the Associate Dean of CFAES; he will be stepping down on June 30, 2015 after 23 years in his current position. Dr. Steve Slack serves as Associate Vice President and Director of OARDC and Associate Dean of CFAES.

OSUE and OARDC are to be engaged, to deliver impacts, and to make a difference. That charge is implicit in the land-grant mission and is reinforced by the OSU leadership, by our elected officials, and by those we serve. Likewise, this charge is central to the USDA-NIFA mandate. Engagement and impact-oriented programs continue to be our hallmark. OARDC and OSUE are leaders in "Agbioscience": the integration of scientific disciplines to address critical needs of (1) food security, production and human health; (2) environmental quality and sustainability; and (3) advanced bioenergy and biobased products. CFAES's agbioscience program underpins Ohio's \$107+ billion agricultural industry. These three signature areas of agbioscience have been adopted as key research priorities for OARDC. At any given time, OARDC researchers are engaged in approximately 400 research projects in these areas.

Similarly, CFAES's research and Extension programs continue to focus on OSU's three University-wide Discovery Themes: (1) Food Production and Security; (2) Energy and Environment; and (3) Health and Wellness. The Discovery Themes provide Ohio State with an unprecedented opportunity to find durable solutions to three of today's--and tomorrow's--most compelling issues. Given that CFAES's signature areas align well with the University Discovery Themes, CFAES is providing leadership at the university-level for the theme "Food Production and Security," and actively participates in the two other themes. These Discovery Themes guide collaboration across the university, direct allocation of new university resources, and add program emphasis university-wide in agbioscience.

OARDC and OSU Extension, collectively employ approximately 1,400 fulltime employees, and work jointly with all CFAES agbioscience programs. Seventy-seven faculty members hold joint appointments in OARDC and OSUE and most also have advising and teaching appointments in CFAES academic programs. Likewise, OSU Extension and OARDC work closely with CFAES's Agricultural Technical Institute (ATI), the nation's largest two-year degree program of its kind. ATI is ranked number one in the nation among two-year schools awarding degrees in agriculture and related sciences. This close collaboration among the three entities in CFAES (OARDC, OSUE and academic programs including ATI) results in seamless programs, such as our agronomic field days--that are held annually at our research stations across the state. OARDC, while serving as the research arm of CFAES, is also intimately involved

in student learning. OARDC research supports approximately 200 graduate level and postdoctoral students each year who spend their time in field and laboratory investigations.

OARDC and OSU Extension have continued to manage their programs within current fiscal realities despite ever-increasing demands for services, and in the face of Ohio's need for advancing job growth and economic development. While economic turnaround is evident throughout Ohio, OARDC and OSU Extension have continued to lead from a position based on leveraging investments made in research and Extension to expand the economy while ensuring the wise use of our social, environmental, and human capital.

OARDC uses capacity funds to leverage additional funding. In fiscal year 2014, OARDC had a portfolio of 582 active grants valued at \$166 million. Some examples are listed below.

**From the National Institute of Food and Agriculture (NIFA):**

- \$730,600 to create eLearning in NIFA challenge areas to transform education of controlled-environment animal production (ECEAP) for sustainability
- \$1 million to study pathogen inactivation in fresh produce by incorporation of sanitizers into existing operations within the produce chain
- \$500,000 to increase aquaculture production and engage new farmers/ranchers in the region

**From the National Science Foundation:**

- \$750,000 to study co-evolution of upstream human behavior and downstream ecosystem services in a changing climate

**From the Ohio Soybean Council:**

- \$2.8 million to address soybean priority areas

**From the Ohio Department of Agriculture:**

- \$790,000 to target specialty crop research in Ohio

While each of these programs is funded to conduct both basic and translational science, OSU Extension is a major partner in many of these studies. Without the expertise of Extension faculty and staff, translating the science to the point of adoption by stakeholders, be it practices or production of new products, would not occur as efficiently as possible.

In order to manage programmatic priorities, OSU Extension has recently engaged in a process of looking to and imagining the future of OSU Extension programming. Beginning in 2014, Dean McPheron of CFAES launched a project, "VP Conversations on the Future of Extension." This project is described as a "strategic foresight project intentionally asking questions about envisioning a long-term future for OSU Extension including the role the organization should play in shaping and positively impacting Ohio's residents."

The project is two-pronged: futuring - identifying challenging trends and issues that will affect Ohioans; and visioning - examining how OSUE uses their strengths and resources to meet educational needs for the identified topics and how OSUE will address those issues. Futuring is "largely an examination of trends and potential outcomes in environments external of the inquiring organization. It is qualitative as well as quantitative, anticipating the future through well-considered expectations." Visioning is "an aspirational exercise in leveraging internal culture, capabilities, resources, goals, and mission to

offer successful products and services to customers and stakeholders in the future." It provides the internal foundation for operational success; it is a basis for managing long-term investments and risks.

Key objectives for the 2014 - 2015 futuring process: 1) describe the current context and position of OSUE (e.g., funders and their expectations; mission-mandate; political context, etc); 2) develop and foster an organizational understanding and practice of futuring; 3) identify the major forces, as well as industry and societal trends, driving change and the potential, related impact for Extension education in Ohio; 4) explore the major issues that Ohio communities and residents will face in the short- and long-term that OSUE can and should be positioned to help address; and 5) Identify and describe a compelling vision for the future of OSUE, with particular attention to the societal trends and critical issues that will impact program priorities, delivery systems, financial models, and staffing.

OARDC and OSU Extension have submitted an array of impacts for this 2014 reporting period that are helping to advance both society and science. The institution has moved beyond food production to the creation of energy and manufacturing materials such as natural rubber, biogas, and ethanol. Plant and animal genetics research, in combination with food technologies, engineering, and plant and animal health research are supporting a safer, healthier food supply that is also more sustainable, with less environmental impact. These programs will substantially contribute to reducing global hunger. For the most part these are all collaborative efforts involving OARDC and OSU Extension, as well as multiple business and industry partners, and multiple federal, state, local agencies and non-government organizations. CFAES continues to support research, Extension services/outreach, and development across five other OSU colleges, entering into multi- and interdisciplinary partnerships to address complex problems and issues that require broad thinking.

Our programs impact Ohioans every day. In summer 2014, Lake Erie and Grand Lake St. Marys, among others, again suffered from harmful algal blooms. The blooms are primarily caused by excessive phosphorus runoff, which enters the waterways primarily from fertilizer and manure used on farms. In August 2014, the city of Toledo, Ohio, awoke to news that tap water was unsafe to drink or use. An algal bloom in Lake Erie had reached unsafe levels of the toxin microcystin, produced by the algae in the lake. This resulted in the water being off limits to everyone in Toledo for 56 hours. While programming was already in place to address phosphorus levels in the waterways of Ohio, Toledo was a true wake-up call, and prompted Ohioans, the university, and senate to pay attention and to ramp up their efforts at tackling this issue.

Senate Bill 150 was passed in 2014, which requires farmers with 50 or more acres to attend a course on fertilizer application. To meet the requirements of Senate Bill 150, and to meet the need for education that will aid in reducing harmful algal blooms, OSU Extension has developed a signature program, 'Nutrient Stewardship for Cleaner Water.' The goal of the signature program is to improve water quality in Ohio by educating farmers on the correct rates, times, amounts and placement of phosphorus-containing fertilizers. Long-term benefits of this program are increasing crop yields, boosting farm profits through increased production, and less nutrient runoff from fields, which ultimately results in safer, cleaner drinking water for all Ohioans. The drinking water for more than half of Ohioans comes from water at risk for harmful algal blooms.

'Nutrient Stewardship for Cleaner Water' is one part of CFAES's "Field to Faucet" initiative, which was announced in September 2014. Dean McPherson dedicated \$1 million to address the source of water quality issues and to ensure clean drinking water across Ohio. The initiative addresses the following through research efforts: real-time identification of toxins and treatment protocols for municipal water treatment facilities; identifying "hot spots" in the Maumee Watershed to target resources and develop nutrient management plans; and creating a data cooperative to address and handle regional farm- and university-specific data.

Another way our programs impact Ohioans is OSU Extension's 'Live Healthy Live Well' program. Chronic diseases are the leading cause of death and disability in the United States. Conditions such as heart disease, stroke, cancer, diabetes, arthritis, and obesity are common, costly, and preventable health problems. These diseases can be addressed and mitigated with education and lifestyle modifications. Chronic diseases have the potential to affect all Ohio citizens, depending on lifestyle choices.

'Live Healthy Live Well' is one of the designated "signature programs" of OSU Extension. The program educates Ohioans on nutrition, physical activity, and wellness issues. Utilizing social media, email wellness challenges, and lunch and learn lessons, the program strives to increase awareness and encourage adoption of healthy lifestyle behaviors. Programming targets working adults, public agencies or governments, and businesses with research-based information. By improving workforce health, employers may see reductions in insurance costs, improved morale and fewer employee sick days.

80% of individuals who participated in the 'Live Healthy Live Well' program reported adopting one or more of the recommended practices that might help reduce their risk of developing chronic disease. These practices may include the following: losing weight, maintaining current healthy weight, choosing healthy foods as snacks, reading food labels to make healthier food choices, and using a coping technique to reduce stress.

OARDC contributes powerful research to help improve the health of Ohioans. One such project looks at finding alternatives to harmful food dyes. Anthocyanins are powerful antioxidants that give color to most red, orange, purple and blue fruits and vegetables. These antioxidants are hot commodities because of their potential as cancer-fighters and natural food dyes. Food processors have several options for natural red dyes, but with blues, the alternatives are limited. In nature, anthocyanins produce a wide range of colors: orange, red, purple, violet, and different shades of purple and blue, even some black colors. Until recently, anthocyanins have been difficult and expensive to isolate into pure forms. OARDC food scientists have developed and patented a new, economical technique to extract the pigments, achieving highly purified anthocyanin blends.

This unique process slashes the cost of producing anthocyanins 10- to 20-fold and will be commercialized by a new startup company, Anthocyantific LLC. The new products' availability and low cost will galvanize new research into the pigments. In addition, because of OARDC's research, Ohio State University and MARS Chocolate North America, producer of candies including M&Ms, have submitted three patent applications for anthocyanin-based blue colorants.

OARDC's innovative research comes on the heels of an announcement by Kraft Foods, which revealed it would be replacing artificial dyes with natural ones in its macaroni-and-cheese products marketed to children. The issue is gaining more attention both by consumers and by the scientific community. The availability of food coloring through a natural product, anthocyanins, provides the food processing industry with an innovative product to meet consumers demands to eliminate unnatural dyes in foods.

**Total Actual Amount of professional FTEs/SYs for this State**

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	195.0	0.0	369.0	0.0
Actual	547.4	0.0	410.0	0.0

## II. Merit Review Process

### 1. The Merit Review Process that was Employed for this year

- Internal University Panel
- External Non-University Panel
- Combined External and Internal University External Non-University Panel
- Expert Peer Review

### 2. Brief Explanation

For OARDC, OSU Extension, and CFAES, merit review processes are critical to our mission and are mandated at all levels. Over the years, the review process has been streamlined and, with the introduction of digital media, we have seen dramatic changes in quality, quantity, and timeliness of reviews. Throughout 2014, internal and external stakeholder advisory committees have been used for input on multiple matters including: annual reports; new facilities such as the Food, Agricultural, and Biological Engineering building and new horticulture and crop greenhouses completed in February 2014 and December 2014 on the Wooster campus; and new dimensions for agbioscience initiatives. With the introduction of OSU's Discovery Themes in 2012, our advisory groups are now being called upon for inputs on University-level programs. Documents, such as annual reports and one-page information sheets, are typically produced in draft form and targeted for review by advisory committees, individuals, partner business groups, public officials and commodity organizations who are both knowledgeable of, and vested in, the subject matter. They are asked to provide feedback on both content, relevance and presentation of the stories and impacts.

All OARDC and OSU Extension published materials, ranging from traditional print to social media releases, are compiled and reviewed by teams with both technical and communication expertise. Most of these products also have some type of administrative review. OSU Extension requires all publications (whether electronic or print) that are intended for statewide (or broader) distribution to be submitted for blind peer review by a minimum of three people. This internal oversight provides a high-quality draft document for stakeholder review.

OARDC utilized its advisory committee this year, as well as various other committees, to focus on facilities, programs, operations, and long-term planning. We have an extensive amount of one-on-one researcher-to-stakeholder interaction to identify needs, establish priorities, and engage in research and development programs. For the most part, a partnership with a stakeholder group exists for each program.

OSU Extension implements several levels of advisory committees, each tasked with helping to ensure that local or statewide programs are relevant and addressing the highest priority needs of our clientele. Tasks within the charge of the advisory committees include: identifying and prioritizing needs, providing input into the identification of staffing needs, connecting Extension with potential partners or those who could fill gaps in service, helping develop budgets, educating stakeholders on Extension's impacts, and advocating for Extension.

In Ohio, there is one state Extension Advisory Committee, which advises the Director on statewide programmatic issues, county-level advisory committees which provide feedback on county-level program issues, and program area advisory committees, which advise educators within the scope of their specific program area (agriculture and natural resources, family and consumer sciences, 4-H youth development, and community development).

Each of these committees has guidelines which dictate how they should be composed. Diversity of membership is key; with consideration for diversity in categories such as: geography, age, race / ethnicity, gender, socio-economic status, program area, and political affiliation. Additional guidelines exist for term / length of membership, size of committee, meeting frequency, and membership rotation.

Excellent examples of the merit review process at work in OSU Extension are the signature programs, and their review process. Signature programs are a cornerstone of the OSUE strategic plan. A key requirement of a program receiving the signature program designation is that it addresses a critical need or issue relevant to a significant proportion of Ohioans. The designation is only given to a small number of programs that complement the impacts of OSU Extension's current portfolio of core programs. Potential signature programs must apply to become a "signature program", and must demonstrate meeting pre-determined criteria. Applications are reviewed by a committee, and finally approved by OSUE Administrative Cabinet. Proposals for new signature programs are accepted annually, and a review of the relevance of current signature programs is also considered each year.

Signature programs are the broad strokes of OSUE's programming efforts. While Extension seeks to deliver programming that is readily applicable across the state, we also realize the need to develop programming specific to the needs of certain / more local parts of the state. Extension Educators and program staff also work to develop programming that meet the needs of citizens within their county and region.

Given that all OARDC and OSU Extension efforts are planned to benefit some targeted group or groups, we engage those groups at the beginning of the process, thus providing formative reviews. This policy holds true even in highly theoretical research where multi- and interdisciplinary partners have been engaged to advance lines of inquiry. In such cases, the stakeholders may be internal to the organization, or they may be found in other colleges and universities. Specialists from academic disciplines provide insight from personal research and published literature, while county Extension personnel provide insight from local communities. Program area personnel work together to identify key issues that cut across disciplines and special task forces collaborate to identify priority program efforts to address these issues. Funding is then allocated to support program priorities.

Our system provides flexibility for educators to maintain the ability to be responsive to unanticipated issues. In situations where grant monies were obtained, staff members with specific, short-term employment contracts have been hired to assist in meeting priority needs. Educator specialization is a way for the system to provide subject matter expertise close to local communities. Educators identify a subject matter specialization that relates to needs in their geographical area of the state. They receive additional training to remain on the cutting edge of their field, and they work with other educators to address local needs in a timely manner. In addition, educators remain linked to state specialists in the same discipline to enable the rapid dissemination of new information or the development of appropriate programming to address critical needs. As OSU Extension specialists continue to work in the context of ever increasing societal needs and tight budgets at all levels, the need for assessment and input from idea initiation to assessments is more important than ever to ensure limited resources are targeted to garner the greatest impacts.

As OSU Extension and OARDC continuously strive to be more relevant, make wiser use of limited resources, and maximize impact, program and publication review by stakeholders, internal and external peer review, and external specialists are more important than ever. To that end, the organization is committed to making use of both informal and formal reviews at all levels of the organization.

### III. Stakeholder Input

#### 1. Actions taken to seek stakeholder input that encouraged their participation

- Use of media to announce public meetings and listening sessions
- Targeted invitation to traditional stakeholder groups
- Targeted invitation to non-traditional stakeholder groups
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to non-traditional stakeholder individuals
- Targeted invitation to selected individuals from general public
- Survey of traditional stakeholder groups
- Survey of traditional stakeholder individuals
- Survey of the general public
- Survey specifically with non-traditional groups
- Survey specifically with non-traditional individuals
- Survey of selected individuals from the general public
- Other (focus groups, public information booths at local gatherings)

#### Brief explanation.

Stakeholder input is central to our organization's well-being and has long been part of our corporate culture. OARDC and OSU Extension, as well as CFAES as a whole, continually have wide support and active participation from our stakeholders. As groups and individuals are provided with meaningful opportunities to influence outcomes in their industry or area of expertise, they become increasingly engaged.

As an institution, emphasis is continually placed on business and industry participation and creating collaborative efforts that yield new commercialized products and jobs. This level of stakeholder engagement is critical as the organization seeks to help Ohio grow its economy and put people back to work. Stakeholders understand that their collaborative participation is necessary to make this happen.

Throughout the year, we use both formal and informal methods to engage our stakeholders and encourage their participation. Due to the changing nature of economic and societal trends, agriculture, food, and the green industry depend on innovators and researchers to generate new processes and products. Ohio's agricultural industry increasingly links with other industries to take on common challenges and opportunities in key areas such as food production and security, energy and the environment, and health and wellness.

One example of this public-private collaboration is SEEDS: The OARDC Research Enhancement Competitive Grants Program. The SEEDS program encourages excellence in OARDC research by promoting exploration that is consistent with the mission and vision of the OARDC and by encouraging connections across disciplines, with industry and with other external partners or stakeholders.

Established in 1996 and supported by OARDC, SEEDS is a unique program among U.S. state-assisted universities. By fostering high-quality research among scientists supported by OARDC and CFAES, SEEDS provides startup dollars for scientists to collect preliminary data needed to give them a competitive edge in national programs, and it provides them with leverage to attract industry

and stakeholder funding support.

OARDC centers and programs, and their stakeholders, have participated in multiple sessions ranging from planning and setting research agendas, to formative and summative evaluation of research projects. Our Ohio Bioproducts Innovation Center brings together two of the largest industries in Ohio--agriculture and polymers--and is one of our most engaged programs. CFAES also supports two individuals in the Industry Liaison Office (ILO) within the Office of Research at The Ohio State University. The ILO acts as a liaison bringing industries with specific issues to interact with faculty and programs to assist industries with technical or research issues.

As part of the previously mentioned "VP Conversations on the Future of Extension" project and in order to seek stakeholder input, the Dean of CFAES selected a steering committee consisting of college employees. They worked closely with their colleagues and called upon the assistance of two experienced futurists, one internal and one external to the university. The steering committee and futurists were tasked with engaging stakeholders in conversations to attempt to identify, explore, and analyze the most important emerging and challenging issues likely to confront Ohioans by the year 2035. Stakeholders, staff, partners, and external experts were engaged in 2014 in approximately 40 dialogue sessions, conducted in a variety of formats, including online surveys, face-to-face dialogue sessions, and interviews.

Additionally, OARDC, OSU Extension, and most academic departments/schools within CFAES each effectively use their external advisory committees and stakeholder groups as forums to discuss current programs and gather input for future direction, e.g. strategic planning. Electronic messaging, social media, webinars, tweeting, and blogging, as well as interactive group meeting/messaging systems have continued to expand rapidly. More of these stakeholders can now participate at lower time and travel costs using technology.

OSU Extension develops stakeholder-based strategic plans to inform the focus of statewide priority programs. The process is ongoing and involves collaboration with local advisory committees, review of demographic and other relevant data, and prioritization based on need and availability of resources. The process enables the creation of focused teams comprised of campus, center, and field specialists, as well as county educators who develop curriculum and evaluation strategies for statewide programs. In many cases, these teams have specific target audiences whom they regularly involve in program planning and evaluation, including educational materials. Some of the program teams include members from external organizations (e.g. state agencies, organizations, commodity groups) who can offer additional resources to enhance program outreach. County Extension Advisory Committees, as well as the State Extension Advisory Committee, are engaged in reviewing and prioritizing new multi- and interdisciplinary programs. Due to their long history of collaboration with OSU Extension and OARDC, stakeholders at a variety of levels make significant input into our programs.

## **2(A). A brief statement of the process that was used by the recipient institution to identify individuals and groups stakeholders and to collect input from them**

### **1. Method to identify individuals and groups**

- Use Advisory Committees
- Use Internal Focus Groups
- Use External Focus Groups
- Open Listening Sessions
- Needs Assessments



- Use Surveys
- Other (one on one interactions with existing and new stakeholders)

**Brief explanation.**

OARDC and OSU Extension are continually making targeted efforts to find and link with representatives of all stakeholder groups. OARDC and OSU Extension utilize faculty and staff, associates from support organizations, traditional stakeholders, and political leaders to help identify other individuals and groups with whom we should be interacting.

OARDC and OSU Extension use every opportunity, such as CFAES's Farm Science Review (FSR), to engage and garner stakeholder participation, feedback, and support. FSR--Ohio's premiere agricultural event, and one of the largest in the nation--is dedicated to demonstrating the best agricultural research and best management practices with ready-access for our stakeholders. In September 2014, CFAES-FSR hosted approximately 131,000 visitors over a three-day period. One-on-one sessions at FSR, the state fair, local fairs, special events, and active participation by faculty and staff in community group processes and business/professional meetings have provided an opportunity to better link with constituents. This process also provides a means to expand our clientele list, knowledge of needs, and feedback on outputs and impacts. These contacts are logged and maintained.

County Extension advisory committee members are most useful in linking with our traditional stakeholders and expanding the list of those within the county that should be contacted. Extension advisory committees have guidelines which dictate how they should be composed. Diversity of membership is key, with considerations for diversity in categories such as: geography, age, race / ethnicity, gender, socio-economic status, program area, and political affiliation. Additional guidelines for term length of membership, size of committee, meeting frequency, and membership rotation also exist. The membership of committees is reviewed during annual onsite and self-study diversity reviews to ensure that involvement is sought from the broadest array of constituents as is feasible. Extension educators are encouraged to, and have, reached out to new and underserved target audiences. Each team, or faculty and staff group, working on a project proposal or existing project will have a client partner list that is ever expanding. Likewise all administrative units in CFAES have advisory committees that continually seek to be more representative, thus they are constantly opening up new channels to new stakeholder individuals and groups.

For the "VP Conversations on the Future of Extension" project, the steering committee created an exhaustive list of all those (both internal and external stakeholders) who should be included, then worked with the schedules of those who were available to participate. An online survey was conducted to give stakeholders an opportunity to share opinions on the most important and challenging trends that would face Ohio in the future; this survey was designed with an open-ended link, so anyone could participate. Participants of the survey were asked to self-identify if they were internal or external to OSU.

Our future success in meeting needs and fulfilling our land-grant mission lies in our ability to maintain links with a representative cross-section of our stakeholders. These linkages aid in assessing research and Extension-related needs, extending information, growing human capital, opening opportunities for Ohio based products and services that we have helped to develop, and ensuring we have a feedback mechanism from our stakeholders.

**2(B). A brief statement of the process that was used by the recipient institution to identify individuals and groups who are stakeholders and to collect input from them**

**1. Methods for collecting Stakeholder Input**

- Meeting with traditional Stakeholder groups
- Survey of traditional Stakeholder groups
- Meeting with traditional Stakeholder individuals
- Survey of traditional Stakeholder individuals
- Survey of the general public
- Meeting specifically with non-traditional groups
- Survey specifically with non-traditional groups
- Meeting specifically with non-traditional individuals
- Survey specifically with non-traditional individuals
- Meeting with invited selected individuals from the general public
- Survey of selected individuals from the general public
- Other (focus group interviews, unobtrusive observation, qualitative data collection)

**Brief explanation.**

The methods noted above have all been utilized to a greater or lesser extent this reporting year at various levels of the organization to gather data from stakeholders. While there are some formal processes used to gather input, many of our efforts are informal. Our survey of various groups is often done in open forum interview/discussion settings that generate more qualitative data than quantitative. OSU Extension and OARDC, as well as many faculty and staff members, departments and schools, and various research and Extension groups within the institution have stakeholder lists that serve as their foundational contact points. In turn, there are business and industrial partners, fellow research and Extension institutions, and support organizations that are on our contact list. Federal, state, regional, and local governments; agencies; advisory committees and friends groups; commodity groups, as well as special interest groups also add to the list of stakeholders from whom we seek input in the initial planning and execution phases of our programs.

OARDC invites members of private and public industry from around the state of Ohio to participate as a member of the OARDC Advisory Committee. This committee meets three times a year along with the OARDC Directors and other OARDC representatives to discuss current research, gather input for future direction, and address any other immediate priorities.

Additionally, each of OARDC's eight Agricultural Research Stations located throughout the state of Ohio have stakeholder advisory committees that meet at least twice a year to review research at the station and provide input. Each station also has a revolving, five-year strategic plan produced by the stakeholder advisory committees and station management.

Data has been collected for the "VP Conversations on the Future of Extension" project in several ways. The project team organized and facilitated approximately 40 dialogue sessions from March - July 2014. The participants included experts in agriculture, economics, demographics, life styles, resource management, state politics and policies, and technologies within Ohio. Approximately 350 expert participants generated over 1,100 ideas regarding challenging trends and issues. Six leaders of the college and agricultural community were interviewed. Additionally, an online survey was distributed to a mixed population of individuals internal and external to the university.

All of these stakeholders are continually being re-engaged as we move forward. The ultimate aim is to have 'meaningful engagement' so our stakeholders find reasons to stay involved. We work on the premise that 'meaningful engagement' will yield meaningful data, both quantitative and qualitative, and that interpretation and internalization of that data will help lead the organization to meaningful partnerships that will, in turn, help foster real impacts.

### **3. A statement of how the input will be considered**

- In the Budget Process
- To Identify Emerging Issues
- Redirect Extension Programs
- Redirect Research Programs
- In the Staff Hiring Process
- In the Action Plans
- To Set Priorities
- Other (Business management practices, culture of organization)

#### **Brief explanation.**

OARDC strives to address the needs of our stakeholders in an efficient and effective manner, especially in times of crisis. For example, the "polar vortex" winter of 2013-2014 was ruthless to Ohio's wine grapes. Growers lost 97 percent of their profitable vinifera grapes, with total damage to all the state's grape varieties topping \$12 million. OARDC experts responded to this catastrophic event by teaching a statewide workshop series on pruning winter-damaged vines, with the goal of returning Ohio grape growers to full production as soon as possible. Scientists are also developing new, cold-hardy hybrid varieties that can better withstand severe weather. Ohio's grape and wine industry has a \$786 million annual economic impact and supports more than 5,000 full-time jobs.

Nick Ferrante, owner of Geneva's Ferrante Winery was one of Ohio's wine grape growers who found his crop devastated by the harsh winter temperatures. Ferrante says OARDC research offers hope for recovery: "[OARDC scientist] Imed Dami's research has impacted all of Ohio's vineyards, especially in the Grand River Valley, which produces some of the state's finest vinifera wines and has won many prestigious awards. We've used many of Imed's strategies to improve vine health, yields and wine quality."

OSU Extension and OARDC, collectively and independently, promote both basic and applied research and build and test advanced models for Extension/outreach programming that meet client needs. To accomplish this goal requires close client/stakeholder/customer interaction. Throughout this reporting year, both OARDC and OSU Extension have continued stakeholder engagement activities that reinforce our customer-centered, customer-focused organizational culture. At each juncture of our decision-making, our organization has sought to weigh stakeholder input against demand for our science and programs and our capacity to deliver. While there are often competing and conflicting demands, for the most part, input from our stakeholders is strongly reflected in what we do. Client needs and their feedback are critical in the state-level budget process. Meeting client requests is the key to fulfilling the land-grant mission and demonstrating that stakeholder support exists for programs that fulfill their needs and contribute to national well-being.

It is the field-level interactions among stakeholders, researchers, and Extension specialists where we jointly identify the majority of emerging issues. While strong, theoretical academic insight is critical, food, agricultural, and environmental issues most often manifest themselves in field

settings and in our clients' daily work and social lives. Stakeholders remain our true partners by joining with faculty and staff to identify emerging issues. Needs and issues originating from producers, processors, manufacturers, distributors, consumers and special interest groups have, and will continue to, inform both Extension and research programs. It is this input, when filtered through our academic knowledge base, which provides our scientists with relevant study questions. Once answered, the response is framed for the clients as well as other interested parties. The response includes interventions to effect change, deliver new goods, provide services, and ultimately to generate real impacts. This approach has and will continue to influence faculty and staff hiring, shifts in priorities and resource allocation, and strategic/ action planning.

Likewise, stakeholder input continues to influence how our College positions itself in the marketplace and conducts business. Stakeholder input has transformed the corporate culture in that, as a public institution, it is imperative for society to see our organization reflecting their aspirations.

Stakeholder input is considered at many levels of the organization. The Administrative Cabinet of OSU Extension reviews input from surveys and strategic planning processes to determine funding and staffing needs. The State Extension Advisory Committee and the OARDC Advisory Committee have met multiple times this year to provide input on programmatic needs and proposed priorities. Cooperative Extension administrators and others with statewide program leadership responsibility have initiated a departmental accountability process with all campus units receiving Extension funding. This process involves meetings to discuss shared priorities, surveys of internal and external stakeholders about their satisfaction with the content and expertise delivered from that unit, and review of documented impacts. This process is directly linked to annual funding for the campus departments. Locally, Extension Advisory Committees and other programmatic committees assist educators in prioritizing programs annually. They review information about local needs and the capacity of Extension to deliver programs, and guide the overall local programmatic vision.

Across all levels of administration, as well as at all program levels, stakeholder input has and continues to prove most valuable. Both OSU Extension and OARDC are extensively engaged with federal, state, and local officials, as well as business, industry, and special interest groups. The stakeholders' voices and needs are central to setting our institution's agendas and fulfilling our collective land-grant mission.

### **Brief Explanation of what you learned from your Stakeholders**

The individuals, groups, organizations, and businesses that are vested in CFAES' research and Extension activities provide a level of input that is central to our success. The primary information learned in these interactions is that:

- The stakeholder perspective is not always as we might assume; thus, it is imperative that we listen intently, communicate broadly, and stay engaged. This has been a strong recommendation from a number of stakeholders who have noted that periodic mailings and webpages do not equate to staying engaged;
- Our science and services are highly valued. Our research and Extension work has positive social, economic, ecological, and ethical impacts, both quantitatively and qualitatively, for individuals, families, groups, communities, businesses and industry;
- OARDC and OSU Extension do not have the resources and personnel to meet all demands, or to take advantage of all opportunities that present themselves. The breath of demand is so wide and the quantities so great that the organization must be engaged in constant planning to garner and optimize resources, invest them in targeted programs, and generate impacts in a timely manner. We also must clearly articulate to the full array of stakeholders what we have the capacity and resources to accomplish.

Through feedback during the 40 dialogue sessions hosted in 2014 for the "VP Conversations for the Future of Extension" process, over 1,100 ideas were generated. This data was combined and sorted by keywords and organized into 25 clusters. Further qualitative analysis was conducted to refine the clusters and expose emerging trends within the data. This process resulted in 17 potential descriptors (elements, factors, variables, etc) of potential emerging trends in Ohio.

Since the identification of the 17 potential descriptors, a series of workshops to generate ideas for alternative futures have been conducted. During the workshops, participants were asked to identify the two descriptors that they felt were the most important, and the two descriptors which were most uncertain. This additional investigation allowed the core research team to whittle the list of emerging trends down to: 1) alignment of employee skills, 2) economic and employment growth; 3) health care / health and wellness; 4) environment and natural resources management; 5) food production, safety, and security; 6) public services and finances; and 7) technology.

This process is still very much in progress; the final future scenarios / alternate futures described in the previous paragraph will help us, as an organization, to recognize opportunities for future programming. Beginning in April 2015 and continuing through July 2015, the visioning process (second phase) will be taking place, where Extension considers how, in the years ahead, we might best meet the above identified challenges.

Institution-stakeholder interaction is providing OARDC and OSU Extension with better insights into stakeholder needs, willingness to participate and at what levels, and ability to pay. Stakeholders better understand our institutional capacity to respond to needs, our funding models, institutional support (political, monetary, and client participation) needed, and the mission of the institution in the 21st century. Because of our college's culture of 'meaningful stakeholder engagement', OARDC and OSU Extension better understand how to match existing resources and expertise with high priority needs of stakeholders. Out of these interactions emerge an improved understanding among all parties as to realistic expectations.

**IV. Expenditure Summary**

<b>1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)</b>			
<b>Extension</b>		<b>Research</b>	
<b>Smith-Lever 3b &amp; 3c</b>	<b>1890 Extension</b>	<b>Hatch</b>	<b>Evans-Allen</b>
11208168	0	7703121	0

<b>2. Totaled Actual dollars from Planned Programs Inputs</b>				
	<b>Extension</b>		<b>Research</b>	
	<b>Smith-Lever 3b &amp; 3c</b>	<b>1890 Extension</b>	<b>Hatch</b>	<b>Evans-Allen</b>
<b>Actual Formula</b>	10761911	0	7639572	0
<b>Actual Matching</b>	10761911	0	10616815	0
<b>Actual All Other</b>	0	0	0	0
<b>Total Actual Expended</b>	21523822	0	18256387	0

<b>3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous</b>				
<b>Carryover</b>	3124744	0	1172	0

## V. Planned Program Table of Content

S. No.	PROGRAM NAME
1	Climate Change
2	Sustainable Energy
3	Childhood Obesity
4	Food Safety
5	Global Food Security and Hunger
6	Soil, Air and Water (OARDC Led)
7	Natural Resources and Environmental Systems (OARDC Led)
8	Plants Systems (OARDC Led)
9	Animals Systems (OARDC Led)
10	Food, Agricultural, and Biological Engineering Systems (OARDC Led)
11	Agricultural, Environmental, and Development Economics (OARDC Led)
12	Human Health (OARDC Led)
13	Human and Community Resource Development (OARDC Led)
14	Advancing Employment and Income Opportunities (Extension)
15	Enhancing Agriculture and the Environment (Extension)
16	Preparing Youth for Success (Extension)
17	Strengthening Families & Communities (Extension)

**V(A). Planned Program (Summary)**

**Program # 1**

**1. Name of the Planned Program**

Climate Change

Reporting on this Program

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
132	Weather and Climate	50%		25%	
133	Pollution Prevention and Mitigation	35%		65%	
605	Natural Resource and Environmental Economics	15%		10%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of FTE/SYs expended this Program**

Year: 2014	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	4.0	0.0	0.9	0.0
<b>Actual Paid</b>	1.5	0.0	1.1	0.0
<b>Actual Volunteer</b>	0.6	0.0	0.0	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
84341	0	161354	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
84341	0	136469	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**



On-going research activities related to climate change will include both basic and applied research. This research will continue to take place in all academic departments/schools within the College of Food, Agricultural, and Environmental Sciences. Laboratories for experiments, pilot plants, a feedstock processing plant, greenhouses, and research plots and stations will support this program. All functional laboratories and sites will be improved over time as program needs warrant. OSU Extension will provide parallel programs in this Planned Program to advance knowledge, promote adoption and change, and develop human capital. OSU Extension's current primary method of addressing climate change issues is via monthly webinars. OARDC and OSU Extension faculty and staff will engage in appropriate levels of outreach, engagement, and consultation, with both internal and external stakeholders.

**2. Brief description of the target audience**

Targeted audiences in the Climate Change Planned Program include, but are not limited to:

- Businesses and industries that have expressed a need for climate change information that is derived through new research, extracted from on-going research, or is derived from scientific literature;
- Fellow academic units that partner with program scientists to create systems and processes needed to support not only the research, but also the adoption of the research findings by industrial partners;
- Ag producers and farmers;
- Fellow agencies or support organizations who will not only use the information but will also be brokers of that information, including embedding it into groups to encourage change;
- Populations who have not requested the information but will likely benefit from that information
- Other scientists and scientific groups;
- Political entities;
- Other education, outreach, and Extension personnel;
- Students from elementary school to post doctorate studies;
- News organizations.

**3. How was eXtension used?**

eXtension was not used in this program

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	18777	7059	0	0

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

Year: 2014  
 Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2014	Extension	Research	Total
Actual	6	59	0

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Number of participants attending educational programs of one teaching hour or more.

Year	Actual
2014	2274

**Output #2**

**Output Measure**

- number of webinars / online educational and research sessions

Year	Actual
2014	94

**Output #3**

**Output Measure**

- # of acres impacted as a result of educational events on the topics related to the management of natural resources

Year	Actual
2014	37168

**Output #4**

**Output Measure**

- number of individuals receiving one-on-one consultation or assistance

Year	Actual
2014	919

**Output #5**

**Output Measure**

- number of people completing non-formal educational events on water quality and quality of surface water and ground water supplies

<b>Year</b>	<b>Actual</b>
2014	51

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Advance the understanding of soil carbon sequestration research to the point that Ohio farmers can enter the carbon trading market.
2	number of producers using no-till techniques(Extension)
3	create strategies / technology within our program mission to reduce atmospheric pollution that can contribute to global climate change (OARDC)
4	number of strategies / technologies created that reduce atmospheric pollution that can contribute to global climate change (Extension)
5	Advance knowledge of how climate change affects crops (OARDC)
6	proportion of climate change webinar participants who indicated they learned new information and would share their new knowledge with others (OSUE)

**Outcome #1**

**1. Outcome Measures**

Advance the understanding of soil carbon sequestration research to the point that Ohio farmers can enter the carbon trading market.

Not Reporting on this Outcome Measure

**Outcome #2**

**1. Outcome Measures**

number of producers using no-till techniques(Extension)

Not Reporting on this Outcome Measure

**Outcome #3**

**1. Outcome Measures**

create strategies / technology within our program mission to reduce atmospheric pollution that can contribute to global climate change (OARDC)

Not Reporting on this Outcome Measure

**Outcome #4**

**1. Outcome Measures**

number of strategies / technologies created that reduce atmospheric pollution that can contribute to global climate change (Extension)

Not Reporting on this Outcome Measure

**Outcome #5**

**1. Outcome Measures**

Advance knowledge of how climate change affects crops (OARDC)

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

The "polar vortex" winter of 2013-2014 was ruthless to Ohio's wine grapes. The prolonged and extremely frigid temperatures caused growers to lose 97 percent of their profitable vinifera grapes, with total damage to all the state's grape varieties topping \$12 million. Vinifera, or European, grapes go into such wines as Chardonnay. Ohio's grape and wine industry has a \$786 million annual economic impact and supports more than 5,000 full time jobs.

**What has been done**

A survey was conducted by OARDC experts and completed by 62 grape producers statewide representing 838 acres, 720 of which are occupied by wine grape varieties. The average coldest temperature recorded at these vineyards was -14 degrees F, with an unofficial low of -27 degrees F.

**Results**

The survey results reported 97 percent losses of vinifera (European) grape varieties, which are the most popular and profitable for wine production but also the most susceptible to cold weather.

Hybrid grape varieties such as Vidal Blanc, Chambourcin and Traminette, which are more cold resistant than vinifera, experienced an average crop loss of 57 percent.

Finally, cold-hardy American grape varieties such as Concord and Catawba fared better, with reported losses estimated at 29 percent.

These losses amount to nearly \$4 million, according to the survey. Total losses to Ohio grape producers (who also grow juice and table grapes) are much larger, considering that there are some 1,900 acres growing this crop in the state.

While these losses are substantial, potential damage to grapevine trunks and vine death is more worrisome, as it would impact growers over a longer period of time.

Several factors made this year's winter particularly damaging to grapevines. First, the coldest temperatures experienced in the state were frequent as a result of the polar vortex that descended into the United States. Second, extremely low temperatures that can kill buds and trunks usually only last a few minutes, while this year such temperatures lingered for hours.

The most important factor, however, was that vine hardiness became compromised this winter due to warm weather in December that tricked vines into believing spring was coming, referred to as "de-acclimation." Additionally, the coldest days of the season were preceded by relatively warm temperatures and basically took the vines by surprise.

OARDC experts responded to this catastrophic event by teaching a statewide workshop series on pruning winter-damaged vines, with the goal of returning Ohio grape growers to full production as soon as possible. Scientists are also developing new, cold-hardy hybrid varieties that can better withstand severe weather.

OARDC's grape and wine research program is the only long-term university-backed research program serving Ohio's grape and wine industry. The program does extensive research on improved grape production methods. Field trials take place in Wooster, at OARDC's Ashtabula Agricultural Research Station in Kingsville and in vineyards of cooperating growers.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
132	Weather and Climate

#### Outcome #6

##### 1. Outcome Measures

proportion of climate change webinar participants who indicated they learned new information and would share their new knowledge with others (OSUE)

##### 2. Associated Institution Types

- 1862 Extension

##### 3a. Outcome Type:

Change in Action Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2014	88

##### 3c. Qualitative Outcome or Impact Statement

###### **Issue (Who cares and Why)**

Understanding of issues surrounding climate change is limited. Meaningful public discussion regarding potential policy is difficult without a basic understanding of these issues.

###### **What has been done**

Nine climate change webinars have been produced involving 2,274 participants. Those participants represent over 200 organizations from across the United States. Some of the topics addressed in 2014 include: climate change and corn belt agriculture, exploring snowfall, climate change and harmful algal blooms in Maumee Bay, climate change impacts on wildlife, trends and forecasts, and the movement of climate change knowledge through social networks.

### Results

Nearly 90% of all participants have indicated that they have learned new information and planned to share it with others. The National Park Service, USEPA, and eight high school or university instructors have used the webinars as teaching tools.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
132	Weather and Climate

#### V(H). Planned Program (External Factors)

##### External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Competing Programmatic Challenges

##### Brief Explanation

Limited resources require choices. Should a more compelling issue surface, it is possible that resources currently devoted to this program and planned for the future could be re-directed.

Likewise, natural disasters / climactic extremes may impact the focus of some programming efforts back towards issues regarding climate change. For example, the polar vortex conditions during the 2013 - 2014 winter in Ohio caused great losses to Ohio's wine grape industry, who estimate industry loss at \$12 million.

#### V(I). Planned Program (Evaluation Studies)

##### Evaluation Results

Climate change is a global problem, but a specific subset of its challenges are already affecting the Great Lakes region. Climate change can: affect the safety of drinking water; increase the number of droughts and floods; cause changes in precipitation and higher temperatures, which can lead to a change in the types of trees that grow in the region, thus impacting the timber industry; cause a decrease in crop yield dramatically over time and impact species migration.

Current resources in OSU Extension have limited programming efforts explicitly addressing climate change to webinar delivery. Nearly 2,300 participants representing 200 organizations from around the country have participated in OSUE webinars. 88% of participants acknowledged that they learned new information from the viewed webinar(s) and would share that information with others. The National Park Service, USEPA, and 8 secondary or university level instructors have used the webinars as teaching tools. The webinar archives have been used as an educational resource for more than 56,000 natural resource professionals.

##### Key Items of Evaluation



**V(A). Planned Program (Summary)****Program # 2****1. Name of the Planned Program**

Sustainable Energy

 Reporting on this Program**V(B). Program Knowledge Area(s)**

## 1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
511	New and Improved Non-Food Products and Processes	30%		90%	
608	Community Resource Planning and Development	70%		10%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)**

## 1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	4.0	0.0	2.7	0.0
<b>Actual Paid</b>	4.0	0.0	1.9	0.0
<b>Actual Volunteer</b>	0.0	0.0	0.0	0.0

## 2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
224909	0	210297	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
224909	0	610450	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

**V(D). Planned Program (Activity)**

## 1. Brief description of the Activity

Throughout the planning period, research and Extension activities will inform sustainable energy and advanced materials programs, through both basic and applied research, and with the full range of Extension activities. The research takes place in all academic departments/schools within the College of Food, Agricultural, and Environmental Sciences. Laboratories for experiments, pilot plants, a feedstock processing plant, greenhouses, and research plots and stations throughout the state support this program. All functional laboratories and sites are improved over time as program need warrants.

OSU Extension provides parallel educational programs in this Planned Program to advance knowledge, promote adoption and change, develop human capital, and support economic development activities. 'Energize Ohio', an Ohio State University Extension signature program, provides non-biased, research-based information to address critical energy issues impacting Ohioans. The programming is designed to enhance community leaders' and local residents' knowledge of energy drivers and development in order to promote best practices and informed decision-making on the implementation of sustainable energy strategies in Ohio's communities, businesses, and farms.

OARDC and OSU Extension faculty and staff engage in appropriate levels of outreach, engagement, and consultation, with both internal and external stakeholders, to ensure the research has the greatest chance of effecting change within society.

## **2. Brief description of the target audience**

Targeted audiences include, but are not limited to:

- Businesses, industries, and residents that have expressed a need for sustainable energy and advanced materials information that is derived through new research, extracted from on-going research, or is derived from scientific literature;
- Other stakeholders, with particular focus on consumers;
- Academic units that partner with program scientists to create systems and processes needed to support not only the research, but also the adoption of the research findings by industrial partners;
- Fellow agencies or support organizations who will not only use the information but will also be brokers of that information, including embedding it into groups to encourage change;
- Populations who have not requested the information but will likely benefit from that information, e.g. community leaders, general public;
- Other scientists and scientific groups;
- Political entities;
- Other education, outreach, and Extension personnel;
- Students from elementary school to post doctorate studies;
- News organizations.

## **3. How was eXtension used?**

eXtension was not used in this program

## **V(E). Planned Program (Outputs)**

### **1. Standard output measures**

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	1903	19813	0	0

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

Year: 2014

Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2014	Extension	Research	Total
Actual	7	0	0

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- number of educational workshops and seminars

Year	Actual
2014	62

**Output #2**

**Output Measure**

- number of research-based assessments of energy project sites  
Not reporting on this Output for this Annual Report

**Output #3**

**Output Measure**

- number of counseling sessions / meetings concerning community energy project assistance & planning  
Not reporting on this Output for this Annual Report

**Output #4**

**Output Measure**

- number of attendees at on-farm photovoltaic solar energy development workshops

<b>Year</b>	<b>Actual</b>
2014	289

**Output #5**

**Output Measure**

- number of visitor sessions to the "Energize Ohio" website

<b>Year</b>	<b>Actual</b>
2014	16464

**V(G). State Defined Outcomes****V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Programs in this area will develop strategies to engage producers, industrial partners, and consumers groups over a 5-year period resulting in effective leadership-oriented partnerships.
2	The program will build scientist/stakeholder cores to guide/provide biological, chemical, physical, engineering, and social research necessary to create new and improved processes and products commensurate with demand.
3	Annually the program will report, in conjunction with industrial partners, non-proprietary research gains made to the consuming public to garner interest in adoption of new products and processes when released.
4	Maintain an ongoing needs assessment program to identify yet to be determined needs of society for bio-based products as crude oil and natural gas supplies decline, as well as assessing impacts from other external factors.
5	By 2018, the program will contribute at least two alternatives to a petroleum-based product or process that meets client needs with an acceptable point of purchase price.
6	Support, through research, the building of biobased development that annually, beginning in 2013, utilizes Ohio and the region's plentiful supply of biomass, including waste steam materials in such manner as to improve the economy.
7	Support the building of biobased development that, beginning in 2013, effectively utilizes agriculture's production capacity to produce plants that have the desired attributes for manufacturing.
8	Increased understanding of energy alternatives, resources and project support (OSUE)
9	Implement change in energy usage by workshop participants (OSUE)
10	Complete installation of alternative energy activity (OSUE)
11	Complete plan for community or business energy activity (OSUE)
12	number of on-farm alternative energy projects completed (OSUE)
13	proportion of participants who indicated they know more about energy as a result of the 'Energize Ohio' program (OSUE)
14	proportion of participants who indicated that they plan to use the materials and / or information from the 'Energize Ohio' program in making decisions related to energy at their home, farm, or business (OSUE)
15	proportion of 'Energize Ohio' participants who indicated that the program provided valuable information that they would recommend to others (OSUE)

## **Outcome #1**

### **1. Outcome Measures**

Programs in this area will develop strategies to engage producers, industrial partners, and consumers groups over a 5-year period resulting in effective leadership-oriented partnerships.

Not Reporting on this Outcome Measure

## **Outcome #2**

### **1. Outcome Measures**

The program will build scientist/stakeholder cores to guide/provide biological, chemical, physical, engineering, and social research necessary to create new and improved processes and products commensurate with demand.

### **2. Associated Institution Types**

- 1862 Research

### **3a. Outcome Type:**

Change in Condition Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	0

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

Millions of Americans, including 8-17 percent of healthcare workers, are allergic to latex. Medical professionals prefer latex gloves because they perform better and offer more protection, but the risk of allergies has made synthetic gloves increasingly common.

#### **What has been done**

To address this problem, OARDC researchers have developed new, patent-pending materials that are safe for both Type I and Type IV latex allergy sufferers. Some of these materials are made from guayule, a U.S. desert shrub that produces high-quality latex that is naturally Type I-hypoallergenic. The scientists also created a new process that gets rid of the residues on latex products that cause Type IV allergy.

#### **Results**

This new, bio-based latex can also be used in other conventional-latex healthcare products including catheters, dental dams, and orthodontic rubber bands. A startup company, EnergEne Inc., headquartered in Wooster, OH, has been established to lead the development and commercialization of products made from these new materials.

Guayule is one of many new bioenergy and bioproduct crops that OARDC is evaluating. The Ohio State University is conducting guayule trials in southern Ohio with the aim of developing new agricultural industries and economic opportunities in the region. In addition to rubber and latex, guayule produces a diesel-like fuel that can be extracted easily and cheaply.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
511	New and Improved Non-Food Products and Processes

##### Outcome #3

###### 1. Outcome Measures

Annually the program will report, in conjunction with industrial partners, non-proprietary research gains made to the consuming public to garner interest in adoption of new products and processes when released.

Not Reporting on this Outcome Measure

##### Outcome #4

###### 1. Outcome Measures

Maintain an ongoing needs assessment program to identify yet to be determined needs of society for bio-based products as crude oil and natural gas supplies decline, as well as assessing impacts from other external factors.

Not Reporting on this Outcome Measure

##### Outcome #5

###### 1. Outcome Measures

By 2018, the program will contribute at least two alternatives to a petroleum-based product or process that meets client needs with an acceptable point of purchase price.

Not Reporting on this Outcome Measure

##### Outcome #6

###### 1. Outcome Measures

Support, through research, the building of biobased development that annually, beginning in 2013, utilizes Ohio and the region's plentiful supply of biomass, including waste steam materials in such manner as to improve the economy.

Not Reporting on this Outcome Measure

**Outcome #7**

**1. Outcome Measures**

Support the building of biobased development that, beginning in 2013, effectively utilizes agriculture's production capacity to produce plants that have the desired attributes for manufacturing.

Not Reporting on this Outcome Measure

**Outcome #8**

**1. Outcome Measures**

Increased understanding of energy alternatives, resources and project support (OSUE)

Not Reporting on this Outcome Measure

**Outcome #9**

**1. Outcome Measures**

Implement change in energy usage by workshop participants (OSUE)

Not Reporting on this Outcome Measure

**Outcome #10**

**1. Outcome Measures**

Complete installation of alternative energy activity (OSUE)

Not Reporting on this Outcome Measure

**Outcome #11**

**1. Outcome Measures**

Complete plan for community or business energy activity (OSUE)

Not Reporting on this Outcome Measure



**Outcome #12**

**1. Outcome Measures**

number of on-farm alternative energy projects completed (OSUE)

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	4

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

It may be possible for ag producers to lower energy costs using new alternative energy-generating technologies. Lowering energy costs via alternative energy-generation sources has environmental and economic benefits.

**What has been done**

Fifteen on-farm alternative energy-generation programs and demonstration days have been conducted involving 600 participants. In addition, to support landowner and community education on renewable energy, the 'Energize Ohio' team has developed a number of new tools in 2014, including 4 new fact sheets, 3 short videos, a technical report, and a journal article.

**Results**

Four farmers have installed solar systems on their farms, generating roughly 118,000 kWh of electricity and offsetting nearly 180,600 pounds of greenhouse gas emissions annually.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
511	New and Improved Non-Food Products and Processes

### **Outcome #13**

#### **1. Outcome Measures**

proportion of participants who indicated they know more about energy as a result of the 'Energize Ohio' program (OSUE)

#### **2. Associated Institution Types**

- 1862 Extension

#### **3a. Outcome Type:**

Change in Knowledge Outcome Measure

#### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	84

#### **3c. Qualitative Outcome or Impact Statement**

##### **Issue (Who cares and Why)**

Energy development in Ohio is important for the future vitality of the state as it influences both economic growth and the general quality of life of Ohioans. In 2012, the average per capita energy expenditures in Ohio was \$4,265, representing roughly 12 percent of Ohioans per capita income. As a result, access to affordable energy directly influences our quality of life.

##### **What has been done**

Sixty-two 'Energize Ohio' programs were conducted involving 1,903 participants from throughout Ohio in 2014. Participants were educated about renewable energy and shale energy issues, including: energy policy, farm energy education, homeowner energy education, and sustainable community planning.

##### **Results**

In a post-program assessment, 84% of 'Energize Ohio' participants indicated that they had learned more about energy as a result of participating in the 'Energize Ohio' workshops. One past participant commented, "OSU Extension is not only giving us guidance, but they've been in touch with other states that have already been through shale development, and they're providing us with that experience and expertise. It's been invaluable."

#### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
511	New and Improved Non-Food Products and Processes
608	Community Resource Planning and Development

## **Outcome #14**

### **1. Outcome Measures**

proportion of participants who indicated that they plan to use the materials and / or information from the 'Energize Ohio' program in making decisions related to energy at their home, farm, or business (OSUE)

### **2. Associated Institution Types**

- 1862 Extension

### **3a. Outcome Type:**

Change in Action Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	68

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

Energy development in Ohio is important for the future vitality of the state as it influences both economic growth and the general quality of life of Ohioans. In 2012 the average per capita energy expenditures in Ohio was \$4,265, representing roughly 12 percent of Ohioans per capita income. As a result, access to affordable energy directly influences our quality of life.

#### **What has been done**

Sixty-two 'Energize Ohio' programs were conducted in 2014, involving 1,903 participants from throughout Ohio covering topics such as shale energy leasing, pipeline easements, on-farm renewable energy, and community-scale renewable energy development.

#### **Results**

68% of participants in 2014 'Energize Ohio' programming indicated on post-program assessments that they planned to use materials and / or information learned in making decisions related to energy at their home, farm or business. Following the program being offered in their county, an OSU Extension educator commented, "Since the program was conducted in September 2014, two of our county's greenhouse growers, who were in attendance, have investigated solar energy development for their own operations, and one of which has already begun installing solar panels just 4 months later."

### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
511	New and Improved Non-Food Products and Processes
608	Community Resource Planning and Development

## **Outcome #15**

### **1. Outcome Measures**

proportion of 'Energize Ohio' participants who indicated that the program provided valuable information that they would recommend to others (OSUE)

### **2. Associated Institution Types**

- 1862 Extension

### **3a. Outcome Type:**

Change in Knowledge Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	82

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

Energy development in Ohio is important for the future vitality of the state as it influences both economic growth and the general quality of life of Ohioans. In 2012 the average per capita energy expenditures in Ohio was \$4,265, representing roughly 12 percent of Ohioans per capita income. As a result, access to affordable energy directly influences our quality of life.

#### **What has been done**

To support landowner education on shale and renewable energy, tools to support educational efforts, such as shale energy fact sheets and 7 Extension workshops, were captured electronically and converted into multimedia programs.

#### **Results**

82% of 2014 'Energize Ohio' program participants indicated via post-program assessments that they found the information received through educational events to be valuable, and would share that information with others. An OSU Extension educator made the following comment after inviting the 'Energize Ohio' team to come speak in her county: "In September, the team was invited to Medina County, Ohio to provide a public on-farm solar program. The team was great to work with and was flexible about having the program in a barn. They brought out the solar display which I feel was a bonus for attendees who may be experiencing solar technology for the first time. I feel the results of this program were significant."

### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
511	New and Improved Non-Food Products and Processes

## **V(H). Planned Program (External Factors)**

### **External factors which affected outcomes**

- Public Policy changes

### **Brief Explanation**

On-farm alternative energy installation is economically feasible under current Ohio policy. Should that policy change, the feasibility may be in question and as such, programming could be affected.

## **V(I). Planned Program (Evaluation Studies)**

### **Evaluation Results**

Post-program evaluations have been used to gauge change in participant knowledge and plans for using new knowledge. Evaluation data suggest participants intend to act on their new knowledge; for example, one-third of participants indicated they would use it directly when speaking with others about their business operations, and 42 percent indicated the information would be useful to them in their occupations in general. Every one of the participants at each of the 'Small Farm College' / 'On-Farm Solar Energy Workshop' programs indicated in post-program evaluations that they gained new knowledge, they would recommend the information learned to others, and would use their new knowledge when making decisions related to renewable energy at their home, farm, or business. Finally, approximately 118,000kWh of electricity has been generated via the installation of four on-farm solar systems in 2014. These systems have offset nearly 180,600 pounds of greenhouse gas emissions last year.

### **Key Items of Evaluation**

OARDC's new hypoallergenic latex made from guayule creates a new bioenergy and bio-product business opportunity. The following feedback is from a raw material supplier:

"Having a steady supply of domestically produced natural latex would open the door for major dipped-goods manufacturers and medical glove producers to re-establish facilities in the U.S. As a raw material supplier, we applaud the work championed by Dr. Cornish and supported by OARDC."

-- Tom Marsh, president, Centrotech Minerals and Metals, Chesapeake, Virginia.

**V(A). Planned Program (Summary)**

**Program # 3**

**1. Name of the Planned Program**

Childhood Obesity

Reporting on this Program

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
702	Requirements and Function of Nutrients and Other Food Components	10%		90%	
703	Nutrition Education and Behavior	60%		5%	
724	Healthy Lifestyle	30%		5%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of FTE/SYs expended this Program**

Year: 2014	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	10.0	0.0	0.6	0.0
<b>Actual Paid</b>	4.0	0.0	0.5	0.0
<b>Actual Volunteer</b>	0.1	0.0	0.0	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
224909	0	83671	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
224909	0	44012	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

Obesity research includes food science, plant sciences, and consumer research related to human health and obesity. Parallel Extension programs that address health and wellness, life styles, and consumer choice are included in this Planned Program as well. Given the complex nature of obesity as a subject, the area is broadly supported in scientific disciplines ranging from genetics for breeding plants and animals that can be processed into healthier food products, to education of school children about eating healthy. Thus, not all impacts relating to obesity, per se, are found in this Planned Program. OARDC and OSU Extension advance programs that ensure nutritious foods are affordable and available, and provide guidance so that individuals and families are able to make informed, science-based decisions about their health and well-being.

**2. Brief description of the target audience**

Related research and Extension information will be derived through new research, extracted from on-going research, or derived from scientific literature. Within the Childhood Obesity Planned Program, such research will be shared with targeted audiences including, but not limited to: specific individuals, families, and groups who have an expressed a need, or where there are latent needs. Additionally, fellow academic units that partner with OARDC and OSU Extension will support not only the research, but also the adoption of the research findings by stakeholders; fellow agencies or support organizations who will not only use the information but will also be brokers of that information, including embedding it into groups to encourage change; populations who have not requested the information but will likely benefit from that information, e.g. obese children; other scientists and scientific groups; political entities; school administrators; students from pre-school to post doctorate studies; news organizations; and business and industrial groups concerned about obesity in their workforce or who are producers of foods and food additives that can help reduce obesity and its side effects.

**3. How was eXtension used?**

eXtension was not used in this program

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	1292	2928	1000	670

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

Year: 2014

Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

<b>2014</b>	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Actual</b>	14	0	0

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- number of educational sessions held

<b>Year</b>	<b>Actual</b>
2014	25

**Output #2**

**Output Measure**

- number of participants attending educational events related to 'Childhood Obesity' that can be defined as under-served (i.e., individuals whose needs have not been addressed in the past)

<b>Year</b>	<b>Actual</b>
2014	797

**Output #3**

**Output Measure**

- number of children being taught the 'Choose It!' curriculum

<b>Year</b>	<b>Actual</b>
2014	288

**Output #4**

**Output Measure**

- number of children being taught the 'Use It!' curriculum

<b>Year</b>	<b>Actual</b>
2014	133



**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	To better understand human decision making; specifically with reference to how individuals make food consumption decisions.
2	Apply new knowledge to programs at the field level with a goal of significant long term weight loss and overall improvement of health in those who participate.
3	To identify research activities such as new data sources, improved techniques for data analysis, and improved hypotheses for obesity research questions.
4	Number of participants who learned new information from this program. (OSUE)
5	Number of participants who plan to increase their level of daily physical activity. (OSUE)
6	number of children who were able to identify an image demonstrating the correct plate method for fruits and vegetables following 'Choose It! Use It!' programming (OSUE)
7	number of children who experienced a knowledge gain related to the amount of food that should be consumed at each meal as a result of 'Choose It! Use It!' programming (OSUE)
8	number of children who indicated they will eat more fruits and vegetables each day as a result of participating in 'Choose It! Use It!' programming (OSUE)
9	number of children who indicated they will share what they learned in the 'Choose It! Use It!' program with their family (OSUE)

**Outcome #1**

**1. Outcome Measures**

To better understand human decision making; specifically with reference to how individuals make food consumption decisions.

Not Reporting on this Outcome Measure

**Outcome #2**

**1. Outcome Measures**

Apply new knowledge to programs at the field level with a goal of significant long term weight loss and overall improvement of health in those who participate.

Not Reporting on this Outcome Measure

**Outcome #3**

**1. Outcome Measures**

To identify research activities such as new data sources, improved techniques for data analysis, and improved hypotheses for obesity research questions.

Not Reporting on this Outcome Measure

**Outcome #4**

**1. Outcome Measures**

Number of participants who learned new information from this program. (OSUE)

Not Reporting on this Outcome Measure

**Outcome #5**

**1. Outcome Measures**

Number of participants who plan to increase their level of daily physical activity. (OSUE)

Not Reporting on this Outcome Measure

## **Outcome #6**

### **1. Outcome Measures**

number of children who were able to identify an image demonstrating the correct plate method for fruits and vegetables following 'Choose It! Use It!' programming (OSUE)

### **2. Associated Institution Types**

- 1862 Extension

### **3a. Outcome Type:**

Change in Knowledge Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	174

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

The rate of childhood obesity has tripled in the last 30 years. Obesity in childhood can result in future heart problems, bone and joint issues, social problems, sleep apnea, and many other adult health issues. Many schools have reduced the number of hours of gym and recess offered to students, which negatively contributes to the obesity issue. OSU Extension programs seek to educate children and their families. We believe that knowledge and understanding of obesity causes, and the subsequent impacts to health are the first step in affecting future quality of life.

#### **What has been done**

The 'Choose It! Use It!' program was offered in 2 counties in 2014. Participants were third graders. The long term goal of this program is for individuals to change their eating habits and become more physically active. Through self-assessment surveys, participants were asked if they learned new information regarding obesity topics presented.

#### **Results**

174 children (63.7%) were able to correctly identify the image that accurately represented the proportion of fruits and vegetables (plate method) that should be consumed. Affecting knowledge gains is the first step towards individuals making true lifestyle changes.

### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
703	Nutrition Education and Behavior

## **Outcome #7**

### **1. Outcome Measures**

number of children who experienced a knowledge gain related to the amount of food that should be consumed at each meal as a result of 'Choose It! Use It!' programming (OSUE)

### **2. Associated Institution Types**

- 1862 Extension

### **3a. Outcome Type:**

Change in Knowledge Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	279

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

The rate of childhood obesity has tripled in the last 30 years. Obesity in childhood can result in future heart problems, bone and joint issues, social problems, sleep apnea, and many other adult health issues. Many schools have reduced the number of hours of gym and recess offered to students, which negatively contributes to the obesity issue. OSU Extension programs seek to educate children and their families. We believe that knowledge and understanding of obesity causes, and the subsequent impacts to health are the first step in affecting future quality of life.

#### **What has been done**

The 'Choose It! Use It!' program was offered in 2 counties in 2014. Participants were third graders. The long term goal of this program is for individuals to change their eating habits and become more physically active. Through self-assessment surveys, participants were asked if they learned new information regarding obesity topics presented.

#### **Results**

279 (96.9%) participants indicated via a post-program self-assessment that they understood the correct amount of food that should be consumed each meal.

### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
703	Nutrition Education and Behavior

**Outcome #8**

**1. Outcome Measures**

number of children who indicated they will eat more fruits and vegetables each day as a result of participating in 'Choose It! Use It!' programming (OSUE)

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	263

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

The rate of childhood obesity has tripled in the last 30 years. Obesity in childhood can result in future heart problems, bone and joint issues, social problems, sleep apnea, and many other adult health issues. Many schools have reduced the number of hours of gym and recess offered to students, which negatively contributes to the obesity issue. OSU Extension programs seek to educate children and their families. We believe that knowledge and understanding of obesity causes, and the subsequent impacts to health are the first step in affecting future quality of life.

**What has been done**

The 'Choose It! Use It!' program was offered in 2 counties in 2014. Participants were third graders. The long term goal of this program is for individuals to change their eating habits and become more physically active. Through self-assessment surveys, participants were asked if they learned new information regarding obesity topics presented.

**Results**

263 (91.6%) participants indicated via a post-program self-assessment that they will eat more fruits and vegetables each day.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle

## **Outcome #9**

### **1. Outcome Measures**

number of children who indicated they will share what they learned in the 'Choose It! Use It!' program with their family (OSUE)

### **2. Associated Institution Types**

- 1862 Extension

### **3a. Outcome Type:**

Change in Knowledge Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	235

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

The rate of childhood obesity has tripled in the last 30 years. Obesity in childhood can result in future heart problems, bone and joint issues, social problems, sleep apnea, and many other adult health issues. Many schools have reduced the number of hours of gym and recess offered to students, which negatively contributes to the obesity issue. OSU Extension programs seek to educate children and their families. We believe that knowledge and understanding of obesity causes, and the subsequent impacts to health are the first step in affecting future quality of life.

#### **What has been done**

The 'Choose It! Use It!' program was offered in 2 counties in 2014. Participants were third graders. The long term goal of this program is for individuals to change their eating habits and become more physically active. Through self-assessment surveys, participants were asked if they learned new information regarding obesity topics presented.

#### **Results**

235 (82.2%) participants indicated via a post-program self-assessment that they would go home and share what they learned in the 'Choose It! Use It!' program with their family. Sharing their knowledge with family members not only helps to raise the awareness of other individuals, but the repetition of information also helps reinforce lessons learned for the participating third graders.

### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
703	Nutrition Education and Behavior
724	Healthy Lifestyle

## **V(H). Planned Program (External Factors)**

### **External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)
- Other (Support in schools for programs )

### **Brief Explanation**

Obesity is a complex topic to address, in that it encompasses a range of variables, including food quality, socio-emotional elements, access to healthy foods, economics, and the decisions of individuals in food choice. Shifts in these variables impact all aspects of people's lives -- psychologically, socially, and physically. Recent research shows that obesity outcomes for individuals are somewhat determined by the time children reach kindergarten. Reaching individuals with education and prevention measures on such a compressed timeline presents challenges to researchers and Extension personnel as they consider new curriculum and delivery methods.

Within this program area, public monies and the fluctuations in appropriations have had a dramatic (both positive and negative) affect on human well-being, as do levels of government support for obesity education. The varying level of importance placed on social science research impacts our ability to compete for limited dollars, and thus impacts the extent to which research can be carried out. Factors such as the availability of base funding to ensure a core faculty and staff, availability of extramural funds, and excessive programmatic demands are affecting outcomes.

## **V(I). Planned Program (Evaluation Studies)**

### **Evaluation Results**

OSU Extension (OSUE) has had a long-standing program addressing obesity. OSUE has seen positive results from the evaluations issued to participants of programming related to Childhood Obesity. The following is an example of the information yielded from assessments done by OSUE. Participants gained knowledge of the following topics: different foods and their benefits, the need for balance of all the food groups, appropriate portion sizes, and the amount of physical activity needed daily. These skills will assist participants in obtaining a balanced diet and engaging in daily physical activity to achieve and maintain a healthy weight.

OSUE is building great capacity to both assess and respond to Childhood Obesity. To make significant progress, key programs include Simple Suppers, the 'Choose It! Use It!'

program, and the Ohio Farm to School program.

Simple Suppers is an interactive, hands-on nutrition education and cooking program for preschool children and their parents. The 10 lesson program includes: nutrition education/activities and discussion; skill building in food preparation/cooking; family meal preparation; group family meal; take-home educational materials; and session evaluation. Preliminary data indicate that Simple Suppers participants enjoy more family meals together at home, with parents indicating greater confidence in providing healthy options and encouraging healthy food choices for their children.

The 'Choose It, Use It' curriculum teaches children about making healthy choices when selecting food to eat, and choosing to get exercise on a regular basis. An assessment given following the program revealed that 91.6% of youth participating indicate that they plan to eat more fruits and vegetables daily. 96.9% (279) of participants learned the correct amount of food that should be eaten on a daily basis.

The Farm to School program was transferred from the Ohio Department of Education to OSU Extension in 2012. The goal of the program is to bring healthy food to school cafeterias, while simultaneously supporting local farmers. Students who are touched by the program gain healthy eating habits that will set the foundation for a healthy lifestyle. In 2014, 26.7% of the 615 Ohio public school districts (1,007 schools) who participated in the USDA Farm to School Census reported participating in Farm to School activities.

The programming associated with the planned program, 'Childhood Obesity,' is offered through the OSUE program area, Family and Consumer Sciences (FCS). FCS is currently in the process of working with the Program Development and Evaluation Unit of OSUE to review, revise and update their assessment tools for all FCS programming. Once assessment / evaluation tool changes are final, key indicators from those assessment tools will be incorporated into the online reporting tool used by The Ohio State University and OSUE. Data mined from the online reporting database in turn provides some of the quantitative and qualitative data used to write the federal report each year. We anticipate seeing benefits from these updates in the next two to three years, as demonstrated by an increase in the number of outputs and outcomes for FCS-related reports (Childhood Obesity, Strengthening Families and Communities, Food Safety).

## **Key Items of Evaluation**



**V(A). Planned Program (Summary)****Program # 4****1. Name of the Planned Program**

Food Safety

 Reporting on this Program**V(B). Program Knowledge Area(s)**

## 1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
502	New and Improved Food Products	0%		15%	
703	Nutrition Education and Behavior	90%		5%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	10%		80%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)**

## 1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	10.0	0.0	0.6	0.0
<b>Actual Paid</b>	4.4	0.0	1.5	0.0
<b>Actual Volunteer</b>	0.6	0.0	0.0	0.0

## 2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
247400	0	225478	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
247400	0	353885	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

**V(D). Planned Program (Activity)**

## 1. Brief description of the Activity

OARDC's food safety research for advancing broad food safety goals will include both basic and applied research. Research will range from microbial studies to packaging. Laboratories, pilot plants, farms, and multiple business sites will all be available throughout state to permit data gathering and to continue long-term experiments. All functional laboratories and sites will be improved over time as program needs warrant.

Parallel OSU Extension food safety programs will be developed based on client demand and food safety standards set by both the industry and regulators. Food safety programs to reduce the incidence of foodborne illness and provide a safer food supply by addressing and eliminating causes will continue to be a primary program goal of OSU Extension and OARDC.

Specific activities of food safety education for consumers will include:

- Conducting food safety education classes
- Conducting ServSafe classes with food establishment managers and employees
- Conducting Safe Food Handling for Occasional Quantity Cooks classes with volunteer food preparers
- Providing research-based information to consumers through various forms of media, phone calls, fact sheets, and web pages

## 2. Brief description of the target audience

Targeted audiences within our food safety programs include, but are not limited to:

- Specific individuals or groups who have expressed a need for food safety research and Extension information that is to be derived through new research, extracted from on-going research, or is derived from scientific literature;
- Fellow academic units that partner with food scientists to create systems and processes needed to support not only the research, but also the adoption of the research findings by stakeholders;
- Fellow agencies or support organizations who will not only use the information but will also be brokers of that information, including embedding it into groups to encourage change;
- Populations who have not requested the information but will likely benefit from that information, e.g. persons who engage in home canning of food;
- Other scientists and scientific groups;
- Political entities;
- Students from pre-school to post-doctorate studies;
- News organizations;
- Businesses and industrial groups;
- Food establishment managers (ServSafe manager training; food service employees ServeSafe training);
- Volunteer food preparers (general population) (OQC);
- General consumers (via both formal or informal education)

## 3. How was eXtension used?

eXtension was not used in this program

## V(E). Planned Program (Outputs)

### 1. Standard output measures

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	9412	37717	0	0

**2. Number of Patent Applications Submitted (Standard Research Output)**  
**Patent Applications Submitted**

Year: 2014  
 Actual: 1

**Patents listed**

Anthocyanin-metallo complexation blue and purple colorants for food application

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2014	Extension	Research	Total
Actual	0	40	0

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Number of educational sessions held

Year	Actual
2014	207

**Output #2**

**Output Measure**

- individual instruction on food safety or preservation through phone calls

Year	Actual
2014	901

**Output #3**

**Output Measure**

- number of home canners (pressure of boiling water) tested

<b>Year</b>	<b>Actual</b>
2014	251

**Output #4**

**Output Measure**

- number of participants attending food preservation educational sessions

<b>Year</b>	<b>Actual</b>
2014	1850

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Contribute to the advancement of knowledge about food packaging technologies, e.g. ultrasonic sealing, controlled environment packaging, to the extent that, annually, the risk of contamination due to packaging is reduced measurably.
2	Expand the knowledge base for contamination detection within packaged foods by developing or refining technologies such as magnetic resonance or infrared spectroscopy that will, within ten years, eliminate the problem.
3	Reduce food borne pathogens in the food supply chain.
4	Number of participants who learned new information from this program. (OSUE)
5	Number of participants who plan to adopt one or more recommended practices. (OSUE)
6	Reduce health risk by releasing at least one major study every five years demonstrating nutritional health benefits, e.g. carotenoids and cataracts, anthocyanins and colon cancer or as a substitute for artificial dyes.
7	number of ServSafe® Level 2 attendees that answered "Agree" or "Strongly Agree" when presented with the statement "I am comfortable talking with coworkers about increasing the safety of food in my establishment."
8	increased knowledge around the topic of safe food handling, as demonstrated by the mean score on post-tests (out of a possible 10) compared to pre-tests for attendees of the 'Occasional Quantity Cooks' program.

**Outcome #1**

**1. Outcome Measures**

Contribute to the advancement of knowledge about food packaging technologies, e.g. ultrasonic sealing, controlled environment packaging, to the extent that, annually, the risk of contamination due to packaging is reduced measurably.

Not Reporting on this Outcome Measure

**Outcome #2**

**1. Outcome Measures**

Expand the knowledge base for contamination detection within packaged foods by developing or refining technologies such as magnetic resonance or infrared spectroscopy that will, within ten years, eliminate the problem.

Not Reporting on this Outcome Measure

**Outcome #3**

**1. Outcome Measures**

Reduce food borne pathogens in the food supply chain.

Not Reporting on this Outcome Measure

**Outcome #4**

**1. Outcome Measures**

Number of participants who learned new information from this program. (OSUE)

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	5669

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

All adult consumers in Ohio handle food that has the potential of making them ill. Foodborne illnesses cause between \$1 billion and \$7.2 billion in health care costs, affect quality of life, and decrease work productivity. With potential impacts such as the ones detailed above, the need for food safety education is evident.

**What has been done**

OSU Extension offers several curricula that focus on food safety education. ServSafe® is a nationally recognized food safety training and certification program established by the National Restaurant Association. The ServSafe® food safety program is recognized by more jurisdictions than any other food safety program. Home food preservation sessions are offered, teaching the basics of home canning and preservation through demonstrations and workshops. The science behind preservation is emphasized, so that all participants understand why certain procedures must be followed to ensure a high-quality, safe product. Additionally, the program Occasional Quantity Cooks is offered to individuals and groups preparing large meals on an infrequent basis. All OSUE staff and volunteers complete a Safe Food Handling class.

**Results**

Of a total of 9412 individuals participating in Food Safety-related programming, 5669 (60.2%) class participants reported on end-of-program evaluations that they learned recommended safe food handling skills.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
703	Nutrition Education and Behavior
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

**Outcome #5**

**1. Outcome Measures**

Number of participants who plan to adopt one or more recommended practices. (OSUE)

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	4847

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

All adult consumers in Ohio handle food that has the potential of making them ill. Foodborne illnesses cause between \$1 billion and \$7.2 billion in health care costs, affect quality of life, and decrease work productivity. With potential impacts such as the ones detailed above, the need for food safety education is evident.

#### What has been done

OSU Extension offers several curricula that focus on food safety education. ServSafe® is a nationally recognized food safety training and certification program established by the National Restaurant Association. The ServSafe® food safety program is recognized by more jurisdictions than any other food safety program. Home food preservation sessions are offered, teaching the basics of home canning and preservation through demonstrations and workshops. The science behind preservation is emphasized, so that all participants understand why certain procedures must be followed to ensure a high-quality, safe product. Additionally, the program Occasional Quantity Cooks is offered to individuals and groups preparing large meals on an infrequent basis. All OSUE staff and volunteers complete a Safe Food Handling class.

#### Results

4847 participants reported on end-of-program evaluations that they intended to adopt one or more of the recommended safe food handling practices. Practices include: keeping foods at the correct temperature for the correct amount of time, safe canning methods, preventing cross-contamination, and cleaning and sanitizing methods.

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

#### Outcome #6

##### 1. Outcome Measures

Reduce health risk by releasing at least one major study every five years demonstrating nutritional health benefits, e.g. carotenoids and cataracts, anthocyanins and colon cancer or as a substitute for artificial dyes.

##### 2. Associated Institution Types

- 1862 Research

##### 3a. Outcome Type:

Change in Condition Outcome Measure



### 3b. Quantitative Outcome

Year	Actual
2014	0

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

Anthocyanins are powerful antioxidants that give color to most red, orange, purple and blue fruits and vegetables. These antioxidants are hot commodities because of their potential as cancer-fighters and natural food dyes. Food processors have several options for natural red dyes, but with blues, the alternatives are limited. In nature, anthocyanins produce a wide range of colors: orange, red, purple, violet, and different shades of purple and blue, even some black colors.

#### What has been done

Until recently, anthocyanins have been difficult and expensive to isolate into pure forms. OARDC food scientists have developed and patented a new, economical technique to extract the pigments, achieving highly purified anthocyanin blends.

#### Results

This unique process slashes the cost of producing anthocyanins 10- to 20-fold and will be commercialized by a new startup company, Anthocyantific LLC. The new products' availability and low cost will galvanize new research into the pigments.

In addition, because of OARDC's research, Ohio State University and MARS Chocolate North America, producer of candies including M&Ms, have submitted three patent applications for anthocyanin-based blue colorants.

OARDC's innovative research comes on the heels of an announcement by Kraft Foods, which revealed it would be replacing artificial dyes with natural ones in its macaroni-and-cheese products marketed to children. The issue is gaining more attention both by consumers and by the scientific community. The availability of food coloring through a natural product, anthocyanins, provides the food processing industry with an innovative product to meet consumers demands to eliminate unnatural dyes in foods.

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
502	New and Improved Food Products

#### Outcome #7

##### 1. Outcome Measures

number of ServSafe® Level 2 attendees that answered "Agree" or "Strongly Agree" when presented with the statement "I am comfortable talking with coworkers about increasing the safety of food in my establishment."

## 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Action Outcome Measure

### 3b. Quantitative Outcome

Year	Actual
2014	210

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

Building a culture of safe food handling practices in restaurants is important for the overall reduction in foodborne illnesses. All employees of an establishment that serves food should be demonstrating sound techniques in this area.

#### What has been done

ServSafe® classes not only educate food industry employees but encourage them to take what they have learned back to their place of employment. ServSafe® Level 2 classes are designed for managers. In the courses, managers learn to implement essential food safety practices and create a culture of food safety. All content and materials taught are based on actual job tasks identified by food service industry experts.

#### Results

210 (93.2%) respondents on the ServSafe® Level 2 post-test answered "Agree" or "Strongly Agree" when presented with the statement, "I am comfortable talking with coworkers about increasing the safety of food in my establishment." This was compared to only 39.3% on the pre-test.

## 4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

### Outcome #8

#### 1. Outcome Measures

increased knowledge around the topic of safe food handling, as demonstrated by the mean score on post-tests (out of a possible 10) compared to pre-tests for attendees of the 'Occasional Quantity Cooks' program.

## 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

Year	Actual
2014	9

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

The production of meals for large numbers of people is a regular occurrence for churches, clubs, and other organizations. Individuals who volunteer for food preparation at these events often lack basic knowledge of safe food handling practices, creating an environment which may contribute to foodborne illness.

#### What has been done

The 'Occasional Quantity Cooks' program was developed to teach volunteer food service workers. The curriculum addresses practices and responsibilities of food service workers, using a critical thinking approach, and HACCP. Topics include planning and purchasing; storing food supplies; preparing food; transporting, storing, and serving cooked food; and handling leftovers.

#### Results

Participants in the 'Occasional Quantity Cooks' program take a pre-test and post-test survey containing 10 items that test knowledge around safe food handling practices. Before the program, the mean score was 8.2 among participants, while the mean score after the program / on the post-test was 9.7 (quantitative value would not allow for a decimal. 9.7 is the correct value for a quantitative outcome).

## 4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

## **V(H). Planned Program (External Factors)**

### **External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)
- Other (National Security Threats )

### **Brief Explanation**

Food safety is impacted by all sectors of agbioscience: physical, chemical, biological, social, economic, and environmental. Climatic extremes, for example, impact food safety to the extent that they impact supply or foster growth and dispersion of pests and pathogens. Climatic extremes that are now occurring throughout the world impact the quantity and quality of food supplied as well as the timely distribution of food before contamination is an issue.

Economic shifts, such as the cost of processing equipment or production costs, public policy shifts, regulations, and shifts in demand will impact outcomes. Food trends/ fads, food advertising agendas, new biological and chemical threats, and public nutritional health-related issues are also external factors that affect outcomes. All of these place greater demands on the land grant system.

Factors such as the availability of base funding to ensure a core faculty and staff, availability of extramural funds, and programmatic demands that far exceed resources, are affecting outcomes.

## **V(I). Planned Program (Evaluation Studies)**

### **Evaluation Results**

For OSUE programming in the area of food safety, all programmatic efforts are directed at reducing the incidence of foodborne illnesses by teaching safe food handling, preparation, storage, and freezing methods. The following evaluation results show proof of strong educational gains by participants of OSUE Food Safety programming efforts.

The following evaluation results are based on a retrospective evaluation tool, administered by OSU Extension professionals, given at the end of home food preservation workshops. Participants reported to "Always" do the following Extension-recommended behaviors when preserving food at home:

- 67.1% will acidify tomatoes with lemon juice or citric acid (up from 16.3% on the pre-test)
- 71.8% will use a boiling water bath canner to process high acid foods (up from 33.1% on the pre-test)
- 65.9% will use a pressure canner to process low-acid foods (up from 22.1% on the

pre-test)

- 82.9% will use the correct headspace after filling the jars (up from 34.6% on the pre-test)
- 83.5% will prepare bands, lids, and jars according to guidelines (up from 46.2% on the pre-test)
- 78.1% will use current OSU Extension and USDA canning and freezing recommendations (up from 16.5% on the pre-test)
- 71.8% will blanch vegetables before freezing (up from 36.1% on the pre-test)
- 91.6% will wash their hands with soap and warm running water for at least 20 seconds before working with foods (up from 67.8% on the pre-test)

### **Key Items of Evaluation**

OARDC's unique, patented process will help jump-start development of natural food dyes with cancer-fighting antioxidants.

"[OARDC researcher] Monica Giusti's work is both cost-effective and innovative -- a powerful combination that's attractive to industry partners. Companies are working with Ohio State not only to fund her research but to commercialize it as well."

-- Melissa Kelly, licensing manager, The Ohio State University Technology Commercialization Office.

**V(A). Planned Program (Summary)**

**Program # 5**

**1. Name of the Planned Program**

Global Food Security and Hunger

Reporting on this Program

**V(B). Program Knowledge Area(s)**

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
501	New and Improved Food Processing Technologies	0%		20%	
502	New and Improved Food Products	10%		0%	
503	Quality Maintenance in Storing and Marketing Food Products	15%		10%	
607	Consumer Economics	15%		0%	
701	Nutrient Composition of Food	10%		10%	
702	Requirements and Function of Nutrients and Other Food Components	5%		15%	
703	Nutrition Education and Behavior	10%		5%	
704	Nutrition and Hunger in the Population	5%		15%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	15%		10%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	15%		15%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)**

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	18.0	0.0	5.9	0.0
<b>Actual Paid</b>	10.5	0.0	4.1	0.0
<b>Actual Volunteer</b>	2.7	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
590387	0	654908	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
590387	0	798730	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

### V(D). Planned Program (Activity)

#### 1. Brief description of the Activity

This Planned Program advances broad global food security goals and includes both basic and applied research, and associated outreach and Extension programs. Research foci include microbial studies, packaging, food taste tests, new production techniques, and consumer preferences and behavior. Laboratories, pilot plants, farms, and multiple sites are available throughout state to permit data gathering and to continue longer-term experiments. All functional laboratories and sites are improved over time as program need warrants. Extension has the capacity to advance knowledge acquisition, promote adoption strategies, and help build human capital to promote global food security and reduce hunger worldwide. OARDC and OSU Extension faculty and staff engage in outreach, engagement, and consultation, with both internal and external stakeholders, across Ohio and nationally.

#### 2. Brief description of the target audience

Targeted audiences for global food security research and Extension include, but are not limited to:

- Specific individuals or groups who have expressed a need for food-related information that is to be derived through new research, extracted from on-going research, or is derived from scientific literature;
- Fellow academic units that partner with food scientists to create systems and processes needed to support not only the research, but also the adoption of the research findings by stakeholders;
- Fellow agencies or support organizations who will not only use the information but will also be brokers of that information, including embedding it into groups to encourage change;
- Populations who have not requested the information but will likely benefit from that information, e.g. persons who engage in home canning of food;
- Other scientists and scientific groups;
- Political entities;
- Other Extension personnel;
- Students from pre-school to post doctorate studies;
- News organizations;
- Business and industrial groups.

#### 3. How was eXtension used?

eXtension was not used in this program

### V(E). Planned Program (Outputs)

**1. Standard output measures**

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	47637	48225	14744	525

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

Year: 2014

Actual: 1

**Patents listed**

Cheese Foods and Related Materials and Methods

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2014	Extension	Research	Total
<b>Actual</b>	21	44	0

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Number of participants attending educational programs of one teaching hour or more.

Year	Actual
2014	47637

**Output #2**

**Output Measure**

- Total number of workshops offered to producers and agri-business leaders (OSUE)

Year	Actual
2014	361



**Output #3**

**Output Measure**

- total number of participants in events related to 'Global Food Security and Hunger' (OSUE)  
Not reporting on this Output for this Annual Report

**Output #4**

**Output Measure**

- total number of volunteers participating in the planning and implementation of this event (committee members, teachers / trainers, unpaid staff, etc) (OSUE)

<b>Year</b>	<b>Actual</b>
2014	1409

**Output #5**

**Output Measure**

- number of community gardens associated with local and community food systems programming and demonstrations (OSUE)

<b>Year</b>	<b>Actual</b>
2014	14

**Output #6**

**Output Measure**

- number of participants in community gardening efforts associated with local and community food systems programming and demonstrations (OSUE)

<b>Year</b>	<b>Actual</b>
2014	10626

**Output #7**

**Output Measure**

- number of volunteer hours associated with community gardens and local community food systems programming

<b>Year</b>	<b>Actual</b>
2014	2278

**Output #8**

**Output Measure**

- percentage of total program participants that are considered to be under-represented (OSUE)

<b>Year</b>	<b>Actual</b>
2014	23

**Output #9**

**Output Measure**

- percentage of total program participants that are considered to be under-served (OSUE)

<b>Year</b>	<b>Actual</b>
2014	10

**Output #10**

**Output Measure**

- number of participants in educational events for Farm Bill insurance programs (OSUE)

<b>Year</b>	<b>Actual</b>
2014	5363

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Advance processing techniques, e.g. electrostatic coating, to achieve the desired traits requested by industrial partners, that are manifested in consumer demand studies, or that are novel technologies that may meet latent needs.
2	Participate in the creation of a standardized model and protocols for studying functional foods for the purpose of providing consumers with more informed functional choices that are currently available
3	Expand utilization of products with known functionality or nutraceutical value and give consumers greater informed consumer choice, including the bioavailability of the desire substance in the food, than they presently have.
4	Reduce health risk by releasing at least one major study every five years.
5	Processing technology research will improve and optimize equipment and processing of food in such manner as meet consumer demand as or before that demand emerges.
6	Reduce through research and development the negative processing impacts on physio-chemical or molecular properties of food within varying parameters to make foods more acceptable and higher quality commensurate with demand.
7	Advance and document improvements in quality and quantity of food stocks to meet global food security and hunger goals.
8	Ohio Market Maker results will indicate food preferences and number of farmers/retailers networks established (measured in number of networks established) (OSUE)
9	Establishment of a number of local/regional food systems
10	number of schools purchasing Ohio produced food as part of the Ohio Farm to School program (OSUE)
11	improvement in economic and social conditions, as indicated by the number of dollars in direct farm sales (OSUE)
12	number of producers becoming certified following 'Fertilizer Applicator Certification' training (OSUE)
13	number of participants in plant and animal systems management programs that implement new activities on their farm (OSUE)

**Outcome #1**

**1. Outcome Measures**

Advance processing techniques, e.g. electrostatic coating, to achieve the desired traits requested by industrial partners, that are manifested in consumer demand studies, or that are novel technologies that may meet latent needs.

Not Reporting on this Outcome Measure

**Outcome #2**

**1. Outcome Measures**

Participate in the creation of a standardized model and protocols for studying functional foods for the purpose of providing consumers with more informed functional choices that are currently available

Not Reporting on this Outcome Measure

**Outcome #3**

**1. Outcome Measures**

Expand utilization of products with known functionality or nutraceutical value and give consumers greater informed consumer choice, including the bioavailability of the desire substance in the food, than they presently have.

Not Reporting on this Outcome Measure

**Outcome #4**

**1. Outcome Measures**

Reduce health risk by releasing at least one major study every five years.

Not Reporting on this Outcome Measure

**Outcome #5**

**1. Outcome Measures**

Processing technology research will improve and optimize equipment and processing of food in such manner as meet consumer demand as or before that demand emerges.

Not Reporting on this Outcome Measure

## **Outcome #6**

### **1. Outcome Measures**

Reduce through research and development the negative processing impacts on physio-chemical or molecular properties of food within varying parameters to make foods more acceptable and higher quality commensurate with demand.

Not Reporting on this Outcome Measure

## **Outcome #7**

### **1. Outcome Measures**

Advance and document improvements in quality and quantity of food stocks to meet global food security and hunger goals.

### **2. Associated Institution Types**

- 1862 Research

### **3a. Outcome Type:**

Change in Condition Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	0

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

In areas of the world where poverty and malnutrition are palpable, efforts to address food insecurity are matters of life and death. However, In addition to helping food producers in those nations boost production today, it's just as vital to strengthen their institutional capabilities to address the challenge for generations to come.

So say the leaders of Ohio State University's Innovative Agricultural Research Initiative, or iAGRI. Now about halfway through its \$25.5 million, six-year grant, the project in the East African nation of Tanzania is becoming a prototype for strengthening the capacity of agricultural universities to improve African food security for the long term.

#### **What has been done**

Through the Innovative Agricultural Research Initiative (iAGRI), led by Ohio State University's Office of International Programs in Agriculture, a total of 128 Tanzanian graduate students are receiving advanced agricultural training at universities in the United States, Africa and India to build a new generation of Tanzanian agricultural scholars, and as part of an extensive effort to provide long-term food security in the East African nation.

The initiative is part of the U.S. government's primary global hunger and food security program, Feed the Future, and is supported by the U.S. Agency for International Development.

In addition to the research that graduate students are conducting, iAGRI is sponsoring major projects in which scientists in Tanzania, from both Sokoine University and the Ministry of Agriculture, collaborate with faculty from one of the six U.S. partner universities. Projects focus on food security needs identified at the project's outset and include research on crops, water, gender issues, climate change, nutrition and agricultural policy.

### **Results**

The project has 128 graduate students (108 master's degree and 20 doctoral students) enrolled in the program, and has already significantly impacted the lives of Tanzanian agricultural students. More than half of the program's participants have spent a year on a full scholarship at Ohio State or one of the initiative's five partner universities in the U.S. The other half have studied at Sokoine University of Agriculture in Tanzania, Punjab Agricultural University in India, or at other participating universities in East and Southern Africa.

Advanced academic training is vital to address the long-term food security needs of the country. For instance, more than half the faculty in Sokoine University's soil science department are at retirement age, and the iAGRI project is providing the training necessary for junior faculty to replace them.

At Sokoine University, only 19 percent of the faculty and 27 percent of the undergraduate student body are women. But in Tanzania, it's women who primarily are responsible for not only food preparation, but providing farm labor as well. With more than 80 percent of the Tanzanian agricultural sector comprised of women, iAGRI actively recruits female participants, seeking to promote women in the growth of the agricultural industry in the country. The iAGRI program has formulated a gender development plan and a gender policy implementation committee in its dedication to this task.

In iAGRI, "there is a real focus on educating women to be change-makers in the agricultural sector in Tanzania," says Privta Chwindo, a doctoral student at The Ohio State University. "In my country, they say that if you help a woman, you help the entire country."

## **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
704	Nutrition and Hunger in the Population

## **Outcome #8**

### **1. Outcome Measures**

Ohio Market Maker results will indicate food preferences and number of farmers/retailers networks established (measured in number of networks established) (OSUE)

Not Reporting on this Outcome Measure

## **Outcome #9**

### **1. Outcome Measures**

Establishment of a number of local/regional food systems

### **2. Associated Institution Types**

- 1862 Extension

### **3a. Outcome Type:**

Change in Condition Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	10

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

Fresh fruits and vegetables are an important part of any diet. Many urban areas are lacking access to a steady source of fresh produce. Aside from providing a steady source of fresh produce, community gardens have the additional benefits of spurring economic development and a sense of community well-being.

#### **What has been done**

OSU Extension combined its expertise in urban agriculture production and cultivation techniques, with the resources of city and county governments, non-governmental organizations, and community groups to establish 10 new community gardens in cities across Ohio.

#### **Results**

10 Ohio communities are now seasonally enjoying fresh produce. Community awareness of food gardens around the new garden sites has increased. Food availability in the 10 communities has increased, and set the stage for further growth of this program in coming years.

### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
607	Consumer Economics
704	Nutrition and Hunger in the Population

## **Outcome #10**

### **1. Outcome Measures**

number of schools purchasing Ohio produced food as part of the Ohio Farm to School program (OSUE)

### **2. Associated Institution Types**

- 1862 Extension

### **3a. Outcome Type:**

Change in Action Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	1007

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

The basic mission of 'Farm to School' is to increase the supply of fresh, local, nutritious foods in schools around the state. With that mission comes much broader goals that involve developing more informed food decision-making among students, supporting and connecting with local farmers, developing community ties, and reinvesting in local economies. 'Farm to School' initiatives are gaining momentum in light of two recent phenomena - rising obesity, in particular among youth, and the declining family farm.

#### **What has been done**

OSU Extension provides leadership for the statewide 'Farm to School' program. 'Farm to School' provides youth, pre-K through college, with access to nutritious meals, while supporting local farmers and communities. This program provides children with fresh, local foods, and helps them understand where their food comes from and how food choices affect their health, environment and community. The Ohio Farm to School program is part of a national network and involves many local, state and regional partners, advisors and projects. OSUE and their partners provide guidance and help make connections that result in healthy young people, healthy economies, and healthy communities.

#### **Results**

The 'Farm to School' initiative in Ohio has grown to 1,007 schools participating. This number is up from 2013, when there were 833 participating schools. This represents a 21% increase in participation.

### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
607	Consumer Economics



- 703 Nutrition Education and Behavior
- 711 Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources

**Outcome #11**

**1. Outcome Measures**

improvement in economic and social conditions, as indicated by the number of dollars in direct farm sales (OSUE)

Not Reporting on this Outcome Measure

**Outcome #12**

**1. Outcome Measures**

number of producers becoming certified following 'Fertilizer Applicator Certification' training (OSUE)

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	2800

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

This training is being conducted in accordance with Ohio Senate Bill 150. This program has a target audience of all producers who apply fertilizer to 50 or more acres. The ultimate goal of the program is to reduce the amount of phosphorus and other nutrient runoff in groundwater and freshwater bodies, thus reducing harmful algal blooms in water bodies across Ohio. Legislators, farmers, and all citizens of Ohio have a vested interest in water quality.

**What has been done**

In conjunction with the Ohio Department of Agriculture, Extension specialists and county educators have developed a curriculum for fertilizer certification, which includes information about selecting appropriate fertilizers, rates of application, correct timing of application, and correct placement of application. In 2014, this curriculum was taught in 15 educational programs. This is the initial series of meetings on this topic, and will continue for several years to come. All certifications will be valid for 3 years, at which point the applicator will need to be recertified by OSUE.

## Results

Nearly 80 programs have been conducted with over 2800 applicators becoming certified.

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources

### Outcome #13

#### 1. Outcome Measures

number of participants in plant and animal systems management programs that implement new activities on their farm (OSUE)

#### 2. Associated Institution Types

- 1862 Extension

#### 3a. Outcome Type:

Change in Action Outcome Measure

#### 3b. Quantitative Outcome

Year	Actual
2014	2486

#### 3c. Qualitative Outcome or Impact Statement

##### **Issue (Who cares and Why)**

Adapting to changes in prices, management activities, and regulations are essential for any small business to remain viable. The importance is even greater for farms, as they need to ensure a secure and sustainable food supply, which in turn benefits consumers (general public). Regular participation in educational sessions helps farmers to obtain the knowledge that will allow them to implement the newest technology and methods to maximize their production safely and efficiently.

##### **What has been done**

New management techniques and procedures for plant and animal systems are taught to producers through a number of direct educational programs, including the Farm Science Review, Conservation Tillage Conference, agronomy field days, and other events. Some of the topics introduced include: soil and water quality, nutrient management, no-till systems, cover crops, managing apiaries, manure management, sessions on a variety of livestock species, and veterinary-related topics. Indirectly, these new techniques are also taught through OSU Extension-produced newsletters, fact sheets and other publications, radio broadcasts, and other electronic media.

## Results

361 direct educational programs were conducted for 18,553 individuals. Of those participants in educational programming, 13.4% (2,486 people) plan on adopting or conducting a new management activity on their farm as a result of information received at an educational OSUE event.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
607	Consumer Economics
701	Nutrient Composition of Food
704	Nutrition and Hunger in the Population
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

#### V(H). Planned Program (External Factors)

##### External factors which affected outcomes

- Public Policy changes

##### Brief Explanation

The passage of Senate Bill 150 has and will continue to affect the way farmers apply fertilizer. To ensure farmers are in compliance with the law, OSUE has diverted some programming resources to develop new course offerings in the area of fertilizer management, customized to addressing the parameters and requirements of Senate Bill 150.

#### V(I). Planned Program (Evaluation Studies)

##### Evaluation Results

As indicated in the 'brief description of activity' section of this planned program, OSU Extension has the capacity to advance knowledge acquisition, promote adoption strategies, and help build human capital to promote global food security and reduce hunger. Extension has hosted a variety of large-scale events, targeting producers and consumers, which address food quality, and increasing yields.

The Conservation Tillage Conference (CTC) is an annual 2-day educational program with over 60 speakers in concurrent sessions. Sessions typically address topics such as: production of corn and soybeans, cover crops, nutrient management, soil and water quality, and no-till systems.

Farm Science Review (FSR) is another annual event hosted by Ohio State University Extension on 80 acres at the Molly Caren Agricultural Center near London, Ohio. An additional 600 acres of land are dedicated to field demonstrations, such as corn and soybean combines, tillage, nutrient and lime applications, and drainage installations. Each year, FSR attracts roughly 140,000 visitors from all over the United States and Canada, who come for three days to view 4,000 product lines from 600 commercial exhibitors, as well as

learn the latest in agricultural production. Educational programs are provided by Ohio State University and Purdue University specialists.

The CTC and FSR are both large-scale events, but Extension thinks smaller-scale as well. Whether helping communities develop gardens which can provide hundreds of pounds of fresh produce to areas that formerly did not have the means or access to such nutritious options, or by recruiting more schools and school districts to join in the Farm to School movement, Extension is attempting to provide Ohio citizens with access to high quality food, grown locally and sustainably. OSU Extension reached 47,637 individuals last year through a variety of educational programs.

As detailed in the outputs and outcomes section of this planned program, Extension has helped to grow Ohio's capacity for better production methods has linked Ohio citizens to the resources necessary to partner with local farms, grow their own produce, and make sustainable choices.

### **Key Items of Evaluation**

**V(A). Planned Program (Summary)**

**Program # 6**

**1. Name of the Planned Program**

Soil, Air and Water (OARDC Led)

Reporting on this Program

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
101	Appraisal of Soil Resources	0%		10%	
102	Soil, Plant, Water, Nutrient Relationships	0%		25%	
103	Management of Saline and Sodic Soils and Salinity	0%		5%	
104	Protect Soil from Harmful Effects of Natural Elements	0%		10%	
111	Conservation and Efficient Use of Water	0%		15%	
112	Watershed Protection and Management	0%		10%	
132	Weather and Climate	0%		5%	
133	Pollution Prevention and Mitigation	0%		10%	
141	Air Resource Protection and Management	0%		10%	
	<b>Total</b>	0%		100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of FTE/SYs expended this Program**

Year: 2014	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	0.0	0.0	4.5	0.0
<b>Actual Paid</b>	0.0	0.0	3.8	0.0
<b>Actual Volunteer</b>	0.0	0.0	0.0	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	571679	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	458715	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

### V(D). Planned Program (Activity)

#### 1. Brief description of the Activity

On-going OARDC research activities include both basic and applied agbioscience. Both laboratory and multiple field sites/research stations are available throughout state to permit data gathering and to continue long-term experiments, such as no-till plots. On-farm research takes place, as do national and international studies, as is evidenced by programs such as OARDC's carbon sequestration program. All functional laboratories and sites will continue to be improved over time as program need and resources available warrants. OARDC faculty and staff engage in appropriate levels of outreach, engagement, and consultation, with both internal stakeholders such as fellow Extension personnel and with external stakeholders.

#### 2. Brief description of the target audience

OARDC's targeted audiences for this Planned Program include, but are not limited to:

- Specific individuals or groups who have expressed a need for certain information that is to be derived through new research, extracted from on-going research, or is derived from scientific literature. Often those requests are communicated to OARDC by an intermediary such as a staffer at Ohio Dept. of Natural Resources or a county Extension agent;
- Fellow agencies or support organizations that will not only use the information but will also be brokers of that information, including embedding it into groups to encourage change;
- Populations who have not requested the information but will likely benefit from that information, e.g. immigrant populations;
- Other scientists and scientific groups;
- Political entities;
- Extension personnel;
- Students from pre-school to post doctorate studies;
- News organizations;
- Business groups such as chambers of commerce and community coalitions.

#### 3. How was eXtension used?

eXtension was not used in this program

### V(E). Planned Program (Outputs)

#### 1. Standard output measures

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

Year: 2014

Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2014	Extension	Research	Total
Actual	0	26	0

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Number of graduate students completed  
Not reporting on this Output for this Annual Report

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Continue to advance soil, water, nutrient, and plant research to, among other outcomes, ensure Ohio continues to be one of the top five states in corn and soybean production and has knowledge to support growing niche market agriculture, organic farming, and biobased products.
2	Provide the necessary research finding (scientific knowledge and techniques) to support stakeholder compliance with Ohio and federal EPA regulations, and future regulations, regarding odors and other air quality issues in ag production and processing.
3	Expand watershed and ecosystem level modeling to the extent that scientific data and watershed management protocols can bring all streams effected by agriculture and natural resource runoff into compliance with Ohio EPA standards.
4	Through the provisioning of watershed specific data, support the creation of and conservation action of community-based watershed networks in each major watershed in Ohio.
5	Advance the basic knowledge contribution so that Ohio continues to be viewed as a center of excellence in terms of soils and water sciences, and associated extension programming.
6	Provide the necessary soil, air, weather/climate, and water research, in conjunction with actions in other planned programs KA (e.g. IPM), to permit continued adoption of conservation tillage practices in the face of problems such as climatic changes, pest, etc.



**Outcome #1**

**1. Outcome Measures**

Continue to advance soil, water, nutrient, and plant research to, among other outcomes, ensure Ohio continues to be one of the top five states in corn and soybean production and has knowledge to support growing niche market agriculture, organic farming, and biobased products.

Not Reporting on this Outcome Measure

**Outcome #2**

**1. Outcome Measures**

Provide the necessary research finding (scientific knowledge and techniques) to support stakeholder compliance with Ohio and federal EPA regulations, and future regulations, regarding odors and other air quality issues in ag production and processing.

Not Reporting on this Outcome Measure

**Outcome #3**

**1. Outcome Measures**

Expand watershed and ecosystem level modeling to the extent that scientific data and watershed management protocols can bring all streams effected by agriculture and natural resource runoff into compliance with Ohio EPA standards.

Not Reporting on this Outcome Measure

**Outcome #4**

**1. Outcome Measures**

Through the provisioning of watershed specific data, support the creation of and conservation action of community-based watershed networks in each major watershed in Ohio.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	0

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

There is a growing trend toward removing dams to restore rivers, but studies documenting the ecological responses and the resulting benefits are limited.

#### What has been done

To fill this gap, OARDC scientists are studying the impacts of dam removals at two former dams in Columbus: one on the Olentangy River on The Ohio State University's Columbus campus, and another in proximity to OSU on the Scioto River. The researchers are documenting the exact physical changes seen at the sites, especially in terms of channel shape, water flow, and features like pools and riffles. Then they are trying to show the changes' effects on fish, birds, insects and other biological species within the river and the surrounding environment. They are also looking at changes in river ecosystem processes, such as sediment transport, contaminant buildup, and the flow of energy and carbon in food webs between creatures in the water and on land. The findings should improve future dam removals, especially in similar urbanized areas, by giving a clearer idea of what to expect.

#### Results

Current results indicate removal of dams has a definite impact on water flow. Researchers are already seeing differences in water quality, and beginning to determine what that means for the water itself and the surrounding landscape. They have also found that benefits to removing dams include improved water flow, which eliminates the buildup of sediments full of accumulated toxins-including health threats such as polychlorinated biphenyls (PCBs). These sites offer the potential to become long-term comparative study sites for river ecology and natural resource management of water systems.

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management

#### Outcome #5

##### 1. Outcome Measures

Advance the basic knowledge contribution so that Ohio continues to be viewed as a center of excellence in terms of soils and water sciences, and associated extension programming.

Not Reporting on this Outcome Measure

#### Outcome #6

##### 1. Outcome Measures

Provide the necessary soil, air, weather/climate, and water research, in conjunction with actions in other planned programs KA (e.g. IPM), to permit continued adoption of conservation tillage practices in the face of problems such as climatic changes, pest, etc.

Not Reporting on this Outcome Measure

#### **V(H). Planned Program (External Factors)**

##### **External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)
- Other (extramural funding)

##### **Brief Explanation**

Climatic extremes, coupled with pest and diseases that are often climate related, can impact soil-related outcomes. As the soil-dependent food, fiber, and environmental economies adjust to the global marketplace, in conjunction with public policy shifts, regulations, and shifts in demand, outcomes are being impacted. Worldwide the availability of productive soils is a limiting factor. Also, the availability of base funding to ensure a core faculty and staff, availability of extramural funds, and programmatic demands that exceed available personnel and resources are affecting outcomes.

#### **V(I). Planned Program (Evaluation Studies)**

##### **Evaluation Results**

For 2014, CFAES-OARDC has conducted no formal studies regarding evaluation of our research program. Surrogate evaluation metrics--inclusive but not limited to--that are considered indicators of research success are:

- Research contracts and awards received/ongoing/completed (\$166 million plus in active projects during 2014);
- Number of referred publications reported elsewhere in this report;
- Number of business, industries and groups engaged in CFAES's research programs;
- Number of patents received;
- Economic impact of this college's research program as reported elsewhere in this report;
- The level of base funding from USDA-NIFA and the State of Ohio in 2014;
- Impacts submitted in this report, and the continued robustness of CFAES' research program throughout 2014, both in terms of breadth of programs and depth of new knowledge generated and applied.

The research reported herein is also supported by an informal yet effective formative evaluation. Very little research is conducted at OARDC without early engagement of business, industry, commodity groups, special interest or community groups, or other

interested parties given these are the individuals who have the need for and will be the adopters of our research output/impacts. Even in the case of very theoretical research, fellow researchers in industry, government, and academic institutions are consulted (formative evaluation/needs assessment) in the formulation of studies.

### **Key Items of Evaluation**

Ohio has removed 60-plus dams in the past four decades, in large part to improve water quality. The improved water flow from dam removal keeps sediment from building up. Dam sediment can be full of accumulated toxins, including health threats such as polychlorinated biphenyls (PCBs). The following feedback is from a partner at the Ohio Department of Natural Resources Division of Wildlife who is working with our researchers to study the impacts of dam removals at two former dams in Columbus, Ohio:

"The partnership between Ohio State and the ODNR Division of Wildlife, through the Ohio Biodiversity Conservation Partnership, supports the research being conducted by [OARDC scientists] Mazeika (Sullivan) and Kris (Jaeger), and will provide concrete evidence of the benefits of dam removals."

-- John Navarro, program administrator, Ohio Department of Natural Resources Division of Wildlife.

**V(A). Planned Program (Summary)**

**Program # 7**

**1. Name of the Planned Program**

Natural Resources and Environmental Systems (OARDC Led)

Reporting on this Program

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
121	Management of Range Resources	0%		5%	
122	Management and Control of Forest and Range Fires	0%		5%	
123	Management and Sustainability of Forest Resources	0%		5%	
124	Urban Forestry	0%		10%	
125	Agroforestry	0%		10%	
131	Alternative Uses of Land	0%		10%	
134	Outdoor Recreation	0%		10%	
135	Aquatic and Terrestrial Wildlife	0%		35%	
136	Conservation of Biological Diversity	0%		10%	
	<b>Total</b>	0%		100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of FTE/SYs expended this Program**

Year: 2014	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	0.0	0.0	2.3	0.0
<b>Actual Paid</b>	0.0	0.0	1.5	0.0
<b>Actual Volunteer</b>	0.0	0.0	0.0	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	171216	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	264048	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

The natural resources and environmental systems program includes both basic and applied research across the previously mentioned activities. Both laboratories and multiple field sites are available throughout state to permit data gathering and to continue long-term experiments, such as human-wildlife interaction studies. Extensive in-state research takes place as do national and international studies, as is evidenced by programs such as OARDC's avian ecology studies. Close working relationships with the organizations such as the Ohio Department of Natural Resources will continue to greatly enhance program capacity and outputs/impacts. All functional laboratories and sites are improved over time as program need and resources available warrant. OARDC faculty and staff engage in appropriate levels of outreach, engagement, and consultation with both internal stakeholders, such as fellow Extension personnel, and with external stakeholders.

**2. Brief description of the target audience**

OARDC's targeted audiences include, but are not limited to:

- Specific individuals or groups who have expressed a need for natural resources and environmental research knowledge that is to be derived through new research, extracted from on-going research, or is derived from scientific literature. Often those requests are communicated to OARDC by an intermediary such as a staffer at USDA, ODNR, or a county Extension agent;
- Related agencies or support organizations who will not only use the information but will also be brokers of that information, including embedding it into groups to encourage change, e.g. fish and wildlife clubs;
- Populations who have not requested the information but will likely benefit from that information, e.g. people who fish for recreation;
- Other scientists and scientific groups;
- Political entities;
- Extension personnel;
- Students from pre-school to post doctorate studies;
- News organizations;
- Business groups such as Ohio Farm Bureau;
- Community groups such as watershed collations.

**3. How was eXtension used?**

eXtension was not used in this program

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	0	0	0	0

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

Year: 2014

Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2014	Extension	Research	Total
<b>Actual</b>	0	20	0

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Number of graduate students completed  
Not reporting on this Output for this Annual Report

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	In conjunction with companion agencies and organizations, advance research in forest biology and ecology to promote advances in best management practices on and flow of goods and services from Ohio ecosystems.
2	Increase the scientific understanding necessary to maintain flow of environmental goods and services through conservation actions commensurate with regional demand, i.e. Buffer zones in forest riparian zones, reforestation, CREP, carbon sequestration in forests and grassland biomass, outdoor recreation opportunities, urban forest zones.
3	Advance research knowledge, both basic and applied, in the areas of silviculture and horticulture to existing and emerging industry and consumer demand regarding forest genetics, forest biology, seed production, nutrition, and related topics.
4	Meet ODNR, USDA, USDI, local, commodity groups, community, and other stakeholder demands for scientific knowledge to inform existing and emerging issues/practices in aquatic and terrestrial wildlife including human wildlife use/conflicts, and human to human conflicts related to wildlife and use.
5	To contribute to the theoretical knowledge base within this planned program to ensure that where possible all applied research can be grounded in the best science and evaluation available in all knowledge areas selected.
6	Improve the biodiversity and utilization of land use in rural and urban environments



### **Outcome #1**

#### **1. Outcome Measures**

In conjunction with companion agencies and organizations, advance research in forest biology and ecology to promote advances in best management practices on and flow of goods and services from Ohio ecosystems.

Not Reporting on this Outcome Measure

### **Outcome #2**

#### **1. Outcome Measures**

Increase the scientific understanding necessary to maintain flow of environmental goods and services through conservation actions commensurate with regional demand, i.e. Buffer zones in forest riparian zones, reforestation, CREP, carbon sequestration in forests and grassland biomass, outdoor recreation opportunities, urban forest zones.

Not Reporting on this Outcome Measure

### **Outcome #3**

#### **1. Outcome Measures**

Advance research knowledge, both basic and applied, in the areas of silviculture and horticulture to existing and emerging industry and consumer demand regarding forest genetics, forest biology, seed production, nutrition, and related topics.

Not Reporting on this Outcome Measure

### **Outcome #4**

#### **1. Outcome Measures**

Meet ODNR, USDA, USDI, local, commodity groups, community, and other stakeholder demands for scientific knowledge to inform existing and emerging issues/practices in aquatic and terrestrial wildlife including human wildlife use/conflicts, and human to human conflicts related to wildlife and use.

Not Reporting on this Outcome Measure

### **Outcome #5**

#### **1. Outcome Measures**

To contribute to the theoretical knowledge base within this planned program to ensure that where possible all applied research can be grounded in the best science and evaluation available in all knowledge areas selected.

Not Reporting on this Outcome Measure

**Outcome #6**

**1. Outcome Measures**

Improve the biodiversity and utilization of land use in rural and urban environments

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Decades of population losses have left the city of Cleveland, OH with 32,000 acres of vacant land, while some 1,000 homes are demolished every year. Currently, Cleveland plants turfgrass on empty lots, but it's expensive to maintain and offers few benefits. Alternative plant communities could offer greater environmental benefits, such as support of biodiversity and improved storm-water infiltration to reduce flooding.

**What has been done**

OARDC researchers started a large-scale, never-before-attempted project that examines the impact of eight different landscape treatments on the biodiversity and ecosystem function of 64 empty lots in eight Cleveland neighborhoods. The five-year project's main goal is to gather data that will guide future green space design in Cleveland and other cities engaged or interested in vacant-land management.

With the right combination of plants and increased ecosystem services, urban vacant land can be seen as an asset for community development rather than an eyesore.

The research team is examining what combination of plant species are best for restoration of these blighted lots. The group is also looking at installing rain gardens in the city of Cleveland to determine how these restorations contribute to pollinators, soil health and the reduction of pollutants from storm water.

**Results**

Hatch funding invested into our faculty has leveraged additional funding by a highly competitive \$909,200 Faculty Early Career Development Program grant from the National Science

Foundation.

This project also includes the development of a high school science curriculum for use by teachers in Cleveland and throughout the state. The lessons focus on insect-predator-prey relationships and teaching students how to collect data and communicate their findings using scientific arguments.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
131	Alternative Uses of Land

#### V(H). Planned Program (External Factors)

##### External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

##### Brief Explanation

Public policy shifts, regulations, laws, and shifts in demand continue to impact outcomes. Also climatic extremes, coupled with pest and diseases that are often climate related, are also impacting outcomes. Exotic species such as the Emerald Ash Borer is a significant external factor, especially in terms of forest ecosystems. Factors such as the availability of state and federal base funding to ensure a core faculty and staff, availability of extramural funds, and programmatic demands that are exceeding resources, individually and collectively, are affecting outcomes.

#### V(I). Planned Program (Evaluation Studies)

##### Evaluation Results

For 2014, CFAES-OARDC has conducted no formal studies regarding evaluation of our research program. Surrogate evaluation metrics--inclusive but not limited to--that are considered indicators of research success are:

- Research contracts and awards received/ongoing/completed (\$166 million plus in active projects during 2014);
- Number of referred publications reported elsewhere in this report;
- Number of business, industries an groups engaged in CFAES's research programs;
- Number of patents received;
- Economic impact of this college's research program as reported elsewhere in this report;

- The level of base funding from USDA-NIFA and the State of Ohio in 2014;
- Impacts submitted in this report, and the continued robustness of CFAES' research program throughout 2014, both in terms of breadth of programs and depth of new knowledge generated and applied.

The research reported herein is also supported by an informal yet effective formative evaluation. Very little research is conducted at OARDC without early engagement of business, industry, commodity groups, special interest or community groups, or other interested parties given these are the individuals who have the need for and will be the adopters of our research output/impacts. Even in the case of very theoretical research, fellow researchers in industry, government, and academic institutions are consulted (formative evaluation/needs assessment) in the formulation of studies.

### **Key Items of Evaluation**

Decades of population losses have left the city of Cleveland with 3,600 acres of vacant land, while some 1,000 homes are demolished every year. With the right combination of plants and increased ecosystem services, urban vacant land can be seen as an asset for community development rather than an eyesore. Community members and city leaders partner with OARDC, providing input about their landscape treatment preferences. One partner provided the following feedback:

"Working on ecological research in city neighborhoods requires advanced scientific knowledge and excellent people skills. [OARDC researcher] Mary (Gardiner) embodies both of these things. Her work has the potential to impact people's lives in tangible and lasting ways, and to contribute to new ways of thinking about Cleveland."

--Terry Schwarz, director, Cleveland Urban Design Collaborative

**V(A). Planned Program (Summary)**

**Program # 8**

**1. Name of the Planned Program**

Plants Systems (OARDC Led)

Reporting on this Program

**V(B). Program Knowledge Area(s)**

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		10%	
202	Plant Genetic Resources	0%		15%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		5%	
204	Plant Product Quality and Utility (Preharvest)	0%		20%	
205	Plant Management Systems	0%		10%	
206	Basic Plant Biology	0%		5%	
211	Insects, Mites, and Other Arthropods Affecting Plants	0%		5%	
212	Diseases and Nematodes Affecting Plants	0%		5%	
213	Weeds Affecting Plants	0%		5%	
214	Vertebrates, Mollusks, and Other Pests Affecting Plants	0%		5%	
216	Integrated Pest Management Systems	0%		15%	
	<b>Total</b>	0%		100%	

**V(C). Planned Program (Inputs)**

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	0.0	0.0	18.9	0.0
<b>Actual Paid</b>	0.0	0.0	22.8	0.0
<b>Actual Volunteer</b>	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	2873066	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	3505360	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

## V(D). Planned Program (Activity)

### 1. Brief description of the Activity

OARDC's on-going research activities to advance plant systems goals include both basic and applied research. Both laboratory and multiple field sites/research stations are available throughout state to permit data gathering and to continue long-term experiments, such as commodity yields. On-farm research takes place, as do national and international studies. All functional laboratories and sites are improved over time as program need and resources available warrant. OARDC faculty and staff engage in appropriate levels of outreach, engagement, and consultation, with both internal stakeholders, such as fellow Extension personnel, and with external stakeholders.

### 2. Brief description of the target audience

Audiences targeted by OARDC include, but are not limited to:

- Specific individuals or groups who have expressed a need for plant systems information that is to be derived through new research, extracted from on-going research, or is derived from scientific literature. Often those requests are communicated to OARDC by an intermediary such as a staffer at a USDA office, NRCS, or a county Extension agent;
- Fellow agencies or support organizations who will not only use the information but will also be brokers of that information, including embedding it into groups to encourage change;
- Populations who have not requested the information but will likely benefit from that information, e.g. home gardeners;
- Other scientists and scientific groups;
- Political entities;
- Extension personnel;
- Students from pre-school to post doctorate studies;
- News organizations.

### 3. How was eXtension used?

eXtension was not used in this program

## V(E). Planned Program (Outputs)

### 1. Standard output measures

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

Year: 2014

Actual: 3

**Patents listed**

1. Agrobacterium Strains for Plant Transformation and Related Materials and Methods
2. A Convenient and Effective Device for Efficient Delivery of Agriculturally-Relevant Microbial Inoculants
3. System for Delivery of Microbial Inoculants and Related Materials and Methods

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2014	Extension	Research	Total
Actual	0	86	0

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Number of graduate students completed  
Not reporting on this Output for this Annual Report

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Meet or exceed the demand of fellow scientists and stakeholders within the next ten years for materials relating to plant genetics and plant breeding technologies, including identification of molecular markers for elite germplasms.
2	Advance germplasm science over the next ten years to the extent that the genetic resources targeted for acquisition are preserved and can be considered secure in terms of systems preservation, e.g. short season crops or for studying rice pathogens.
3	Enrich the gene pool, and knowledge thereof, to meet identified stakeholder needs.
4	Annually provide adequate preharvest research findings, including field trial data, to support Ohio's status as a top soybean and corn producer
5	Release or support release by others of special cultivars to enhance Ohio agriculture, e.g. grapes to replace tobacco in southeastern Ohio, low maintenance turf grass, nitrogen uptake efficient crops including foliar based fertilization, field crop cultivars.
6	Annually contribute to and report a basic or applied understanding of IPM, including all physical, biological, and chemical components of the plant system, to reduce environmental stresses, improve production, and lower costs when employed.
7	Enrich the gene pool and knowledge thereof in disease/pest resistance, and gene recombination and interaction studies
8	Enrich the gene pool and knowledge thereof in the areas of molecular studies to better understand how immune systems in plants inhibit diseases and how bacteria perturb the immune system.



### **Outcome #1**

#### **1. Outcome Measures**

Meet or exceed the demand of fellow scientists and stakeholders within the next ten years for materials relating to plant genetics and plant breeding technologies, including identification of molecular markers for elite germplasms.

Not Reporting on this Outcome Measure

### **Outcome #2**

#### **1. Outcome Measures**

Advance germplasm science over the next ten years to the extent that the genetic resources targeted for acquisition are preserved and can be considered secure in terms of systems preservation, e.g. short season crops or for studying rice pathogens.

Not Reporting on this Outcome Measure

### **Outcome #3**

#### **1. Outcome Measures**

Enrich the gene pool, and knowledge thereof, to meet identified stakeholder needs.

Not Reporting on this Outcome Measure

### **Outcome #4**

#### **1. Outcome Measures**

Annually provide adequate preharvest research findings, including field trial data, to support Ohio's status as a top soybean and corn producer

Not Reporting on this Outcome Measure

### **Outcome #5**

#### **1. Outcome Measures**

Release or support release by others of special cultivars to enhance Ohio agriculture, e.g. grapes to replace tobacco in southeastern Ohio, low maintenance turf grass, nitrogen uptake efficient crops including foliar based fertilization, field crop cultivars.

Not Reporting on this Outcome Measure

## **Outcome #6**

### **1. Outcome Measures**

Annually contribute to and report a basic or applied understanding of IPM, including all physical, biological, and chemical components of the plant system, to reduce environmental stresses, improve production, and lower costs when employed.

Not Reporting on this Outcome Measure

## **Outcome #7**

### **1. Outcome Measures**

Enrich the gene pool and knowledge thereof in disease/pest resistance, and gene recombination and interaction studies

### **2. Associated Institution Types**

- 1862 Research

### **3a. Outcome Type:**

Change in Condition Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	0

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

Introduced species cause major environmental changes and dramatically reshape forest ecosystems in ways we are only beginning to understand. The hemlock woolly adelgid (HWA) arrived in southeastern Ohio in 2011 and is currently causing near complete mortality of eastern hemlock across the eastern United States. This is a significant environmental concern for Ohio as hemlock dominates many of the important natural and recreational areas including the Cuyahoga Valley National Park, Mohican State Forest, and the Hocking Hills region. Hemlock forests support a unique microclimate and suite of species, and significantly contribute to landscape diversity, particularly in Ohio where hemlock ravines add diversity and scenic value to many state public lands.

Unfortunately, there is no known treatment to control HWA, and this impending threat to Ohio's forests will be extensive as it is estimated that visitors to Ohio's state parks contribute over \$1 billion to the state and local economies. Consequently, it is important to understand the effects of hemlock decline on Ohio's forests so resource managers and scientists can develop techniques and strategies to help moderate the effects of HWA on hemlock-dominated forests.

**What has been done**

A comparison of infected hemlock stands in Virginia and West Virginia with un-invaded forests in Ohio show that hemlock is in severe decline in areas where HWA is present. However, hemlock continues to dominate both the overstory and sapling layers of these forests. Results also suggest that the future forest depends on the current mix of species associated with hemlock. The loss of hemlock trees and thus their associated canopy results in greater solar exposure of the forest floor with a rise in soil temperature and increased nutrient cycling. These changes result in a different ecosystem than previously existed resulting in the loss of the forest canopy.

**Results**

With the assistance of OSU Extension, these findings are being shared with forest managers and other stakeholders in southeastern Ohio. Efforts are ongoing and include training opportunities focusing on hemlock ecosystems, hemlock inventory, HWA survey methods, and HWA management strategies. These efforts have reached approximately 800 individuals at more than 20 events. Monitoring will continue in order to refine predictions about forest development and extend efforts to focus on how HWA influences downed wood located both in and along streams. We also intend to continue our outreach to public resource managers and private landowners to educate them on the potential impacts of HWA on Ohio's forests and develop strategies to help mitigate the impending loss of this important forest tree species.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
211	Insects, Mites, and Other Arthropods Affecting Plants

**Outcome #8**

**1. Outcome Measures**

Enrich the gene pool and knowledge thereof in the areas of molecular studies to better understand how immune systems in plants inhibit diseases and how bacteria perturb the immune system.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Plant diseases are one of the main limiting factors in crop production worldwide, causing billions of dollars in yield loss and tremendous historical human suffering. The two most important agricultural crops in the world are wheat and rice. Availability of these two grains historically has more impact on human health, regional economic stability, and social unrest than any other crop. One of the most important diseases of rice is rice blast, caused by the fungal pathogen *Magnaporthe oryzae*. Significantly, *Magnaporthe* has recently jumped to become a pathogen of wheat in South America causing wheat blast disease. Currently, wheat blast is present in all wheat-growing regions of Brazil and surrounding countries. A major outbreak in 2009 pushed losses over 40% in many parts of the region. The impact of this disease in South America is acute, and there is every expectation that it will continue to move north and dramatically affect U.S. wheat fields.

#### **What has been done**

The goal of this project was to elucidate how this pathogen gains entry into its host and the basic etiology of infection, to screen Ohio wheat germplasm for susceptibility to the pathogen, and to use genomics to begin to understand the origin of the pathogen in Brazil and how to detect it.

The genomes of two isolates of the wheat blast pathogen from Brazil were sequenced and analyzed. The analysis revealed that the pathogen most likely did not originate from rice infecting versions of the fungus, but rather a ryegrass infecting version. This result was revealed after collaboration with investigators at the University of Kentucky and Kansas State University. These genome data were the first sequences available for this pathogen and have now been combined with a new, larger national effort to understand its origin and develop detection methods.

A pilot study screened 86 cultivars of soft red winter wheat for susceptibility. The goal of this study was threefold: to identify highly resistant and susceptible varieties of wheat for use as future reference groups; refine inoculation techniques; and re-isolate *M. oryzae* from infected plants.

#### **Results**

All three goals were achieved. These and other isolates will be used for labeling the pathogen with a florescent protein for tracking in the plant during all phases of growth, penetration, and infection. The results of the studies performed as part of this project were a major factor in the ability of the investigators to be invited to participate in a million dollar USDA NIFA grant studying this pathogen.

#### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
212	Diseases and Nematodes Affecting Plants

## **V(H). Planned Program (External Factors)**

### **External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

### **Brief Explanation**

Pests, pathogens, diseases, weeds, and climate change, among other factors can impact outcomes within plant systems. As the food, fiber, and environmental economy adjust to the global marketplace, in conjunction with public policy shifts, regulations, and shifts in demand, outcomes will be impacted. Production agriculture is most sensitive to these shifts. Research that is conducted well before its outcomes are needed and formative evaluation to identify opportunities and problems can have returns throughout the life of the program. Factors such as the availability of base funding to ensure a core faculty and staff, availability of extramural funds, and programmatic demands exceed resources are affecting outcomes.

## **V(I). Planned Program (Evaluation Studies)**

### **Evaluation Results**

For 2014, CFAES-OARDC has conducted no formal studies regarding evaluation of our research program. Surrogate evaluation metrics--inclusive but not limited to--that are considered indicators of research success are:

- Research contracts and awards received/ongoing/completed (\$166 million plus in active projects during 2014);
- Number of referred publications reported elsewhere in this report;
- Number of business, industries and groups engaged in CFAES's research programs;
- Number of patents received;
- Economic impact of this college's research program as reported elsewhere in this report;
- The level of base funding from USDA-NIFA and the State of Ohio in 2014;
- Impacts submitted in this report, and the continued robustness of CFAES' research program throughout 2014, both in terms of breadth of programs and depth of new knowledge generated and applied.

The research reported herein is also supported by an informal yet effective formative evaluation. Very little research is conducted at OARDC without early engagement of business, industry, commodity groups, special interest or community groups, or other interested parties given these are the individuals who have the need for and will be the adopters of our research output/impacts. Even in the case of very theoretical research,

fellow researchers in industry, government, and academic institutions are consulted (formative evaluation/needs assessment) in the formulation of studies.

### **Key Items of Evaluation**

Meeting the needs of growers and stakeholders in terms of both research and Extension is a long-established program. In managing the infestation of the hemlock woolly adelgid, one of our Extension specialists has praised CFAES' response:

"OSU Extension, OARDC and CFAES bring a broad range of expertise on forest ecosystems and invasive pests to the table. We've been able to use this expertise to help our partners to evaluate the management practices that have been developed and utilized in other states to formulate strategies for managing HWA in Ohio."

--Dave Apsley, natural resources specialist, Jackson County Extension

**V(A). Planned Program (Summary)**

**Program # 9**

**1. Name of the Planned Program**

Animals Systems (OARDC Led)

Reporting on this Program

**V(B). Program Knowledge Area(s)**

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
301	Reproductive Performance of Animals	0%		15%	
302	Nutrient Utilization in Animals	0%		15%	
303	Genetic Improvement of Animals	0%		10%	
304	Animal Genome	0%		5%	
305	Animal Physiological Processes	0%		15%	
306	Environmental Stress in Animals	0%		5%	
307	Animal Management Systems	0%		10%	
308	Improved Animal Products (Before Harvest)	0%		15%	
311	Animal Diseases	0%		10%	
	<b>Total</b>	0%		100%	

**V(C). Planned Program (Inputs)**

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	0.0	0.0	7.8	0.0
<b>Actual Paid</b>	0.0	0.0	9.4	0.0
<b>Actual Volunteer</b>	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	1404884	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	3077740	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

## V(D). Planned Program (Activity)

### 1. Brief description of the Activity

OARDC research activities, in this planning period, seek to advance food animal and global food security goals, and include both basic and applied agbioscience research. Laboratory, animal enclosures, farms, and multiple field sites/research stations are available throughout state to permit data gathering and to continue long-term experiments. Ohio on-farm research is conducted as part of this program as is national and international studies. Effective research requires a mixture of laboratory, animal enclosures, and on-farm research to maximize knowledge. Emerging threats now require more advanced facilities such as OARDC's bio-security lab, particularly needed in studies on infectious animal diseases. OARDC's bio-security lab has been fully functional throughout this planning period. All functional laboratories and sites are improved over time as program need warrants. OARDC faculty and staff engage in appropriate levels of outreach, engagement, and consultation, with both internal stakeholders, such as fellow Extension personnel, and with external stakeholders

### 2. Brief description of the target audience

OARDC's targeted audiences include, but are not limited to:

- Specific individuals or groups who have expressed a need for food animal systems information that is to be derived through new research, extracted from on-going research, or is derived from scientific literature. Often those requests are communicated to OARDC by an intermediary such as a staffer at a USDA office, NRCS, Ohio Department of Agriculture, or a county Extension agent; fellow agencies or support organizations who will not only use the information but will also be brokers of that information, including embedding it into groups to encourage change;
  - Populations who have not requested the information but will likely benefit from that information, e.g. small or recreational farmers;
  - Other scientists and scientific groups;
  - Political entities;
  - Extension personnel;
  - Students for pre-school to post doctorate studies;
  - News organizations;
  - Business groups such as the Ohio Farm Bureau or commodity groups.

### 3. How was eXtension used?

eXtension was not used in this program



**V(E). Planned Program (Outputs)**

**1. Standard output measures**

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	0	0	0	0

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

Year: 2014

Actual: 2

**Patents listed**

1. Metabolic Perturbations to Enhance Microbial Fermentation of Lignocellulose-Derived Sugars to Fuels and Chemicals
2. Immortalized Duck Embryonic Intestinal Epithelial Cell line (MK-DIEC)

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2014	Extension	Research	Total
<b>Actual</b>	0	45	0

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Number of graduate students completed  
Not reporting on this Output for this Annual Report

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Improve reproduction efficiency and enhanced application of new technologies over the next five years to fully meet the competitive demands faced by OARDC's stakeholders in areas such as early maturation, estrus, fertility, and ovulation
2	Increase dietary research and nutrition utilization for the purpose of increased growth and quality of products commensurate with consumer demand.
3	Meet the demand of fellow scientists and stakeholders within ten years for materials relating to genetics and breeding, including id of molecular markers for improved animal health and reproductively, and increased quality and quantity of products
4	Provide new contributions to the body of literature that will positively food animal genetics, e.g. molecular techniques and materials to aid in identifying genetic codes of bacteria in that breaks down cellulose
5	Improve management for multiple animal farm types, including organics, that will produce higher yields for and lower costs to the producer and consumer
6	Animal disease researchers will provide the necessary research to inform producers in a timely manner how to protect against known and present diseases, e.g. bovine mastitis
7	Animal disease researchers will advance the research frontiers in emerging disease investigations to the extent that OARDC continues to serve as a center for excellence

**Outcome #1**

**1. Outcome Measures**

Improve reproduction efficiency and enhanced application of new technologies over the next five years to fully meet the competitive demands faced by OARDC's stakeholders in areas such as early maturation, estrus, fertility, and ovulation

Not Reporting on this Outcome Measure

**Outcome #2**

**1. Outcome Measures**

Increase dietary research and nutrition utilization for the purpose of increased growth and quality of products commensurate with consumer demand.

Not Reporting on this Outcome Measure

**Outcome #3**

**1. Outcome Measures**

Meet the demand of fellow scientists and stakeholders within ten years for materials relating to genetics and breeding, including id of molecular markers for improved animal health and reproductively, and increased quality and quantity of products

Not Reporting on this Outcome Measure

**Outcome #4**

**1. Outcome Measures**

Provide new contributions to the body of literature that will positively food animal genetics, e.g. molecular techniques and materials to aid in identifying genetic codes of bacteria in that breaks down cellulose

Not Reporting on this Outcome Measure

**Outcome #5**

**1. Outcome Measures**

Improve management for multiple animal farm types, including organics, that will produce higher yields for and lower costs to the producer and consumer

Not Reporting on this Outcome Measure

## **Outcome #6**

### **1. Outcome Measures**

Animal disease researchers will provide the necessary research to inform producers in a timely manner how to protect against known and present diseases, e.g. bovine mastitis

Not Reporting on this Outcome Measure

## **Outcome #7**

### **1. Outcome Measures**

Animal disease researchers will advance the research frontiers in emerging disease investigations to the extent that OARDC continues to serve as a center for excellence

### **2. Associated Institution Types**

- 1862 Research

### **3a. Outcome Type:**

Change in Condition Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	0

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

In 2013, a new swine disease appeared in the U.S. Very quickly, porcine epidemic diarrhea virus (PEDv) spread across the country, killing 50-100% of piglets at hundreds of farms in at least 30 states, including Ohio. PEDv reduces pork production and is threatening to impact the availability of pork products as well as prices.

#### **What has been done**

OARDC scientists are conducting research to answer crucial questions about PEDv and to develop effective tests and vaccines against the virus. The scientists grew the virus in cell culture and used this material to develop a "booster" vaccine that can protect pigs previously exposed to PEDv. The end goal is to develop a stronger vaccine that can also protect swine with zero immunity to the virus.

#### **Results**

OARDC is one of the few facilities nationwide that has been able to grow PEDv in the lab, allowing researchers to have enough virus material to develop diagnostic tests and vaccine candidates. The animal disease research is supported by OARDC's unique germ-free animal labs, where new diseases and treatments can be tested in isolation; and by its Plant and Animal

Agrosecurity Research facility, the only lab in Ohio and one of only two nationally with capacity for plant and animal disease research at the BSL-3 biosafety level.

The researchers are also collaborating with a large animal health company to develop the PEDv vaccines.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
311	Animal Diseases

#### V(H). Planned Program (External Factors)

##### External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

##### Brief Explanation

Animal diseases coupled with abnormal weather patterns are impacting outcomes. Public policy shifts, regulations, and shifts in demand for product continue to impact outcomes. Human values and environmental sensitivities of the populace to animal production and processing are also external factors that affect outcomes. Formative evaluation relating to animal care norms and protocols can be effective in informing the process. Uncertainty, though, is a constant factor in the animal industry. Factors such as the availability of base funding to ensure a core research faculty and staff, availability of extramural research funds, and programmatic demands that are exceeding resources, all, affect outcomes.

#### V(I). Planned Program (Evaluation Studies)

##### Evaluation Results

For 2014, CFAES-OARDC has conducted no formal studies regarding evaluation of our research program. Surrogate evaluation metrics--inclusive but not limited to--that are considered indicators of research success are:

- Research contracts and awards received/ongoing/completed (\$166 million plus in active projects during 2014);
- Number of referred publications reported elsewhere in this report;
- Number of business, industries and groups engaged in CFAES's research programs;
- Number of patents received;
- Economic impact of this college's research program as reported elsewhere in this report;
- The level of base funding from USDA-NIFA and the State of Ohio in 2014;

- Impacts submitted in this report, and the continued robustness of CFAES' research program throughout 2014, both in terms of breadth of programs and depth of new knowledge generated and applied.

The research reported herein is also supported by an informal yet effective formative evaluation. Very little research is conducted at OARDC without early engagement of business, industry, commodity groups, special interest or community groups, or other interested parties given these are the individuals who have the need for and will be the adopters of our research output/impacts. Even in the case of very theoretical research, fellow researchers in industry, government, and academic institutions are consulted (formative evaluation/needs assessment) in the formulation of studies.

### **Key Items of Evaluation**

Developing new vaccines is a crucial part of our research program within OARDC. PEDv is not likely to just go away. We need to develop vaccines that can protect pigs that have never been exposed to the disease before. OARDC is one of the few facilities nationwide that has been able to grow PEDv in the lab, allowing researchers to have enough virus material to develop diagnostic tests and vaccine candidates. A local swine producer has praised OARDC's work in this area:

"It is increasingly important that we have a high-quality swine research capability in Ohio. We, as swine producers, need this information as soon as possible to help us manage diseases such as PEDv the best we can to limit severe economic losses."

--Pat Hord, owner, Hord Livestock Company, Bucyrus, Ohio

**V(A). Planned Program (Summary)**

**Program # 10**

**1. Name of the Planned Program**

Food, Agricultural, and Biological Engineering Systems (OARDC Led)

Reporting on this Program

**V(B). Program Knowledge Area(s)**

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
401	Structures, Facilities, and General Purpose Farm Supplies	0%		20%	
402	Engineering Systems and Equipment	0%		25%	
403	Waste Disposal, Recycling, and Reuse	0%		25%	
404	Instrumentation and Control Systems	0%		10%	
405	Drainage and Irrigation Systems and Facilities	0%		15%	
723	Hazards to Human Health and Safety	0%		5%	
	<b>Total</b>	0%		100%	

**V(C). Planned Program (Inputs)**

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	0.0	0.0	2.5	0.0
<b>Actual Paid</b>	0.0	0.0	1.5	0.0
<b>Actual Volunteer</b>	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	201260	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	346633	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

Engineering research activities to advance OARDC goals will continue to include both basic and applied research as discussed in the previously mentioned sections. Laboratories, construction sites, farms, a research park, and multiple field sites/research stations are available throughout state to permit data gathering and to continue long-term activities. All functional laboratories and sites are improved over time as program need warrants. OARDC faculty and staff engage in appropriate levels of outreach, engagement, and consultation, with both internal stakeholders such as fellow Extension personnel, and with external stakeholders.

**2. Brief description of the target audience**

OARDC's targeted audiences include, but not limited to:

- Specific individuals or groups who have expressed a need for engineering information that is to be derived through new research, extracted from on-going research, or is derived from scientific literature. Often those requests are communicated to OARDC by an intermediary such as a staffer at a USDA office, NRCS, Ohio Department of Agriculture, Soil and Water Conservation Districts or a county Extension agent;
- Fellow academic units that rely on engineers to create systems and processes needed to support not only the research, but also the adoption of the research findings by stakeholders fellow agencies or support organizations who will not only use the information but will also be brokers of that information, including embedding it into groups to encourage change;
- Populations who have not requested the information but will likely benefit from that information, e.g. recreational animal owners;
- Other scientists and scientific groups;
- Political entities;
- Extension personnel;
- Students for pre-school to post doctorate studies;
- News organizations;
- Business groups such as small town administrators, county commissioners, or commodity groups.

**3. How was eXtension used?**

eXtension was not used in this program

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

**2. Number of Patent Applications Submitted (Standard Research Output)**  
**Patent Applications Submitted**



Year: 2014  
 Actual: 5

**Patents listed**

1. Wet Scrubber for Ammonia Capture (patent issued)
2. An Electrostatic Precipitation System for Mitigating Particulate Matter Emissions from Animal Facilities
3. Filler-Natural Rubber Composites
4. Methods to Extract Natural Rubber from Guayule and Other Plants Using Differential Flocculation
5. Novel Biofiller-Natural Rubber Composites for Industrial Applications

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2014	Extension	Research	Total
Actual	0	45	0

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Number of graduate students completed  
 Not reporting on this Output for this Annual Report

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Provide appropriate facilities design and engineering processes commensurate with stakeholders demand, including fellow research units demands, to the extent that they have all the information necessary for making adoption decisions
2	Develop enhanced systems to support integrated plant growth systems that will annually result in increased productivity at reduced costs for the industry
3	Improve mechanical devices and instrumentation needed by stakeholders
4	Develop improved systems to aid in meeting new or yet to emerge or novel needs
5	Advance development of state of the art integrated waste management systems to the extent that OARDC and Ohio are viewed as one of the top ten programs/states in this area nationally
6	Advance the knowledge of ecological based engineered systems for waste management to the extent that, where cost effective and appropriate, they will be adopted over mechanical systems

**Outcome #1**

**1. Outcome Measures**

Provide appropriate facilities design and engineering processes commensurate with stakeholders demand, including fellow research units demands, to the extent that they have all the information necessary for making adoption decisions

Not Reporting on this Outcome Measure

**Outcome #2**

**1. Outcome Measures**

Develop enhanced systems to support integrated plant growth systems that will annually result in increased productivity at reduced costs for the industry

Not Reporting on this Outcome Measure

**Outcome #3**

**1. Outcome Measures**

Improve mechanical devices and instrumentation needed by stakeholders

Not Reporting on this Outcome Measure

**Outcome #4**

**1. Outcome Measures**

Develop improved systems to aid in meeting new or yet to emerge or novel needs

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	0

**3c. Qualitative Outcome or Impact Statement**

### **Issue (Who cares and Why)**

Foundries purchase virgin sand to create metal casting molds and cores. This sand is reused numerous times in the foundry operation, and over time the sands become unstable and are referred to as spent foundry sands (SFS).

Ten million tons of SFS are annually discarded as industrial waste in the U.S. Most SFS is disposed in landfills at great economic cost to the foundry industry. Ohio and other industrial Midwestern states generate a major portion of the total SFS production from 2,000 U.S. foundries. If SFS could prove beneficial as a soil additive or supplement, then the amount of this material disposed in landfills would be reduced. This would reduce costs borne by foundries for disposal of a waste material, allow Ohio foundries to become more competitive and create startup industries and jobs in Ohio focused on production and marketing of SFS soil blend materials to the public.

### **What has been done**

A key obstacle has been the lack of a regulatory framework at the national and state level that allows SFS to be used as a soil supplement or additive. To address this inadequacy, researchers at OARDC, USDA-ARS and the U.S. Environmental Protection Agency (EPA) Office of Resource Conservation and Recovery cooperated to conduct a risk assessment for beneficial use of SFS and to develop guidance for beneficial use of SFS.

The overall goals for the risk assessment were to:

- Review available information on SFS in soil-related applications;
- Identify likely exposure pathways and receptors associated with various uses;
- Use a combination of screening and modeling methods to determine whether the proposed uses of SFS are protective of human health and the environment; and
- Discuss the findings within the context of certain overarching concepts (e.g., the complexities of soil chemistry) and provide conclusions.

### **Results**

The U.S. EPA, in conjunction with the USDA and the Ohio State University, released a risk assessment concluding that silica-based SFS from iron, steel and aluminum foundries, when used in certain soil-related applications, are protective of human health and the environment, and yield environmental benefits.

Based on the results of the risk assessment, the EPA and USDA now support the beneficial use of silica-based SFS in manufactured soils, soil-less potting media, and as a foundation layer in road construction.

The EPA estimates that the environmental benefits from using silica-based SFS in the specific applications studied, at the current use rate, results in the following savings in one year:

- Energy savings equivalent to the annual electricity consumption of 800 homes;
- CO<sub>2</sub> emissions reductions equivalent to removing 840 cars from the road; and,
- Water savings of 7.8 million gallons

The new risk-based approach for SFS will also increase the global competitiveness of our foundry industry and create startup businesses and jobs focused on producing and marketing SFS as a soil substitute and in soil blends.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
403	Waste Disposal, Recycling, and Reuse

##### Outcome #5

###### 1. Outcome Measures

Advance development of state of the art integrated waste management systems to the extent that OARDC and Ohio are viewed as one of the top ten programs/states in this area nationally

Not Reporting on this Outcome Measure

##### Outcome #6

###### 1. Outcome Measures

Advance the knowledge of ecological based engineered systems for waste management to the extent that, where cost effective and appropriate, they will be adopted over mechanical systems

Not Reporting on this Outcome Measure

#### V(H). Planned Program (External Factors)

##### **External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

##### **Brief Explanation**

Economic shifts such as interest rates to borrow money for facilities, housing foreclosures, public policy shifts, regulations, shifts in demand, and issues such as climate change are impacting outcomes. Human values and conflicts, e.g. urban-rural issues, and environmental sensitivities to agriculture processes and location concerns related to facilities by the populace are also external factors that affect outcomes, e.g. engineering of large farms. Climate change may dictate new and different types of structures, equipment, and processes. Factors such as the availability of base funding to ensure a core research and extension faculty and staff, availability of extramural funds, and programmatic demands that often exceed resources, all, affect outcomes.

#### V(I). Planned Program (Evaluation Studies)

## Evaluation Results

For 2014, CFAES-OARDC has conducted no formal studies regarding evaluation of our research program. Surrogate evaluation metrics--inclusive but not limited to--that are considered indicators of research success are:

- Research contracts and awards received/ongoing/completed (\$166 million plus in active projects during 2014);
- Number of referred publications reported elsewhere in this report;
- Number of business, industries and groups engaged in CFAES's research programs;
- Number of patents received;
- Economic impact of this college's research program as reported elsewhere in this report;
- The level of base funding from USDA-NIFA and the State of Ohio in 2014;
- Impacts submitted in this report, and the continued robustness of CFAES' research program throughout 2014, both in terms of breadth of programs and depth of new knowledge generated and applied.

The research reported herein is also supported by an informal yet effective formative evaluation. Very little research is conducted at OARDC without early engagement of business, industry, commodity groups, special interest or community groups, or other interested parties given these are the individuals who have the need for and will be the adopters of our research output/impacts. Even in the case of very theoretical research, fellow researchers in industry, government, and academic institutions are consulted (formative evaluation/needs assessment) in the formulation of studies.

## Key Items of Evaluation

OARDC and CFAES research on spent foundry sands in conjunction with the U.S. Environmental Protection Agency and U.S. Department of Agriculture is a long-term effort that will benefit Ohio and U.S. industries. The study provides guidance based on sound science for the Ohio Environmental Protection Agency and other state regulatory agencies that will remove regulatory barriers. It will propel the beneficial reuse of foundry sands as a resource in Ohio and elsewhere.

**V(A). Planned Program (Summary)****Program # 11****1. Name of the Planned Program**

Agricultural, Environmental, and Development Economics (OARDC Led)

 Reporting on this Program**V(B). Program Knowledge Area(s)**

## 1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
601	Economics of Agricultural Production and Farm Management	0%		15%	
602	Business Management, Finance, and Taxation	0%		15%	
603	Market Economics	0%		15%	
604	Marketing and Distribution Practices	0%		5%	
605	Natural Resource and Environmental Economics	0%		10%	
606	International Trade and Development Economics	0%		5%	
607	Consumer Economics	0%		10%	
608	Community Resource Planning and Development	0%		5%	
609	Economic Theory and Methods	0%		10%	
610	Domestic Policy Analysis	0%		5%	
611	Foreign Policy and Programs	0%		5%	
	<b>Total</b>	0%		100%	

**V(C). Planned Program (Inputs)**

## 1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	0.0	0.0	4.7	0.0
<b>Actual Paid</b>	0.0	0.0	4.5	0.0
<b>Actual Volunteer</b>	0.0	0.0	0.0	0.0

## 2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	627428	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	467515	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

### V(D). Planned Program (Activity)

#### 1. Brief description of the Activity

To fulfill the goals of the Agricultural, Environmental and Development Economics Planned Program, OARDC will support both basic and applied research initiatives. Both laboratories and multiple field sites are available throughout state to permit data gathering and to continue long-term experiments. Extensive in-state research will take place, as will national and international studies. Close working relationships with multiple industries and organizations will continue to provide real-world settings and data, greatly enhancing the program's capacity and its outputs/impacts. All functional laboratories and sites are improved over time as program need and resource availability warrants. OARDC faculty and staff will engage in appropriate levels of outreach, engagement, and consultation, with both internal stakeholders such as fellow Extension personnel, and with external stakeholders.

#### 2. Brief description of the target audience

OARDC's targeted audiences for this planned program include, but are not limited to:

- Specific individuals or groups who have expressed a need for economic findings related to some aspect of human capital that is to be derived through new research, extracted from on-going research, or is derived from scientific literature;
- Fellow academic units that depend on scientists in this program for support information and for the approaches/measures they generate;
- Fellow agencies or support organizations who will not only use the economic information but will also extend that information;
- Populations who have not requested the information but will likely benefit from that information;
- Other scientists and scientific groups;
- Political entities;
- Extension personnel;
- Students from junior high school to post doctorate studies;
- News organizations;
- Business and industry groups.

#### 3. How was eXtension used?

eXtension was not used in this program

### V(E). Planned Program (Outputs)



**1. Standard output measures**

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	0	0	0	0

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

Year: 2014

Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2014	Extension	Research	Total
<b>Actual</b>	0	35	0

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Number of graduate students completed  
Not reporting on this Output for this Annual Report

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	New knowledge of production variations in markets, including vertical markets, that help producers, processors, and distributors have requisite information for enhanced decision making leading to decreased costs of inputs and an increase in profits/outputs.
2	Business management knowledge, including policy analysis, in targeted areas, e.g. risk management, weather insurance, impacts of land use shifts, grant management that are necessary for and result in increased profitability for stakeholders.
3	Research findings on novel programs such as pollution trading, carbon trading, conservation programs, cooperatives, etc. that results in enhanced profits, new sources of income, and/or prevention of loss of profits or loss of other resources, e.g. soil.
4	Market economies and efficiencies studies relating to factors such as pricing, finance, supply and demand, exchange rates, trade policies, etc. ensuring that stakeholders are informed and their identified needs.
5	Grow research findings on valuing (market and non-market) environmental resources, including biocomplexity, e.g. wetlands, river restoration, and how it applies to stakeholder needs for demonstrated gains in profits, resources sustained, and/or actions mitigated.
6	Increase profitability, reduce environmental impact, and/or improve quality of stakeholders' lives through bio-resource utilization efficiency and effectiveness research such as biomass to energy, nitrogen utilization, biocides, etc.

### **Outcome #1**

#### **1. Outcome Measures**

New knowledge of production variations in markets, including vertical markets, that help producers, processors, and distributors have requisite information for enhanced decision making leading to decreased costs of inputs and an increase in profits/outputs.

Not Reporting on this Outcome Measure

### **Outcome #2**

#### **1. Outcome Measures**

Business management knowledge, including policy analysis, in targeted areas, e.g. risk management, weather insurance, impacts of land use shifts, grant management that are necessary for and result in increased profitability for stakeholders.

#### **2. Associated Institution Types**

- 1862 Research

#### **3a. Outcome Type:**

Change in Condition Outcome Measure

#### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	0

#### **3c. Qualitative Outcome or Impact Statement**

##### **Issue (Who cares and Why)**

County and township leaders in Ohio frequently call farmland policy researchers, educators and advocates with requests for help in dealing with the forces of land use change. They are feeling the pressures of competition for farmland and know there are a few techniques that can help, but are uncertain on how to proceed. They want development and viable farming but are unsure how to balance the two. They want to know more about the approaches already available - do they work, how much do they cost, etc. - but also are shopping for better options.

##### **What has been done**

Our mission is to enable communities to achieve farmland-protection policy priorities by collaborating on innovative projects and providing needed programming. We work to spread local seeds of invention. Further, we work at the state and federal levels to further viable local agricultural environments. To achieve our mission, the Ohio Center for Farmland Policy Innovation works directly with communities on innovative policy demonstrations/models, writes policy briefs that are timely and locally relevant, maintains a communication network, and hosts an annual statewide farmland policy meeting. The objectives of the Center are to: 1. Become an

"action center" for farmland policy in Ohio, creating and delivering new information for communities who do not currently have the professional capacity to manage and balance growth and change; 2. Consider and test new policy instruments with communities seeking to retain farmland in Ohio through a Farmland Protection Partnership program; 3. Consider ways to strengthen the economic viability of Ohio farms as a necessary part of farmland protection. We achieve our mission by conducting research-based outreach and Extension.

### **Results**

The Farmland Protection Partnership Program conducted six collaborative demonstrations to become tangible models of community-based agricultural economic development policy implemented locally for the rest of the state. We published one website, two peer reviewed articles, two conference papers and eight policy briefs. We hosted five food and farm policy summits, which included training. The directors served in an advisory role to the Ohio Food Policy Council, Food Systems Assessment task force (when in operation); Ohio Department of Agriculture (ODA), Office of Farmland Preservation advisory board; MarketMaker advisory board; Ohio Department of Agriculture Specialty Crop Block Grant Review Committee; Ohio Farm to School. Further, The Ohio Agricultural Easement Purchase Program was considered a pilot when instituted in 2000. The Center director headed an effort to provide a new policy framework that could make this state program more locally relevant. We conduct and disseminate applied research that furthers our mission and advises and assists state-level decision makers through our listservs (one for food policy and one for farm policy), via our website, and our annual meetings.

## **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
608	Community Resource Planning and Development

### **Outcome #3**

#### **1. Outcome Measures**

Research findings on novel programs such as pollution trading, carbon trading, conservation programs, cooperatives, etc. that results in enhanced profits, new sources of income, and/or prevention of loss of profits or loss of other resources, e.g. soil.

Not Reporting on this Outcome Measure

### **Outcome #4**

#### **1. Outcome Measures**

Market economies and efficiencies studies relating to factors such as pricing, finance, supply and demand, exchange rates, trade policies, etc. ensuring that stakeholders are informed and their identified needs.

Not Reporting on this Outcome Measure

## **Outcome #5**

### **1. Outcome Measures**

Grow research findings on valuing (market and non-market) environmental resources, including biocomplexity, e.g. wetlands, river restoration, and how it applies to stakeholder needs for demonstrated gains in profits, resources sustained, and/or actions mitigated.

Not Reporting on this Outcome Measure

## **Outcome #6**

### **1. Outcome Measures**

Increase profitability, reduce environmental impact, and/or improve quality of stakeholders' lives through bio-resource utilization efficiency and effectiveness research such as biomass to energy, nitrogen utilization, biocides, etc.

Not Reporting on this Outcome Measure

## **V(H). Planned Program (External Factors)**

### **External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

### **Brief Explanation**

Shifts in economic dimensions impact all aspects of people's lives. Within this program area, public monies, and the fluctuations in appropriations of such, can have dramatic (both positive and negative) affect on human well-being, as do levels of government regulations. Likewise public policy, priorities, and perceptions, in addition to popular culture, education and family are major external factors impacting this program its research and Extension efforts. Factors such as the availability of base funding to ensure a core faculty and staff, availability of extramural funds, and programmatic demands that exceed available resources are affecting outcomes.

## **V(I). Planned Program (Evaluation Studies)**

### **Evaluation Results**

For 2014, CFAES-OARDC has conducted no formal studies regarding evaluation of our research program. Surrogate evaluation metrics--inclusive but not limited to--that are considered indicators of research success are:

- Research contracts and awards received/ongoing/completed (\$166 million plus in active projects during 2014);
- Number of referred publications reported elsewhere in this report;
- Number of business, industries and groups engaged in CFAES's research programs;
- Number of patents received;
- Economic impact of this college's research program as reported elsewhere in this report;
- The level of base funding from USDA-NIFA and the State of Ohio in 2014;
- Impacts submitted in this report, and the continued robustness of CFAES' research program throughout 2014, both in terms of breadth of programs and depth of new knowledge generated and applied.

The research reported herein is also supported by an informal yet effective formative evaluation. Very little research is conducted at OARDC without early engagement of business, industry, commodity groups, special interest or community groups, or other interested parties given these are the individuals who have the need for and will be the adopters of our research output/impacts. Even in the case of very theoretical research, fellow researchers in industry, government, and academic institutions are consulted (formative evaluation/needs assessment) in the formulation of studies.

### **Key Items of Evaluation**

OARDC researchers, with help from OSU Extension educators, provide unbiased information related to farmland policy to constituents and communities in need.

**V(A). Planned Program (Summary)**

**Program # 12**

**1. Name of the Planned Program**

Human Health (OARDC Led)

Reporting on this Program

**V(B). Program Knowledge Area(s)**

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
502	New and Improved Food Products	0%		5%	
703	Nutrition Education and Behavior	0%		5%	
721	Insects and Other Pests Affecting Humans	0%		20%	
722	Zoonotic Diseases and Parasites Affecting Humans	0%		50%	
723	Hazards to Human Health and Safety	0%		10%	
724	Healthy Lifestyle	0%		10%	
	<b>Total</b>	0%		100%	

**V(C). Planned Program (Inputs)**

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	0.0	0.0	1.4	0.0
<b>Actual Paid</b>	0.0	0.0	1.3	0.0
<b>Actual Volunteer</b>	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	156776	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	250395	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

On-going research activities to advance human health goals for societal well-being include both basic and applied research, as discussed in previous sections for this Planned Program. Effective research requires a mixture of laboratory and gathering places for subjects to maximize research knowledge. Emerging threats now require more advanced facilities such as a bio-security lab, particularly needed in the study infectious animal diseases that may directly impact humans. All functional laboratories and sites are improved over time as program need warrants. OARDC faculty and staff will engage in appropriate levels of outreach, engagement, and consultation with both internal stakeholders such as fellow Extension personnel, and with external stakeholders.

**2. Brief description of the target audience**

Targeted audiences include, but are not limited to:

- Specific individuals or groups who have expressed a need for health, obesity, and safety information that is to be derived through new research, extracted from on-going research, or is derived from scientific literature;
- Fellow academic units that depend on scientists in this program for support information and for new health and safety technologies and approaches/measures fellow agencies or support organizations who will not only use the information but will also extend that information; populations who have not requested the information but will likely benefit from that information;
  - Other scientists and scientific groups;
  - Health workers/organizations;
  - Political entities;
  - Extension personnel;
  - Students from pre-school to post doctorate studies;
  - News organizations;
  - Business and industrial groups.

**3. How was eXtension used?**

eXtension was not used in this program

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	0	0	0	0

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

Year: 2014  
 Actual: 0



**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

<b>2014</b>	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Actual</b>	0	7	0

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Number of graduate students completed  
Not reporting on this Output for this Annual Report

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Release studies on insects, ticks, and mites to protect human health that will provide a set of alternatives leading to health gains with lowered risks, and within economic realities, for the affected populations.
2	Advance the understanding of means and methods related to transmission of zoonotic diseases to humans, including prevention, that meets consumer demand/health threat, as or before such emerges.
3	Reduce through research, development, and outreach the exposure to biohazards, pathogens, and similar to the extent that annually such are reduced per capita with an overall time and economic savings to those who may be affected.
4	Reduce health risk by releasing at least one major study each five years demonstrating techniques, procedures, or products that lessen the chance of contacting, or the impact if contacted, zoonotic diseases.
5	Create a growing base of knowledge that supports improving human health as it relates to food, environment, and lifestyle
6	Expand utilization of products with known functionality or nutraceutical value and give consumers greater informed choices, including the bioavailability of the desired substance in the food, than they presently have.

**Outcome #1**

**1. Outcome Measures**

Release studies on insects, ticks, and mites to protect human health that will provide a set of alternatives leading to health gains with lowered risks, and within economic realities, for the affected populations.

Not Reporting on this Outcome Measure

**Outcome #2**

**1. Outcome Measures**

Advance the understanding of means and methods related to transmission of zoonotic diseases to humans, including prevention, that meets consumer demand/health threat, as or before such emerges.

Not Reporting on this Outcome Measure

**Outcome #3**

**1. Outcome Measures**

Reduce through research, development, and outreach the exposure to biohazards, pathogens, and similar to the extent that annually such are reduced per capita with an overall time and economic savings to those who may be affected.

Not Reporting on this Outcome Measure

**Outcome #4**

**1. Outcome Measures**

Reduce health risk by releasing at least one major study each five years demonstrating techniques, procedures, or products that lessen the chance of contacting, or the impact if contacted, zoonotic diseases.

Not Reporting on this Outcome Measure

**Outcome #5**

**1. Outcome Measures**

Create a growing base of knowledge that supports improving human health as it relates to food, environment, and lifestyle

Not Reporting on this Outcome Measure

## **Outcome #6**

### **1. Outcome Measures**

Expand utilization of products with known functionality or nutraceutical value and give consumers greater informed choices, including the bioavailability of the desired substance in the food, than they presently have.

### **2. Associated Institution Types**

- 1862 Research

### **3a. Outcome Type:**

Change in Condition Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	0

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

The relationship between diet and health is a highly complex one, and it is the focus of Ohio State University's Center for Advanced Functional Foods Research and Entrepreneurship (CAFFRE). CAFFRE is part of the College of Food, Agricultural, and Environmental Sciences and involves faculty members from eight other colleges and schools across campus, including the College of Medicine and The Ohio State University Comprehensive Cancer Center -- Arthur G. James Cancer Hospital and Richard J. Solove Research Institute.

#### **What has been done**

OARDC food scientists are focusing on creating new functional foods that potentially could prevent and treat chronic disease without demanding that consumers make major changes to their diets.

The scientists have been working with a large multidisciplinary team for several years to study the anti-cancer properties of confections and nectar made from freeze-dried black raspberries. The products have a high concentration of polyphenols, a type of antioxidant found naturally in black raspberries. The antioxidant and anti-inflammatory properties may halt tumor growth; however, the berries are seasonal and can be hard to find in stores, so, a berry candy could make the antioxidants more easily available year-round.

Scientists freeze-dried and ground black raspberries into a powder to help preserve the cancer-fighting nutrients, then made gummy candies and a concentrated juice drink, each equal to about a cup of fresh berries.

Currently, the team is analyzing results of a clinical trial of prostate cancer patients. During the three to four weeks while the participants awaited surgery, they consumed differing amounts of

the confections or the nectar. Researchers are studying whether the compounds from the solid confection or the liquid nectar are better absorbed, and they're also studying other aspects of the participants' diets -- coffee, tea and chocolate consumption -- to determine if antioxidant compounds in those foods affected the black raspberry absorption.

### **Results**

The team hopes to find which diet is best, which dosage is best, and which form of delivery (nectar or confection) is best -- that is, which method of introducing the compounds into the body has a stronger benefit.

For now, the confections are being tested in healthy individuals to see how the metabolites are being absorbed in the mouth.

New research strongly suggests that a mix of preventative agents, such as those found in concentrated black raspberries, might more effectively inhibit cancer development than single agents aimed at shutting down a particular gene.

Researchers hope to have the candies and concentrated juice available to consumers within the year.

## **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
502	New and Improved Food Products

## **V(H). Planned Program (External Factors)**

### **External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

### **Brief Explanation**

Multiple factors, including factors such as climate change and weather conditions, play a major role in encouraging the growth and spread of pests and diseases that can be transmitted to humans. Shifts in economy can impact the government's ability to address human health matters. Access to health care, both real and due to political positions, and education regarding healthy lifestyles also affects outcomes. Within this program area public monies, and the fluctuations in appropriations of such, have dramatic affect on human health, as do levels of regulations. Likewise public policy and the public's priorities and perceptions, especially regarding risks, are major external factors impacting this program.

Priority of this research for limited dollars and the resulting competition impact the

extent of research that can be carried out. Items such as potential levels of public exposure to certain zoonotic diseases are major external factors. Likewise public willingness to learn safety procedures in terms of pests or zoonotic disease threats are factors impacting research outcomes. Willingness to pay by consumers for additional food safety is also an external factor. Factors such as the availability of base funding to ensure a core faculty and staff, availability of extramural funds, and programmatic demands that exceed available resources are affecting outcomes.

## **V(I). Planned Program (Evaluation Studies)**

### **Evaluation Results**

For 2014, CFAES-OARDC has conducted no formal studies regarding evaluation of our research program. Surrogate evaluation metrics--inclusive but not limited to--that are considered indicators of research success are:

- Research contracts and awards received/ongoing/completed (\$166 million plus in active projects during 2014);
- Number of referred publications reported elsewhere in this report;
- Number of business, industries and groups engaged in CFAES's research programs;
- Number of patents received;
- Economic impact of this college's research program as reported elsewhere in this report;
- The level of base funding from USDA-NIFA and the State of Ohio in 2014;
- Impacts submitted in this report, and the continued robustness of CFAES' research program throughout 2014, both in terms of breadth of programs and depth of new knowledge generated and applied.

The research reported herein is also supported by an informal yet effective formative evaluation. Very little research is conducted at OARDC without early engagement of business, industry, commodity groups, special interest or community groups, or other interested parties given these are the individuals who have the need for and will be the adopters of our research output/impacts. Even in the case of very theoretical research, fellow researchers in industry, government, and academic institutions are consulted (formative evaluation/needs assessment) in the formulation of studies.

### **Key Items of Evaluation**

OARDC's research on black raspberries suggests that a mix of preventative agents, such as those found in concentrated black raspberries, may more effectively inhibit cancer development than single agents aimed at shutting down a particular gene.

**V(A). Planned Program (Summary)**

**Program # 13**

**1. Name of the Planned Program**

Human and Community Resource Development (OARDC Led)

Reporting on this Program

**V(B). Program Knowledge Area(s)**

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
801	Individual and Family Resource Management	0%		10%	
802	Human Development and Family Well-Being	0%		10%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	0%		25%	
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	0%		10%	
805	Community Institutions and Social Services	0%		10%	
901	Program and Project Design, and Statistics	0%		10%	
903	Communication, Education, and Information Delivery	0%		25%	
	<b>Total</b>	0%		100%	

**V(C). Planned Program (Inputs)**

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	0.0	0.0	1.8	0.0
<b>Actual Paid</b>	0.0	0.0	2.5	0.0
<b>Actual Volunteer</b>	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	297555	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	302863	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

### V(D). Planned Program (Activity)

#### 1. Brief description of the Activity

The activities carried out in the Human and Community Resource Development Planned Program is primarily applied research and is supported by several CFAES academic departments. The preceding sections help to characterize activities within this Planned Program. Both laboratories and multiple field sites/community settings are available throughout state to permit data gathering and to continue projects requiring data over time. All functional laboratories and sites are improved over time as program need warrants. OARDC faculty and staff engage in appropriate levels of outreach, engagement, and consultation, with both internal stakeholders such as fellow Extension personnel, and with external stakeholders.

#### 2. Brief description of the target audience

Targeted audiences include, but not limited to:

- Specific individuals or groups who have expressed a need for information related to some aspect of human capital that is to be derived through new research, extracted from on-going research, or is derived from scientific literature;
- Fellow academic units that depend on scientists in this program for support information and for approaches/measures;
- Fellow agencies or support organizations who will not only use the social information but will also extend that information;
- Populations who have not requested the information but will likely benefit from that information;
- Other scientists and scientific groups;
- Political entities;
- Extension personnel;
- Students from pre-school to post doctorate studies;
- News organizations;
- Business and industrial groups.

#### 3. How was eXtension used?

eXtension was not used in this program

### V(E). Planned Program (Outputs)

#### 1. Standard output measures



2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

**2. Number of Patent Applications Submitted (Standard Research Output)**  
**Patent Applications Submitted**

Year: 2014  
 Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2014	Extension	Research	Total
Actual	0	7	0

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Number of graduate students completed  
 Not reporting on this Output for this Annual Report

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Advance human capital and sociological studies that will inform strategies for expanding and strengthening individual and family well-being, community stability, and agricultural workforce leading to improved quality and quantity of life.
2	Investigate shifts in rural-urban interface, land use, immigration, and similar changes to determine if community policies and/or levels of social capital in the community can shape the future of agriculture in face of urbanization pressures.
3	Improve through research the understanding of and skill development for decision-making by local farmers that will result in improved farm viability and competitiveness at the rural-urban interface.
4	Study rural educational systems relative to educational resources, curriculum, instructional delivery, and student learning to the extent necessary to inform decision-makers how to improve rural education systems as requested.
5	Investigate the social implications of structural changes in agriculture and their economic implications, documenting challenges and opportunities for rural individuals, families, groups and communities, including business and government.
6	Advance understanding of communication, education and information services to show gain scores in the teaching and learning process within related agriculture and natural resources programs.

## **Outcome #1**

### **1. Outcome Measures**

Advance human capital and sociological studies that will inform strategies for expanding and strengthening individual and family well-being, community stability, and agricultural workforce leading to improved quality and quantity of life.

### **2. Associated Institution Types**

- 1862 Research

### **3a. Outcome Type:**

Change in Condition Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	0

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

The prevalence of Autism Spectrum Disorder (ASD) has risen substantially in U.S children in recent years. One study concluded that the prevalence rate among children aged 6-11 had grown from .6 to 3.1 per 1000 children from 1994-2003; a five-fold increase. Children in military families have experienced parallel increases in ASD diagnoses. While a variety of factors may help explain this increase, the result is significant, and military families are searching for effective methods to help their children with ASD.

#### **What has been done**

Experts located in national centers and land grant universities have worked on the following objectives of this implementation project: (1) To assess the local availability of educational services for children with ASD on and near military bases and installations following the protocols established in the start-up phase of this project. (2) To develop a review of evidence-based, best practices in educational services for children with ASD and vet this review with national experts in autism. (3) To create a set of recommendations for the provision of ASD educational services to military dependent children. (4) To present a report to CSREES for presentation to the Secretary of Defense that outlines ASD service availability in and around military bases, evidence-based educational service options that are appropriate across the autism spectrum, and recommendations related to assuring that appropriate evidence-based best practices in the provision of educational services are available to military dependent children.

#### **Results**

Ultimately, the educational needs of military families with children diagnosed with ASD will be better met due to the products resulting from this project. Policies related to assuring that military dependent children with ASD receive adequate and appropriate services will be guided by the recommendations that are generated from the project. During this reporting period, the

Department of Defense Office of Special Needs Education Directory for Children with Special Needs searchable website was updated with downloadable PDFs, which provide a review of best practices in educational services for children with ASD and other disabilities and assess the local availability of educational services.

In addition to the state-specific information and resources provided, the directory provides valuable information and tools that all families can use to help with a smooth transition as they relocate with a family member with special needs. Project staff also made recommendations to the office of the Secretary of Defense regarding provision of adequate and appropriate educational services for military dependent children with ASD and other disabilities. Project staff also developed a report for the Secretary of Defense that outlined ASD service availability in and around military bases, evidence-based educational service options that are appropriate across the autism spectrum, and recommendations related to assuring that appropriate evidence-based best practices in the provision of educational services are available to military dependent children.

#### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
802	Human Development and Family Well-Being

#### **Outcome #2**

##### **1. Outcome Measures**

Investigate shifts in rural-urban interface, land use, immigration, and similar changes to determine if community policies and/or levels of social capital in the community can shape the future of agriculture in face of urbanization pressures.

Not Reporting on this Outcome Measure

#### **Outcome #3**

##### **1. Outcome Measures**

Improve through research the understanding of and skill development for decision-making by local farmers that will result in improved farm viability and competitiveness at the rural-urban interface.

Not Reporting on this Outcome Measure

#### **Outcome #4**

##### **1. Outcome Measures**

Study rural educational systems relative to educational resources, curriculum, instructional delivery, and student learning to the extent necessary to inform decision-makers how to improve rural education systems as requested.

##### **2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

It is important for the field of bioenergy that future consumers, policy makers and taxpayers develop knowledge and awareness of bioenergy. Current resources to promote bioenergy awareness often target youth in only the 6th through 12th grades. Research indicates that to effectively impact youth knowledge, skills and abilities, they should be reached at earlier ages for long-term developmental outcomes (Bronfenbrenner, 2005; Enver, Partridge & Clark, 2008). Therefore, educational resources for children are needed to increase bioenergy knowledge, appreciation and career interest.

**What has been done**

A bioenergy educational curriculum for children (K-5th grades) was developed. Three curriculum pieces were created (bioenergy sources, bioenergy conversion, and bioproducts) and the curriculum is available via the web ([www.ohio4h.org/BioenergyEducation](http://www.ohio4h.org/BioenergyEducation)).

A webinar was conducted for states in the northeast Sun Grant region to introduce the bioenergy curriculum and for implementation. Also at state-wide Extension in-service the material was introduced and discussed for implementation.

The curriculum was piloted in seven Ohio counties with 439 children under the supervision of 4-H Extension professionals.

Results have been shared nationally through a Sun Grant Initiative Conference and a state-wide Extension conference in Ohio.

**Results**

The curriculum contributed to the national science education standards in the K-4th grades content areas of life sciences and science as inquiry.

The following impacts are based on the evaluation of 439 children in seven Ohio counties engaged in the bioenergy curriculum. The activities were leader-directed by adult Extension 4H volunteers or professionals and results were based on their reported observations of the participating children.

Seven questions inquired about life skills, behaviors or environment. The scale ranged from 0 (none of the children) to 4 (all of the children). Findings are reported with values "3" and "4" combined.

Increased knowledge about bioenergy: 56.3%  
Gained self-confidence: 50%  
Recognized importance of bioenergy as renewable energy: 56.3%  
Improved in getting along with others: 62.6%  
Asked questions and made predictions (scientific inquiry): 68.8%  
Increased awareness about bioenergy: 68.8%

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
903	Communication, Education, and Information Delivery

#### Outcome #5

##### 1. Outcome Measures

Investigate the social implications of structural changes in agriculture and their economic implications, documenting challenges and opportunities for rural individuals, families, groups and communities, including business and government.

Not Reporting on this Outcome Measure

#### Outcome #6

##### 1. Outcome Measures

Advance understanding of communication, education and information services to show gain scores in the teaching and learning process within related agriculture and natural resources programs.

Not Reporting on this Outcome Measure

#### V(H). Planned Program (External Factors)

##### External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)
- Other (Trends and fads)

##### Brief Explanation

How society is organized, make decisions, is educated, move from locale to locale, etc. all impact the food, agricultural, and environmental human - resources matrix. Factors such as the availability of base funding to ensure a core faculty and staff, availability of

extramural funds, and programmatic demands that often exceed resources, will affect outcomes.

## **V(I). Planned Program (Evaluation Studies)**

### **Evaluation Results**

For 2014, CFAES-OARDC has conducted no formal studies regarding evaluation of our research program. Surrogate evaluation metrics--inclusive but not limited to--that are considered indicators of research success are:

- Research contracts and awards received/ongoing/completed (\$166 million plus in active projects during 2014);
- Number of referred publications reported elsewhere in this report;
- Number of business, industries and groups engaged in CFAES's research programs;
- Number of patents received;
- Economic impact of this college's research program as reported elsewhere in this report;
- The level of base funding from USDA-NIFA and the State of Ohio in 2014;
- Impacts submitted in this report, and the continued robustness of CFAES' research program throughout 2014, both in terms of breadth of programs and depth of new knowledge generated and applied.

The research reported herein is also supported by an informal yet effective formative evaluation. Very little research is conducted at OARDC without early engagement of business, industry, commodity groups, special interest or community groups, or other interested parties given these are the individuals who have the need for and will be the adopters of our research output/impacts. Even in the case of very theoretical research, fellow researchers in industry, government, and academic institutions are consulted (formative evaluation/needs assessment) in the formulation of studies.

### **Key Items of Evaluation**

OARDC researchers, with help from OSU Extension educators, provide unbiased information related to bioenergy to future consumers, policy makers and taxpayers. Additionally, a bioenergy educational curriculum for children was developed to promote awareness and foster long-term developmental outcomes.

**V(A). Planned Program (Summary)**

**Program # 14**

**1. Name of the Planned Program**

Advancing Employment and Income Opportunities (Extension)

Reporting on this Program

**V(B). Program Knowledge Area(s)**

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
602	Business Management, Finance, and Taxation	15%		0%	
608	Community Resource Planning and Development	60%		0%	
801	Individual and Family Resource Management	25%		0%	
	<b>Total</b>	100%		0%	

**V(C). Planned Program (Inputs)**

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	10.0	0.0	0.0	0.0
<b>Actual Paid</b>	6.0	0.0	0.0	0.0
<b>Actual Volunteer</b>	13.6	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
337364	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
337364	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

**V(D). Planned Program (Activity)**



**1. Brief description of the Activity**

- Workshops
- Programs
- Curriculum development
- Leadership development
- Development of on-line resources
- Research to build plans and implement strategies
- One-on-one 'Business Retention and Expansion' (BR&E) consultations
- 'Business Retention and Expansion' (BR&E) volunteer organizational efforts
- Local and regional economic analysis

**2. Brief description of the target audience**

- Community Leaders
- Economic development professionals
- Citizens (families and individuals)
- Entrepreneurs and business owners / operators

**3. How was eXtension used?**

eXtension was not used in this program

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	31194	63127	0	0

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

Year: 2014

Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2014	Extension	Research	Total
<b>Actual</b>	8	0	0

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- number of one-on-one consultations  
Not reporting on this Output for this Annual Report

**Output #2**

**Output Measure**

- number of formal presentation of findings to communities (BR&E)  
Not reporting on this Output for this Annual Report

**Output #3**

**Output Measure**

- number of web-based questionnaires distributed (BR&E)  
Not reporting on this Output for this Annual Report

**Output #4**

**Output Measure**

- number of survey questions developed to address niche program needs (BR&E)  
Not reporting on this Output for this Annual Report

**Output #5**

**Output Measure**

- number of formal training workshops (BR&E)

<b>Year</b>	<b>Actual</b>
2014	6

**Output #6**

**Output Measure**

- number of one-on-one consultations (BR&E)

<b>Year</b>	<b>Actual</b>
2014	45

**Output #7**

**Output Measure**

- number of volunteers who have participated

<b>Year</b>	<b>Actual</b>
2014	2320

**Output #8**

**Output Measure**

- number of volunteer hours

<b>Year</b>	<b>Actual</b>
2014	28340

**Output #9**

**Output Measure**

- number of program planning and implementation volunteers (BR&E)

<b>Year</b>	<b>Actual</b>
2014	5

**Output #10**

**Output Measure**

- number of program planning and implementation volunteer hours donated (BR&E)

<b>Year</b>	<b>Actual</b>
2014	35

**Output #11**

**Output Measure**

- number of Ohio counties impacted by social and environmental changes associated with shale development

<b>Year</b>	<b>Actual</b>
2014	25

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	# of participants who increased their financial literacy (FCS)
2	# of participants who have developed an integrated plan for achieving financial security (FCS)
3	# of participants who understand their roles in the development of a community economy (BR&E)
4	# of participants using knowledge gained from local applied research to make community decisions (CD)
5	# of community plans developed and adopted (BR&E)
6	# of jobs created (BR&E)
7	number of local leaders or community residents who indicated an increase in familiarity with various ways of analyzing and interpreting data that will impact their decision making regarding community issues (BR&E)
8	# of jobs retained (BR&E)
9	number of local leaders and community residents that have indicated they are using knowledge gained from BR&E programming to make better informed community decisions (BR&E)
10	number of youth indicating an intent to start their own business as a result of OSU Extension programming.
11	number of businesses planning to increase investment in a local urban community
12	number of consultations with individuals interested in business start-ups, small business expansions, farming, local foods, and non-profit management
13	number of Ohio tourism-related businesses that participated in a needs assessment and made changes to their professional development efforts based on survey findings

**Outcome #1**

**1. Outcome Measures**

# of participants who increased their financial literacy (FCS)

Not Reporting on this Outcome Measure

**Outcome #2**

**1. Outcome Measures**

# of participants who have developed an integrated plan for achieving financial security (FCS)

Not Reporting on this Outcome Measure

**Outcome #3**

**1. Outcome Measures**

# of participants who understand their roles in the development of a community economy (BR&E)

Not Reporting on this Outcome Measure

**Outcome #4**

**1. Outcome Measures**

# of participants using knowledge gained from local applied research to make community decisions (CD)

Not Reporting on this Outcome Measure

**Outcome #5**

**1. Outcome Measures**

# of community plans developed and adopted (BR&E)

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	42

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Community leaders are often faced with decisions for which they have little or no local research to inform decision making.

**What has been done**

Through a community engagement process, local community socio-economic data and resident input have been collected and compiled by OSU Extension professionals in community plan / report formats that can be referenced to better inform local decision making.

**Results**

Local elected and appointed officials in 45 communities have used locally informed community planning documents (as provided by OSU Extension professionals) to inform decisions regarding infrastructure expansion, zoning, subdivision review, and development patterns for the future.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
608	Community Resource Planning and Development

**Outcome #6**

**1. Outcome Measures**

# of jobs created (BR&E)

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	716

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Economies are powered by employment. Service providers rely on healthy economies as a funding mechanism to continue to provide services. When businesses fail, employment opportunities evaporate, and local economies begin to fail. For example, an aluminum factory in Monroe County (eastern Ohio) began closing in late 2013, and the final 20 employees were laid off in the summer of 2014. The closing was ultimately caused by a number of variables, including ownership changes, bankruptcies, high legacy costs, energy provider rate hikes, and low aluminum prices; this all resulted in the layoff of 700 employees. The workers of the Ormet aluminum factory relied on the company for a decent living, and the economies of the Ohio River communities in Monroe County, Ohio and Wetzel County, West Virginia also hung on the company's survival. It is exactly this situation that 'Business Retention and Expansion' programming seeks to avoid.

**What has been done**

Local community leaders have been engaged in community outreach efforts involving local employers to identify specific needs that, if addressed, can enable expansion of facilities and workforce.

**Results**

Local community leaders have become better informed of local employer needs. Needs have been addressed, enabling local employers to create and / or retain local jobs in Fayette, Noble, Van Wert, and Wyandot counties. In Fayette County, the OSU Extension educator helped to secure \$351,000 in loans from the Ohio Small Business Administration office to assist in the start-up of small businesses in the county. This created 10 full time jobs and 7 part time jobs. These loans will help to increase financial security in the area, as well as promote higher living standards, which will in turn result in increased spending and higher sales and profits for businesses. In Wyandot county, the Community Development Educator helped public and development officials create a narrative describing the local economy. This narrative helped identify a business expansion project requiring infrastructure. The Educator was able to help the business obtain \$150,000 in workforce training grants, as well as state and local tax incentives. Over \$20 million has been invested by companies in Wyandot County. Additionally, 90 full time jobs will be created.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
602	Business Management, Finance, and Taxation
608	Community Resource Planning and Development
801	Individual and Family Resource Management

**Outcome #7**

**1. Outcome Measures**

number of local leaders or community residents who indicated an increase in familiarity with various ways of analyzing and interpreting data that will impact their decision making regarding community issues (BR&E)

Not Reporting on this Outcome Measure

**Outcome #8**

**1. Outcome Measures**

# of jobs retained (BR&E)

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	2161

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Economies are powered by employment. Service providers rely on healthy economies as a funding mechanism to continue to provide services. When businesses fail, employment opportunities evaporate, and local economies begin to fail.

**What has been done**

Local community leaders have been engaged by OSU Extension professionals in community outreach efforts involving local employers to identify specific needs.

**Results**

Local community leaders have become better informed of local employer needs. Needs have been addressed, enabling local employers to retain local jobs. A 2014 success story is in Wyandot county. In addition to the 90 jobs created, 585 jobs will be retained. The Wyandot County OSU Extension Educator helped a local business requiring infrastructure secure \$150,000 in workforce training grants, as well as local tax incentives. The result of the securing of the Educator's work was the retention of 585 jobs in the Wyandot community, as well as over \$20 million invested in the community by companies.



#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
608	Community Resource Planning and Development
801	Individual and Family Resource Management

#### Outcome #9

##### 1. Outcome Measures

number of local leaders and community residents that have indicated they are using knowledge gained from BR&E programming to make better informed community decisions (BR&E)

##### 2. Associated Institution Types

- 1862 Extension

##### 3a. Outcome Type:

Change in Action Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2014	24

##### 3c. Qualitative Outcome or Impact Statement

###### Issue (Who cares and Why)

Local decisions affecting a community or regional economy are often ill-informed. As a result, limited resources are often not fully leveraged.

###### What has been done

Local community economic data have been collected via stakeholder engagement in applied research. The outputs of this applied research have been used to better inform local decision making.

###### Results

Local elected and appointed officials have used local community data to inform decisions regarding infrastructure expansion, use of tax incentives, and job-training programs.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

**Outcome #10**

**1. Outcome Measures**

number of youth indicating an intent to start their own business as a result of OSU Extension programming.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	49

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

In Van Wert County, the rate of entrepreneurship has been declining. The declination of growth rates in small businesses may lead to limited employment opportunities in the future.

**What has been done**

OSU Extension partnered with Wright State University's Business Enterprise Center to expose 98 local high school seniors to the world of entrepreneurship via entrepreneurial strength assessments, business planning exercises, and financial analyses work.

**Results**

Forty-nine student participants indicated that they would consider owning or starting their own business at some point in the future.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
608	Community Resource Planning and Development

**Outcome #11**

**1. Outcome Measures**

number of businesses planning to increase investment in a local urban community

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	8

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Inner city neighborhoods contain a mix of local businesses that provide goods, services, and employment for neighborhood residents. Thriving neighborhoods possess a robust economic sector that provides a wide range of opportunities.

**What has been done**

OSU Extension partnered with the Weinland Park community's neighborhood improvement group to better understand neighborhood business needs and plans for growth by conducting a 'Business Retention and Expansion' program. The Weinland Park community is a diverse one, with approximately 4,800 individuals, located in the University District in Columbus, Ohio. The community has been struggling for a long time, but recent investments have shown promise of improvement.

**Results**

Program participants learned that 8 local businesses have plans to increase their investment in their Weinland Park business locations, and 12 businesses expect to see growth.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
608	Community Resource Planning and Development

**Outcome #12**

**1. Outcome Measures**

number of consultations with individuals interested in business start-ups, small business expansions, farming, local foods, and non-profit management

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	45

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Potential new business owners and entrepreneurs require an understanding of market opportunities to inform their plans for starting a business or expanding their existing business. Such information is critical when applying for needed financing and in determining how to invest.

**What has been done**

The Community Development Educator in Miami County conducted over 45 consultations with individuals who experienced knowledge gains by learning processes and techniques for business start-ups, small business expansions, farming methods to take advantage of local food sales opportunities, and non-profit management.

**Results**

Of the 45+ consultations conducted, 3 organizations were further assisted with strategic planning efforts and 2 organizations conducted major surveys to help businesses or groups understand market conditions. These activities allowed individuals and organizations to translate their ability to make specific decisions regarding business plans for future growth and profitability.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
608	Community Resource Planning and Development

**Outcome #13**

**1. Outcome Measures**

number of Ohio tourism-related businesses that participated in a needs assessment and made changes to their professional development efforts based on survey findings

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	1

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Travel in Ohio involves \$29.9 billion in spending at Ohio hotels, attractions, restaurants, museums, etc. These dollars indirectly result in an additional \$8 billion in sales for other travel-related goods and service. Maintaining and increasing this level of investment is dependent upon a trained and competent travel industry-related workforce.

**What has been done**

Extension partnered with the Ohio Tourism Association (OTA) to conduct an industry-wide needs assessment to identify educational gaps and effective educational delivery methods.

**Results**

50% of respondents cited funding as a barrier to professional development, 40% said there is a lack of relevant training options, and a lack of time was cited by 64% of survey participants. In addition, the OTA board of directors was able to partner with other state level organizations to foster job development and retention among Ohio's tourism workforce.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
608	Community Resource Planning and Development

**V(H). Planned Program (External Factors)**

**External factors which affected outcomes**

- Economy
- Appropriations changes
- Competing Public priorities
- Competing Programmatic Challenges

**Brief Explanation**

External factors above influenced the allocation of organizational resources and resource availability of partnering organizations and individuals, limiting to some degree the extent to which planned efforts could be fully recognized.

## **V(I). Planned Program (Evaluation Studies)**

### **Evaluation Results**

As a result of program efforts, involving group and one-on-one consultations, 24 community residents and leaders have become better informed and better able to make decisions of benefit to their local and regional economies. Due to these consultations, Ohio businesses have been able to leverage over \$12 million in loans and other investments necessary for growth and local community governments and / or organizations have leveraged over \$6 million to support community development efforts. These leveraged dollars represent the sum of a variety of funding streams, including grants, cost shares, loans, and / or loan guarantees and have helped to support the creation and / or retention of 2877 jobs.

### **Key Items of Evaluation**

**V(A). Planned Program (Summary)**

**Program # 15**

**1. Name of the Planned Program**

Enhancing Agriculture and the Environment (Extension)

Reporting on this Program

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	10%		0%	
112	Watershed Protection and Management	15%		0%	
123	Management and Sustainability of Forest Resources	5%		0%	
133	Pollution Prevention and Mitigation	10%		0%	
205	Plant Management Systems	15%		0%	
216	Integrated Pest Management Systems	15%		0%	
307	Animal Management Systems	10%		0%	
601	Economics of Agricultural Production and Farm Management	10%		0%	
602	Business Management, Finance, and Taxation	10%		0%	
	<b>Total</b>	100%		0%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of FTE/SYs expended this Program**

Year: 2014	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	34.0	0.0	0.0	0.0
<b>Actual Paid</b>	49.7	0.0	0.0	0.0
<b>Actual Volunteer</b>	10.2	0.0	0.0	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
2794498	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
2794498	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

## V(D). Planned Program (Activity)

### 1. Brief description of the Activity

- Enhance the adaptation of production techniques through utilization of on-farm research to work directly with producers to evaluate practices to enhance productivity and profitability
  - Conduct workshop training sessions for livestock haulers, food animal veterinarians, livestock producers, consultants and integrators
    - Prepare and distribute research-based educational materials in the areas of animal welfare and biosecurity through worksheets, factsheets, web-based sites, podcasts, and other emerging technologies
    - Conduct tax education workshops for practitioners
    - Conduct Pesticide Applicator Trainings for private and commercial license holders
    - Conduct Fertilizer Applicator Certification training sessions
    - Organize and conduct the two 2014 Small Farm Conference and the Small Farm College series
    - Organize and conduct Transitioning Your Farm Business to the Next Generation Workshops
    - Organize and conduct Women in Agriculture / "Annie's Project" seminars
    - Organize and conduct the 2014 Eastern Ohio Women in Agriculture Conference as well as showcase the "100 Women in Agriculture" display that was debuted at the 2014 Farm Science Review
      - Organize and conduct educational activities targeted at proper nutrient utilization, crop response and water quality concerns
        - Organize and conduct meetings, seminars, conferences, programs and activities for the new "Local Foods" signature program (this program will address the critical need for outreach education around the broad topic of local food systems)
        - Organize and conduct educational workshops, training sessions, and seminars for Master Gardener Volunteers
          - Jointly update and publish the 2015 Weed Control Guide for Ohio and Indiana
          - Organize, plan and conduct seminars, workshops and meetings to assist landowners, foresters, and loggers manage Ohio's natural resources in economically viable and environmentally friendly ways

### 2. Brief description of the target audience

- Ohio citizens
- Commercial green-industry companies
- Consumer horticulture advocates
- Commodity / farm advocacy groups
- Federal and state agricultural / environmental agencies
- State-wide consumer groups



- Volunteer groups
- Community leaders
- Business leaders
- Elected and appointed officials
- Non-government organizations
- Tax practitioners and preparers
- Female agricultural or agricultural-related business owners / partners
- Small and beginning farmers
- Pesticide license holders (commercial and private)
- Ohio farmers
- Livestock haulers
- 4-H and FFA youth exhibiting livestock projects
- Livestock producers
- Manure haulers and applicators
- Fertilizer applicators (commercial and private)
- Forest landowners
- Professional foresters and loggers
- 

**3. How was eXtension used?**

eXtension was not used in this program

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	380188	643076	6513	6853

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

Year: 2014

Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2014	Extension	Research	Total
<b>Actual</b>	154	0	0

**V(F). State Defined Outputs**

## Output Target

### Output #1

#### Output Measure

- number of volunteers involved in delivery and implementation of program

Year	Actual
2014	5458

### Output #2

#### Output Measure

- number of multi-state partnerships

Year	Actual
2014	8

### Output #3

#### Output Measure

- number of people completing the 'Transitioning Your Farm/Agricultural Business to the Next Generation' workshops

Year	Actual
2014	44

### Output #4

#### Output Measure

- number of 'Crop Observation and Recommendation Network' newsletters distributed

Year	Actual
2014	160000

### Output #5

#### Output Measure

- number of participants attending regional / local agronomy meetings

Year	Actual
2014	147060

### Output #6

#### Output Measure

- number of hits to website

<b>Year</b>	<b>Actual</b>
2014	360000

**Output #7**

**Output Measure**

- number of local / on-farm research project sites

<b>Year</b>	<b>Actual</b>
2014	32

**Output #8**

**Output Measure**

- number of participants in local Field Days

<b>Year</b>	<b>Actual</b>
2014	2100

**Output #9**

**Output Measure**

- number of 'Weed Control Guide for Ohio and Indiana' distributed

<b>Year</b>	<b>Actual</b>
2014	3400

**Output #10**

**Output Measure**

- number of 'Corn, Soybean, Wheat and Alfalfa Field Guides' distributed

<b>Year</b>	<b>Actual</b>
2014	810

**Output #11**

**Output Measure**

- number of people participating in an OSUE Local Foods program, activity, conference, or workshop

<b>Year</b>	<b>Actual</b>
2014	4877

**Output #12**

**Output Measure**

- number of hits to the invasive species website (Great Lakes Early Detection Network)

Not reporting on this Output for this Annual Report

**Output #13**

**Output Measure**

- number of individuals taught about disease identification, control, and scouting or other key weed control concepts

<b>Year</b>	<b>Actual</b>
2014	312

**Output #14**

**Output Measure**

- number of people attending 'Bed Bugs' educational talks and meetings
- Not reporting on this Output for this Annual Report

**Output #15**

**Output Measure**

- number of people attending the 'New and Small Farm College'

<b>Year</b>	<b>Actual</b>
2014	693

**Output #16**

**Output Measure**

- number of people attending the 'Small Farm Conference and Trade Show'

<b>Year</b>	<b>Actual</b>
2014	200

**Output #17**

**Output Measure**

- number of producers completing direct and indirect education on 'Weed Control in Agronomic Crops'

<b>Year</b>	<b>Actual</b>
2014	1243

**Output #18**

**Output Measure**

- number of 'Field Crop Insects of Ohio' media distributed
- Not reporting on this Output for this Annual Report

**Output #19**

**Output Measure**

- number of 'Ohio Agronomy Guide' media distributed

<b>Year</b>	<b>Actual</b>
2014	1200

**Output #20**

**Output Measure**

- Number of food animal producers that complete 'Livestock Mortality Composting' training

<b>Year</b>	<b>Actual</b>
2014	72

**Output #21**

**Output Measure**

- number of program participants that are considered to be under-represented

<b>Year</b>	<b>Actual</b>
2014	37765

**Output #22**

**Output Measure**

- number of volunteer hours worked

<b>Year</b>	<b>Actual</b>
2014	21143

**Output #23**

**Output Measure**

- number of new Master Gardener Volunteers

<b>Year</b>	<b>Actual</b>
2014	987

**Output #24**

**Output Measure**

- number of direct contacts through the 'Nutrient Stewardship for Cleaner Water' signature program

<b>Year</b>	<b>Actual</b>
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2014 2807

**Output #25**

**Output Measure**

- number of people attending the Farm Science Review event

<b>Year</b>	<b>Actual</b>
2014	131153

**Output #26**

**Output Measure**

- number of Certified Crop Advisors (CCAs) in Ohio

<b>Year</b>	<b>Actual</b>
2014	540

**V(G). State Defined Outcomes****V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Number of people (agronomic crops, fruit and vegetable producers) that demonstrate an increase in plant-based food biosecurity / biosafety knowledge
2	number of people indicating an increased knowledge of current practices and emerging technology in conservation tillage
3	Increase profitability for the food animal sector of the Ohio agricultural industry, measured in number of farms completing detailed financial and production data lists
4	Number of Schedule "F" tax forms filed by tax practitioners that participated in OSU Income Tax Schools.
5	Number of farms using transitioning planning.
6	number of Increasing Profitable Crop Yields participants that indicate they will implement new management practices based on information received at meetings
7	number of crop production acres that will implement best management practices for nutrient management
8	number of crop production acres that implement weed resistance management strategies
9	number of Ohio crop acres where appropriate utilization of integrated pest management (IPM) practices occur
10	number of individuals who learned something about disease identification, control, and scouting or key weed control concepts
11	number of farmers reporting positive changes in management and / or profitability of their farm from the use of disease identification, control and scouting or key weed control concepts
12	number of farmers reporting positive changes in management and / or profitability of their farm as a result of information from farm financial analysis
13	reported economic impact of cost savings, increased yield, or other increased profitability from use of CORN newsletter reported as total dollars
14	number of acres of Ohio crop land impacted by consultations provided by OSU Extension certified CCAs (Certified Crop Advisors)
15	number of acres of forest land impacted by OSU Extension programming
16	number of individuals who plan to implement on their farm one of the learning outcomes from OSUE programming related to: disease identification and control, scouting, or key weed control concepts

## **Outcome #1**

### **1. Outcome Measures**

Number of people (agronomic crops, fruit and vegetable producers) that demonstrate an increase in plant-based food biosecurity / biosafety knowledge

### **2. Associated Institution Types**

- 1862 Extension

### **3a. Outcome Type:**

Change in Knowledge Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	131400

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

A safe and sustainable food supply begins with the ability of producers to make and handle food in ways that ensures food safety and quality. The need for food safety is more important than ever, as our food is coming from increasingly diverse sources.

#### **What has been done**

Good Agricultural Practice (GAP) programs have been delivered to fruit and vegetable growers, educating participants about on-farm food safety practices that can help reduce the risk of produce contamination. Agronomic Crop Field Days, webinar series, and workshops have been held to educate about on-farm food safety practices that can help reduce the risk of on-farm grain contamination.

#### **Results**

There were over 180,000 attendees at programs dealing with sustainable agriculture, fruit and vegetable crops, agronomic crops, water quality, and other related issues with 131,400 individuals reporting a gain in knowledge (approximately 73%) of on-farm food bio-security / bio-safety.

### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
133	Pollution Prevention and Mitigation
205	Plant Management Systems



## **Outcome #2**

### **1. Outcome Measures**

number of people indicating an increased knowledge of current practices and emerging technology in conservation tillage

### **2. Associated Institution Types**

- 1862 Extension

### **3a. Outcome Type:**

Change in Knowledge Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	720

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

The sustainable management of our soil resources is paramount to maintaining not only the \$100 billion agricultural industry in Ohio, but also in preserving environmental integrity. Ensuring quality knowledge and best practices amongst farmers is a goal of OSU Extension programming in the 'Enhancing Agriculture and the Environment' programming. The management of soil resources directly impacts all citizens of Ohio, as the quality of soil directly impacts the quality of food harvested.

#### **What has been done**

Each year, OSU Extension hosts the Conservation Tillage Conference (CTC), a two day event which features approximately 60 speakers addressing attendees at concurrent sessions. Speakers address such topics as: cover crops, nutrient management, soil and water quality, and no-till systems. The CTC attracts approximately 900 attendees annually, which includes farmers, certified crop consultants, industry representatives, and others interested in sustainable farming.

#### **Results**

Approximately 80% (720) of participants at the 2014 CTC report that they gained useful knowledge which they plan to implement during the next growing season, and that they expect to see an increase in productivity and a reduction in costs as a result of knowledge gained from OSUE programming.

### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
112	Watershed Protection and Management

133	Pollution Prevention and Mitigation
205	Plant Management Systems
216	Integrated Pest Management Systems

**Outcome #3**

**1. Outcome Measures**

Increase profitability for the food animal sector of the Ohio agricultural industry, measured in number of farms completing detailed financial and production data lists

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	78

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Good management is key to the success of any small business. To ensure a sustainable and affordable supply of food, it is essential that animal businesses be financially viable.

**What has been done**

In 2014, to address profitability of the food animal sector of the Ohio agricultural industry, OSU Extension offered workshops and training sessions for livestock haulers, food animal veterinarians, livestock producers, aquaculture producers and consultants. Participants at these workshops received OSUE-prepared educational materials (worksheets, fact sheets, web sites, podcasts) on animal welfare and biosecurity.

**Results**

Approximately 40% (78) of the 200 livestock producers attending farm financial management classes in 2014 indicated they were implementing new financial management procedures as a result of OSUE-led workshops.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
307	Animal Management Systems

**Outcome #4**

**1. Outcome Measures**

Number of Schedule "F" tax forms filed by tax practitioners that participated in OSU Income Tax Schools.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	9243

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

The OSU Income Tax School program has been providing education for tax preparers for over 50 years. Instruction focuses on tax law changes and problems faced in preparing tax returns. The tax school is designed for tax preparers with some experience preparing and filing federal tax returns for individuals and small businesses. Additionally, the OSU Tax School offers an 'Agricultural Tax Issues and Form Preparation' workshop concerning the special issues with farm tax returns. Continuing education credits are available for attorneys, CPAs, EAs, and CFPs.

**What has been done**

OSU Tax Schools were conducted in eight face-to-face sessions and via three webinars throughout Ohio in 2014.

**Results**

737 total attendees came to the eight face-to-face two day workshops, and an additional 526 attendees viewed one of three webinar sessions. These 1,263 tax preparers helped to prepare 9,243 Schedule F tax forms for Ohio farm and small business owners in 2014.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
602	Business Management, Finance, and Taxation

## **Outcome #5**

### **1. Outcome Measures**

Number of farms using transitioning planning.

### **2. Associated Institution Types**

- 1862 Extension

### **3a. Outcome Type:**

Change in Action Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	36

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

As farm owners age, they have concerns about what to do with the family farm, and other future quality of life issues. The need for a developed farm transfer plan, as well as strong family communication regarding the process of transitioning the farm to the next generation is very important to minimize family stress and make the transition process as simple and easy as possible. Farm transitioning has the potential to impact long term stability of the food supply chain.

#### **What has been done**

"Transitioning the Farm to the Next Generation" workshops were held around the state in 2014. Topics addressed in workshops included the effect of the new estate tax laws on farm estate settlement costs, distribution options for heirs, options for farm heirs to purchase farm assets, LLCs to protect farm assets and personal assets, and ways to protect assets from long-term care issues.

#### **Results**

As a result of OSUE programming, 36 new farm families are using long-term planning for transition to the next generation and future quality of life issues. In one county, an assessment showed that 78% of participants planned to implement (within the next six months) a regular monthly family business meeting to discuss farm business and transitioning issues.

### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
602	Business Management, Finance, and Taxation

## **Outcome #6**

### **1. Outcome Measures**

number of Increasing Profitable Crop Yields participants that indicate they will implement new management practices based on information received at meetings

### **2. Associated Institution Types**

- 1862 Extension

### **3a. Outcome Type:**

Change in Action Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	726

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

New agricultural crops and practices are continually being developed. These new practices and crops can help farmers improve production methods, increase revenue and productivity, all while enhancing environmental quality.

#### **What has been done**

Topics at agronomy programs focus on maximizing production, integrated pest management, reducing pesticide resistance, understanding social impacts of agricultural practices, and best management adoption. These issues are delivered to Ohio farmers at numerous field days, the conservation tillage conference, and Farm Science Review.

#### **Results**

726 farmers who attended 'Increasing Profitable Crop Yields' programming reported increased crop yields.

### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
205	Plant Management Systems
216	Integrated Pest Management Systems

**Outcome #7**

**1. Outcome Measures**

number of crop production acres that will implement best management practices for nutrient management

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	100000

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Improper fertilizer application methods used on Ohio farmlands can have disastrous results. Applying fertilizer to fields at the wrong time, using the wrong rates can result in runoff of valuable nutrients, which often end up in large bodies of freshwater. Excess phosphorus, in particular, can be very damaging to water -- it encourages harmful algal blooms, which impact water quality. Education regarding nutrient management best practices saves farmers money by minimizing wasted fertilizer and increasing crop yields. Drinking water stays safer, with a decreased amount of phosphorus entering freshwater.

**What has been done**

OSU Extension teaches landowners about nutrient management best practices through a wide array of programs about the importance of soil and water quality. This is done through field days, workshops, short courses, demonstrations, conferences, and one-on-one interactions.

**Results**

1,309 producers were trained in Fertilizer Certification Applicator Training and another 150 were trained in 4R (Right Source, Right Rate, Right Time, Right Place) nutrient management. These trainings have improved the use of fertilizers on over 100,000 acres of Ohio farmland.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation
205	Plant Management Systems

## **Outcome #8**

### **1. Outcome Measures**

number of crop production acres that implement weed resistance management strategies

### **2. Associated Institution Types**

- 1862 Extension

### **3a. Outcome Type:**

Change in Action Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	250000

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

Weed resistance is an increasing problem in row crop agriculture. As weeds become resistant to herbicides, they are harder and more expensive to control. This drives up costs, and if control efforts aren't successful, crop yields are reduced.

#### **What has been done**

Research and education programs have been designed and delivered to discuss alternative herbicides and weed control strategies, the reasons for herbicide resistance, and what farmers can do to mitigate this looming threat.

#### **Results**

393 participants have reported positive changes in their farm use of key weed control concepts learned in weed management educational programs conducted by OSU Extension.

### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
205	Plant Management Systems
216	Integrated Pest Management Systems

**Outcome #9**

**1. Outcome Measures**

number of Ohio crop acres where appropriate utilization of integrated pest management (IPM) practices occur

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	170000

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Utilizing integrated pest management (IPM) practices protects cropland yields from insects, diseases, and weeds. Weed resistance is an increasing problem in row crop agriculture. As weeds become resistant to herbicides, they are more difficult and expensive to control. Rapid identification of insect pests is important to provide timely treatments to eliminate the insects and prevent them from destroying crops. Loss of crops due to pests has major implications for the sustainability of the food chain, as well as economic repercussions as food costs are driven up by scarcity of supply.

**What has been done**

Research and educational programs have been designed and delivered to discuss alternative herbicides and weed control strategies, the reasons for herbicide resistance, and what farmers can do to mitigate the looming threat. Scouting programs use traps to monitor insect pests.

**Results**

In Wayne County, Ohio, an IPM scouting program provides weekly scouting visits and timely pest management recommendations to subscribed growers. This program uses traps to monitor insect pests. In July 2014, the spotted wing drosophila (SWD) was detected in traps in three county locations. A spray advisory was then issued to IPM-subscribed growers. Timely spraying to treat for SWD (and other identified pests) will literally save thousands of dollars of fruit crops in the area. Wayne County IPM scouting program subscribers reported the following: 71% say they have increased their knowledge of pests; 73% have had an increase in net farm income; 86% make more timely applications of pesticides.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
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**Outcome #10**

**1. Outcome Measures**

number of individuals who learned something about disease identification, control, and scouting or key weed control concepts

Not Reporting on this Outcome Measure

**Outcome #11**

**1. Outcome Measures**

number of farmers reporting positive changes in management and / or profitability of their farm from the use of disease identification, control and scouting or key weed control concepts

Not Reporting on this Outcome Measure

**Outcome #12**

**1. Outcome Measures**

number of farmers reporting positive changes in management and / or profitability of their farm as a result of information from farm financial analysis

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	4760

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Farm profitability is at the heart of sustaining Ohio's most important industry: agriculture. Over \$100 billion is contributed annually to Ohio's economy by agriculture, as well as a safe and healthy supply of food. Sound financial planning is essential if farms wish to remain viable in a world of fluctuating weather, expenses, and crop prices.

**What has been done**

46 educational programs were conducted across Ohio in 2014, addressing issues of farm financial analysis. A team working cooperatively with the Farm Service Agency to educate Ohio's farmers on the Farm Bill conducted 52 training sessions on the Dairy Margin Protection Program (DMPP), Agricultural Risk Coverage (ARC), and Price Loss Coverage (PLC) programs.

#### Results

8,184 participants were trained in farm financial management in 2014 (including Farm Bill-related programming). 58% of participants in financial management training indicated they experienced positive changes in management and / or profitability of their farm as a result of information from farm financial analysis.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation

#### Outcome #13

##### 1. Outcome Measures

reported economic impact of cost savings, increased yield, or other increased profitability from use of CORN newsletter reported as total dollars

##### 2. Associated Institution Types

- 1862 Extension

##### 3a. Outcome Type:

Change in Condition Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2014	12500000

##### 3c. Qualitative Outcome or Impact Statement

###### Issue (Who cares and Why)

Farm profitability is at the heart of sustaining Ohio's most important industry: agriculture. Over \$100 billion dollars is contributed annually to the state economy from agriculture, as well as a safe and healthy food supply. OSU Extension provides the most current information available on planting success, pests, diseases, and harvesting, which gives producers the knowledge needed to maximize productivity, and ultimately ensuring a sustainable food supply.

###### What has been done

The CORN (Crop Observation and Recommendation Network) newsletter is produced 40 times a year, and provides agricultural industry professionals, farmers, and other interested parties with the most up-to-date information on pest observations and predictions, weed control options,

insect and disease control information, production technology, crop development issues, and timely integrated pest management guidelines.

**Results**

The CORN newsletter is distributed to more than 3800 subscribers annually. Subscribers have provided feedback to the editors, including: "Excellent. Easy to read and understand."; and "Overall very good information throughout the growing season. Very valuable in the ever changing spring situations."

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems
216	Integrated Pest Management Systems

**Outcome #14**

**1. Outcome Measures**

number of acres of Ohio crop land impacted by consultations provided by OSU Extension certified CCAs (Certified Crop Advisors)

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	10419840

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Ohio farmers rely on OSU Extension to provide research-based information regarding the latest in cover crops, nutrient management, water quality, advanced scouting and machinery, no-till, soil quality, seeding technology and precision farming. While OSU Extension educators provide this information to farmers, there are a limited number of educators in the state. By teaching and certifying CCAs, OSUE is effectively extending their reach, and increasing capacity across the state to address farming issues.

**What has been done**

CCA training is offered by 65 of OSU Extension's agricultural educators. CCAs require 40 hours biannually in all of the following management categories: nutrients, pests, soil and water, and

crops. OSUE educators provide training on these topics to CCAs at no cost or a nominal fee. There are approximately 540 active CCAs in Ohio as of 2014, so re-certification training is constantly needed.

**Results**

In 2014, more than 400 CCAs attended Ohio State University's Conservation Tillage Conference, which is offered annually. The conference featured 60 presenters and also provided opportunities for continuing education credits to be obtained. A recent study of a sample of 50 CCAs revealed that the average number of acres CCAs consult on is 19,296 acres per consultant. If we extrapolate that value to the 540 CCAs in Ohio, Certified Crop Advisers consulted on 10,419,840 acres of Ohio farmland in 2014. The economic impact that crop advisers can have on farmers is estimated to be at least \$100 per acre, which would calculate to \$1,041,984,000 of economic benefit as a result of OSU Extension training programs.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation
205	Plant Management Systems
216	Integrated Pest Management Systems

**Outcome #15**

**1. Outcome Measures**

number of acres of forest land impacted by OSU Extension programming

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	180000

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Ohio has approximately 8 million acres of forest land. This land provides a sustainable supply of timber, which accounts for approximately 20% (\$22 billion) of Ohio's annual agricultural revenue. Other direct or indirect benefits of forest land are: clean water and air, habitat for wild animals,

and recreation areas.

**What has been done**

88 educational programs were conducted in forest and wildlife management, fisheries, and invasive species identification and control.

**Results**

Management activities were improved on 180,000 acres of Ohio forest land and 42 new forest stewardship management plans were developed as a result of OSU Extension programming. These forest stewardship plans are important, as they allow landowners to participate in federal and state cost share programs.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources

**Outcome #16**

**1. Outcome Measures**

number of individuals who plan to implement on their farm one of the learning outcomes from OSUE programming related to: disease identification and control, scouting, or key weed control concepts

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	2355

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

In order to maximize crop yields, weeds must be controlled. However, one needs to be able to identify the weeds before proper control measures can be taken. The ability to identify the weeds allows the producer to control them in the most cost effective and environmentally friendly way, while providing a sustainable food supply.

**What has been done**

Weed identification was taught at a number of field days, the Conservation Tillage Conference, Farm Science Review, regional agronomy field days, pesticide education training, and other

venues.

### **Results**

Nearly 30% of all attendees indicated they plan on implementing practices learned in the trainings. This type of training has been reported to have over \$8 million savings to the Ohio Soybean industry alone.

#### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
205	Plant Management Systems
216	Integrated Pest Management Systems

#### **V(H). Planned Program (External Factors)**

##### **External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Public Policy changes
- Government Regulations
- Populations changes (immigration, new cultural groupings, etc.)

##### **Brief Explanation**

Extremes in climate can impact many facets of agriculture, including: planting and harvesting success, livestock survival and productivity, and costs of production. The winter of 2013-2014 was ruthless to Ohio's wine grapes, because of polar vortex conditions. The total economic damage to Ohio's wine grape industry is estimated to be \$12 million in losses.

Changes in the economy that effect the agricultural sector (i.e., fuel and insurance costs) effect a farm's profitability and ultimately costs to the consumers.

Changes in laws and regulations happen often, which effect training needs of farmers, costs incurred, and other restrictions and limitations on productivity. In 2014, Senate Bill 150 was passed, which requires farmers with 50 or more acres to attend a course on fertilizer application. To meet the requirements of the bill, and to meet the need for education that will aid in reducing harmful algal blooms in Ohio's freshwater bodies.

Lastly, as the Ohio population becomes more urban, there has been and will be increased pressure on farmers to change production methods, sell farm land for housing, and other land use changes.

#### **V(I). Planned Program (Evaluation Studies)**

##### **Evaluation Results**

OSU Extension programs reached over 380,000 Ohio producers through 1,687 educational programs in 2014. An additional 1.2 million indirect contacts were reached through publications, electronic newsletters, and other means. Of these direct contacts, 22% were from under-served populations, a sign that we are increasing our reach to new clientele.

The Crop Observation Reporting Network (CORN) newsletter is directly distributed to

3800 individuals a year, with another approximately 360,000 unique hits to the website annually. Many of these hits are from foreign countries, which has led OSUE educators to provide programming overseas, helping increase productivity in foreign countries. Our international programming helps to raise the profile of the Extension network, as well as Ohio State University, around the world.

Nearly 200,000 acres of forest land were impacted by OSUE programming. This programming directly led to improved management of these forests through the creation of 42 new forest stewardship management plans.

The annual Conservation Tillage Conference teaches approximately 900 farmers, crop consultants, and other professionals about sustainable management of soil resources.

The ultimate goal of all these programs and activities is to ensure the sustainable management of Ohio's farm and forest resources, in order to provide a long-term supply of healthy food and forest products.

### **Key Items of Evaluation**

**V(A). Planned Program (Summary)**

**Program # 16**

**1. Name of the Planned Program**

Preparing Youth for Success (Extension)

Reporting on this Program

**V(B). Program Knowledge Area(s)**

**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
801	Individual and Family Resource Management	25%		0%	
806	Youth Development	75%		0%	
	<b>Total</b>	100%		0%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of FTE/SYs expended this Program**

Year: 2014	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	85.0	0.0	0.0	0.0
<b>Actual Paid</b>	81.7	0.0	0.0	0.0
<b>Actual Volunteer</b>	143.2	0.0	0.0	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
4593773	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
4593773	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**



- Conduct workshops
- Face to face and virtual meetings
- Develop curriculum
- Provide training to professionals, volunteers and youth
- Media and web site creation
- Partnering with businesses and other organizations
- Fair
- Camping
- Conduct educational programs with youth
- Conduct in-school and after school enrichment

**2. Brief description of the target audience**

- Youth: infants through 18 years of age (with a special focus on new and underserved audiences)
- Parents of youth
- Volunteers working with youth audiences
- Teachers / educators working with youth audiences
- Families
- Youth development professional staff
- Community leaders involved in subject specific areas
- Youth (8-18 years), parents of youth, and volunteers working with youth; all with association with animal projects
  - General public who have interest in animals

**3. How was eXtension used?**

Occasionally, Extension 4-H professionals and / or 4-H volunteers access eXtension to explore the limited information that is available on eXtension for 4-H Youth Development programming. The material that was most often accessed was related to subject matter content of 4-H individual projects.

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	121816	369547	216240	127156

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

Year: 2014  
 Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2014	Extension	Research	Total
Actual	25	0	0

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Number of youth enrolled/engaged in organized community 4-H clubs

Year	Actual
2014	75160

**Output #2**

**Output Measure**

- Number of youth enrolled/engaged in after school 4-H programs

Year	Actual
2014	3688

**Output #3**

**Output Measure**

- Number of youth enrolled/ engaged in military 4-H clubs  
Not reporting on this Output for this Annual Report

**Output #4**

**Output Measure**

- Number of youth participating in Special Interest and short term programs

Year	Actual
2014	119045

**Output #5**

**Output Measure**

- Number of youth participating in School Enrichment programs

Year	Actual
2014	59558

**Output #6**

**Output Measure**

- Number of youth participating in 4-H overnight camping programs

<b>Year</b>	<b>Actual</b>
2014	11763

**Output #7**

**Output Measure**

- Number of youth participating in 4-H day camping programs

<b>Year</b>	<b>Actual</b>
2014	4405

**Output #8**

**Output Measure**

- Number of adult volunteers  
Not reporting on this Output for this Annual Report

**Output #9**

**Output Measure**

- Number of teen volunteers  
Not reporting on this Output for this Annual Report

**Output #10**

**Output Measure**

- number of youth participating in "Assuring Quality Care for Animals" sessions

<b>Year</b>	<b>Actual</b>
2014	25044

**Output #11**

**Output Measure**

- number of volunteers participating in the planning and implementation of this program (committee members, teachers / trainers, unpaid staff, etc.) (RMRW)  
Not reporting on this Output for this Annual Report

**Output #12**

**Output Measure**

- number of adult volunteers contributing to 4-H programming and events

<b>Year</b>	<b>Actual</b>
2014	17836

**Output #13**

**Output Measure**

- number of teen volunteers contributing to 4-H programming and events

<b>Year</b>	<b>Actual</b>
2014	4693

**Output #14**

**Output Measure**

- number of adult volunteers contributing to the planning and implementation of the Real Money. Real World. youth financial literacy program

<b>Year</b>	<b>Actual</b>
2014	1597

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	number of youth indicating an increase in understanding of decision making processes
2	number of youth indicating an increase knowledge of the educational topic being presented
3	number of youth who have demonstrated decision making and problem solving skills
4	number of youth who have indicated the intention to practice improved basic life skills
5	number of youth who have participated in 4-H programs and indicated that they now possess transferrable workforce skills
6	number of participants who increased awareness about what it costs to maintain a household (RMRW)
7	number of participants who increased awareness about how every spending decision affects other spending opportunities (RMRW)
8	number of participants who increased awareness about how the type of job they have affects how much money they will make (RMRW)
9	number of participants who increased feeling of importance about getting more education or training after high school (RMRW)
10	number of participants who increased feeling of importance about waiting to have children until financially ready (RMRW)
11	number of participants who increased feeling of importance about having a plan for spending that includes both needs and wants (RMRW)
12	number of participants who indicated their likeliness to make changes relative to getting more education or training after high school (RMRW)
13	number of participants who indicated their likeliness to make changes relative to learning how to make wise financial decisions (RMRW)
14	number of Real Money. Real World. participants who indicated they would now think about how spending impacts other choices and opportunities. (RMRW)
15	number of Real Money. Real World. participants who increased awareness about how the level of a education a person obtains greatly impacts the type of job they will get and their earning potential. (RMRW)
16	number of Real Money. Real World. participants who indicated an intent to get more training or education after high school. (RMRW)
17	number of Real Money. Real World. participants who indicated they would develop a plan for their money that includes both needs and wants (RMRW).

18	number of Real Money. Real World. participants who indicated they learned how to make wise financial decisions. (RMRW)
19	number of youth participants who increased their knowledge of producing quality and safe animal products for consumers through responsible animal handling, care and welfare (Assuring Quality Care for Animals)

**Outcome #1**

**1. Outcome Measures**

number of youth indicating an increase in understanding of decision making processes

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	66123

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Youth need to increase their understanding of decision making processes to become more productive citizens as adults.

**What has been done**

Past Ohio studies have determined that the typical club member attends an average of 11 club meetings per year, and educational delivery methods employed by clubs included: Work night meetings (31%); workshops / clinics (59%); Skill-a-thon kits (54%); required demonstrations by members (81%); outside speakers (59%); subject matter volunteers (45%); field trips / tours (56%); and community service (91%). Through these delivery methods, 4-H members learn how to make decisions in the operation of their local 4-H clubs. 4-H members learn how to prepare for and participate in project interviews. They also acquire from subject matter specialists necessary information to weigh alternatives to select the best course of action in completing their individual 4-H projects.

**Results**

4-H members were asked if they learned any Decision Making Skills through their 4-H club experience. Following are the percentage of respondents who answered YES to the following Decision Making Skills: 90% -Think about what might happen because of the decision; 90% - Generate ideas for possible solutions before making a decision; 89% - Determine the best alternative and actually make the decision; 88% - Implement the decision; 86% - Gather

background information that will help to make a decision; 85% - Evaluate the outcome of the decision; 79% - Make decisions without delaying too much (timely).

#### 4. Associated Knowledge Areas

<b>KA Code</b>	<b>Knowledge Area</b>
806	Youth Development

#### Outcome #2

##### 1. Outcome Measures

number of youth indicating an increase knowledge of the educational topic being presented

##### 2. Associated Institution Types

- 1862 Extension

##### 3a. Outcome Type:

Change in Knowledge Outcome Measure

##### 3b. Quantitative Outcome

<b>Year</b>	<b>Actual</b>
2014	76004

##### 3c. Qualitative Outcome or Impact Statement

###### **Issue (Who cares and Why)**

Youth need to increase their knowledge of 4-H presented educational topics to become more productive citizens as adults. Educational topics that are most common across local 4-H clubs include such things as: (a) basics of management for each livestock species and/ or other project areas; (b) assuring quality care for animals; (c) how to successfully engage in a job interview; and (d) how to work on committees or in groups to accomplish the goals of the group.

###### **What has been done**

Ohio youth participate in a variety of events including clubs, after-school programs, military clubs, special interest and short term programs, school enrichment programs, overnight camping, and day camping programs. Activities at these events are designed to be fun, and engage youth in positive learning experiences. Youth learning outcomes may be formal or informal, depending on the setting (school-based enrichment learning objectives will be more formal than camping objectives).

###### **Results**

4-H members were asked to rate the amount of project knowledge/ skills gained through 4-H programming on a four point scale, where 1=NONE and 4=A LOT. The highest ratings were "Exhibiting the product(s) of a 4-H project" and "Working on a 4-H project". Next were "4-H project books and written 4-H materials" and then "One-on-one visits with an adult 4-H volunteer".

The lowest rating was "Attending 4-H workshops/ clinics". However, all were rated 3 or higher on a 4 point scale.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

#### Outcome #3

##### 1. Outcome Measures

number of youth who have demonstrated decision making and problem solving skills

##### 2. Associated Institution Types

- 1862 Extension

##### 3a. Outcome Type:

Change in Action Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2014	34202

##### 3c. Qualitative Outcome or Impact Statement

###### **Issue (Who cares and Why)**

Youth need to demonstrate their decision making and problem solving skills to become more productive citizens as adults.

###### **What has been done**

Within the last five years local 4-H volunteers were asked to assess their club members' decision making / problem solving skills and transferable workforce preparation skills. Youth were asked to assess basic life skills learned, decision-making / problem solving skills learned, and project skills / knowledge gained during 4-H programming and events.

###### **Results**

4-H Club Advisors were asked to indicate how many of their club's members could demonstrate decision making skills. On each of the seven decision making skills, 91%-96% of the respondents stated that half or more of their members demonstrated such skills. The highest rated skill was 'generate ideas for possible solutions before making a decision' (96%) and the lowest was, 'implement the decision' (91%)

The other five decision making skills were: 'gather background information that will help to make a decision' (95%); 'think about what might happen because of the decision' (95%); 'make decisions without delaying too much (timely)' (95%); 'determine the best alternative then actually make the decision' (91%); and 'evaluate the outcome of the decision' (94%)



#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

#### Outcome #4

##### 1. Outcome Measures

number of youth who have indicated the intention to practice improved basic life skills

##### 2. Associated Institution Types

- 1862 Extension

##### 3a. Outcome Type:

Change in Action Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2014	71444

##### 3c. Qualitative Outcome or Impact Statement

###### **Issue (Who cares and Why)**

Youth need to improve basic life skills to become more productive citizens as adults. The concept of 'basic life skills' includes, but is not limited to: using time wisely; meeting scheduled deadlines; demonstrating self-motivation; being a team player; displaying positive attitudes; being able to share information learned with others; acquiring and applying new knowledge; demonstrating responsibility; being respectful. These are all skills, behaviors and abilities that are desirable in productive adults. The 4-H experience, both in working on individual 4-H projects and in participating in 4-H club activities, provides scenarios in which such skills can be taught, nurtured and developed.

###### **What has been done**

Data were collected and summarized from a questionnaire in which 4-H advisors / volunteers assessed their club members' decision making / problem solving skills and transferable workforce preparation skills. Youth were asked to assess basic life skills.

###### **Results**

4-H members were asked if they learned any basic life skills through their 4-H club experience. The percentage of 4-H members who responded 'YES' is indicated for each life skill: 96% - Understand it is important to follow through on commitments; 96% - Have control over personal goals/future; 95% - Work/play with people who are different from me; 94% - Use time wisely; 94% - Take care of personal belongings; 94% - Listen carefully to what others say

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

#### Outcome #5

##### 1. Outcome Measures

number of youth who have participated in 4-H programs and indicated that they now possess transferrable workforce skills

##### 2. Associated Institution Types

- 1862 Extension

##### 3a. Outcome Type:

Change in Condition Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2014	36102

##### 3c. Qualitative Outcome or Impact Statement

###### **Issue (Who cares and Why)**

Youth need to possess transferable workforce skills to become more productive citizens as adults. 4-H workforce preparation programming intentionally links interactions with youth to meet specific workforce preparation, content, and outcomes. Studies have shown that in typical workforce preparation programs very little attention has been paid to the quality of work experiences or developmental opportunities. Many youth are unaware of the skills they need to succeed in the workforce, and are unskilled in the steps required to make themselves "job-ready" to meet their career goals.

###### **What has been done**

Workforce preparation programming teaches the following skills: critical thinking, problem solving, creativity and innovation; how to communicate effectively using the range of methods and tools available; working cooperatively with others, building relationships; how to take responsibility for continuous improvement of skills; understanding and selecting appropriate technology, using technology effectively to solve problems; demonstrating personal accountability, effective work habits, and ethical behavior. One of the project events at the Ohio State Fair is "Workforce Preparation Day", where youth can demonstrate their skills and knowledge.

###### **Results**

4-H adult volunteers were asked to assess their club members' decision making / problem solving skills and transferable workforce preparation skills. Similarly, youth were asked to assess basic life skills learned, decision making / problem solving skills learned, and project skills / knowledge.

Assessment surveys showed that at least 92% of 4-H club advisors reported that half or more of their youth club members demonstrated transferable workforce skills. The highest rated skill demonstrated by club members was 'Display positive attitudes' (99% of club members demonstrating); the lowest rated skill was 'Demonstrate self-motivation' (92%). Other skills were rated as follows: 'Use time wisely' (94%); 'Meet scheduled deadlines' (95%); 'Demonstrate responsibility' (96%); 'Are team players' (97%); 'Acquire and apply new knowledge' (97%); 'Are able to share information they have with others' (98%); 'Are respectful' (98%). 130 projects were completed in 2014 for Workforce Preparation.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

#### Outcome #6

##### 1. Outcome Measures

number of participants who increased awareness about what it costs to maintain a household (RMRW)

##### 2. Associated Institution Types

- 1862 Extension

##### 3a. Outcome Type:

Change in Knowledge Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2014	12765

##### 3c. Qualitative Outcome or Impact Statement

###### **Issue (Who cares and Why)**

Real Money. Real World. (RMRW) programming will be of direct use to parents & youth. The curriculum is designed to increase youth awareness of: how education level & corresponding career choice influence personal income and financial security; money management tools used in daily spending for cost-of-living decisions; how income and lifestyle choices affect the amount of available money for discretionary spending. This curriculum will help make today's students more financially aware and responsible adults. Additionally, this program aids schools in meeting the economics and financial literacy content standards as prescribed by Ohio's educational requirements.

###### **What has been done**

Students receive 5 preparatory classroom lessons. The culmination of these lessons is an interactive simulation, where each student is assigned an occupation and corresponding salary.

Students visit 14 booths that correspond to typical adult budget / expense considerations: housing, transportation, insurance, utilities, food, etc. These booths are staffed by volunteers from the local business community.

**Results**

19,421 RMRW participants completed the retrospective evaluation of RMRW programming. 65.7% of participants who completed the retrospective survey indicated a positive change (from before participating in RMRW to after participating in RMRW). Comments from youth participants regarding awareness of the costs to maintain a household included: "I learned that living on your own is not cheap. Your rent takes most of your money."; "A lot of what my mom makes goes for food and taxes, house payments, car payments and entertainment"; "Buying a house is a better investment than renting."; and "Housing cost more than I thought!"

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
801	Individual and Family Resource Management
806	Youth Development

**Outcome #7**

**1. Outcome Measures**

number of participants who increased awareness about how every spending decision affects other spending opportunities (RMRW)

Not Reporting on this Outcome Measure

**Outcome #8**

**1. Outcome Measures**

number of participants who increased awareness about how the type of job they have affects how much money they will make (RMRW)

Not Reporting on this Outcome Measure

**Outcome #9**

**1. Outcome Measures**

number of participants who increased feeling of importance about getting more education or training after high school (RMRW)

Not Reporting on this Outcome Measure

**Outcome #10**

**1. Outcome Measures**

number of participants who increased feeling of importance about waiting to have children until financially ready (RMRW)

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	11575

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Real Money. Real World. (RMRW) programming will be of direct use to parents & youth. The curriculum is designed to increase youth awareness of: how education level & corresponding career choice influence personal income and financial security; money management tools used in daily spending for cost-of-living decisions; how income and lifestyle choices affect the amount of available money for discretionary spending. This curriculum will help make today's students more financially aware and responsible adults. Additionally, this program aids schools in meeting the economics and financial literacy content standards as prescribed by Ohio's educational requirements.

**What has been done**

Students receive 5 preparatory classroom lessons. The culmination of these lessons is an interactive simulation, where each student is assigned an occupation and corresponding salary. Students visit 14 booths that correspond to typical adult budget / expense considerations: housing, transportation, insurance, utilities, food, etc. These booths are staffed by volunteers from the local business community.

**Results**

19,421 RMRW participants completed the retrospective evaluation of RMRW programming. 59.6% of participants who completed the retrospective survey indicated a positive change (from before participating in RMRW to after participating in RMRW). Comments from youth participants regarding the importance of waiting to have children until financially ready included: "[I learned] how important it is to not have kids until you're ready."; "[I learned] how much childcare costs and when you have kids, your paycheck mostly goes to them."; "How much children cost. I knew that childcare wasn't cheap, but seeing the actual costs for things was startling."; and "[I realized] how much money my parents spend on me."

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management
806	Youth Development

#### Outcome #11

##### 1. Outcome Measures

number of participants who increased feeling of importance about having a plan for spending that includes both needs and wants (RMRW)

Not Reporting on this Outcome Measure

#### Outcome #12

##### 1. Outcome Measures

number of participants who indicated their likeliness to make changes relative to getting more education or training after high school (RMRW)

Not Reporting on this Outcome Measure

#### Outcome #13

##### 1. Outcome Measures

number of participants who indicated their likeliness to make changes relative to learning how to make wise financial decisions (RMRW)

Not Reporting on this Outcome Measure

#### Outcome #14

##### 1. Outcome Measures

number of Real Money. Real World. participants who indicated they would now think about how spending impacts other choices and opportunities. (RMRW)

##### 2. Associated Institution Types

- 1862 Extension

##### 3a. Outcome Type:

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	13162

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Real Money. Real World. (RMRW) programming will be of direct use to parents & youth. The curriculum is designed to increase youth awareness of: how education level & corresponding career choice influence personal income and financial security; money management tools used in daily spending for cost-of-living decisions; how income and lifestyle choices affect the amount of available money for discretionary spending. This curriculum will help make today's students more financially aware and responsible adults. Additionally, this program aids schools in meeting the economics and financial literacy content standards as prescribed by Ohio's educational requirements.

**What has been done**

Students receive 5 preparatory classroom lessons. The culmination of these lessons is an interactive simulation, where each student is assigned an occupation and corresponding salary. Students visit 14 booths that correspond to typical adult budget / expense considerations: housing, transportation, insurance, utilities, food, etc. These booths are staffed by volunteers from the local business community.

**Results**

19,421 RMRW participants completed the evaluation of RMRW programming. 67.8% of participants who completed the survey indicated an intent to change their behavior as a result of participating in RMRW. Comments from youth participants regarding future spending behaviors included: "I plan to change the way I spend money."; "I will have to think about something and the impact it will have before purchasing it."; "Actually budget the income I do have instead of just spending it on whatever."; and "I plan on thinking things through before I buy something to make sure it is really something I want to spend my money on."

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
801	Individual and Family Resource Management
806	Youth Development

**Outcome #15**

**1. Outcome Measures**

number of Real Money. Real World. participants who increased awareness about how the level of a education a person obtains greatly impacts the type of job they will get and their earning potential. (RMRW)

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	0

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Real Money. Real World. (RMRW) programming will be of direct use to parents & youth. The curriculum is designed to increase youth awareness of: how education level & corresponding career choice influence personal income and financial security; money management tools used in daily spending for cost-of-living decisions; how income and lifestyle choices affect the amount of available money for discretionary spending. This curriculum will help make today's students more financially aware and responsible adults. Additionally, this program aids schools in meeting the economics and financial literacy content standards as prescribed by Ohio's educational requirements.

**What has been done**

Students receive 5 preparatory classroom lessons. The culmination of these lessons is an interactive simulation, where each student is assigned an occupation and corresponding salary. Students visit 14 booths that correspond to typical adult budget / expense considerations: housing, transportation, insurance, utilities, food, etc. These booths are staffed by volunteers from the local business community.

**Results**

19,421 RMRW participants completed the retrospective evaluation of RMRW programming. 62.2% of participants who completed the retrospective survey indicated a positive change (from before participating in RMRW to after participating in RMRW). During the simulation, students who 'received' a less-than-desirable job had to make many concessions to stay on track and not overspend. Comments from youth participants regarding awareness of correlation between a job and earnings / earning potential: "[I learned] how important it was to have a real job and how much food, housing, and child care cost."; "How little people make from their jobs and how expensive things are."; "How much everything costs all together & how much your job impacts that."; "[I learned] how much things really add up even when you have a decent job."

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
801	Individual and Family Resource Management
806	Youth Development



**Outcome #16**

**1. Outcome Measures**

number of Real Money. Real World. participants who indicated an intent to get more training or education after high school. (RMRW)

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	11492

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Real Money. Real World. (RMRW) programming will be of direct use to parents & youth. The curriculum is designed to increase youth awareness of: how education level & corresponding career choice influence personal income and financial security; money management tools used in daily spending for cost-of-living decisions; how income and lifestyle choices affect the amount of available money for discretionary spending. This curriculum will help make today's students more financially aware and responsible adults. Additionally, this program aids schools in meeting the economics and financial literacy content standards as prescribed by Ohio's educational requirements.

**What has been done**

Students receive 5 preparatory classroom lessons. The culmination of these lessons is an interactive simulation, where each student is assigned an occupation and corresponding salary. Students visit 14 booths that correspond to typical adult budget / expense considerations: housing, transportation, insurance, utilities, food, etc. These booths are staffed by volunteers from the local business community.

**Results**

19,421 RMRW participants completed the evaluation of RMRW programming. 59.2% of participants who completed the survey indicated an intent to get more training or education after high school. Comments from youth participants regarding future education / training included: "[I learned] how much money it takes to raise a family and how much schooling really affects your job."; "Go to college because it will give you a much better job to get paid a lot better."; "How expensive regular costs are, such as child care, and how little pay you will take with only a high school education."

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
801	Individual and Family Resource Management
806	Youth Development

### **Outcome #17**

#### **1. Outcome Measures**

number of Real Money. Real World. participants who indicated they would develop a plan for their money that includes both needs and wants (RMRW).

#### **2. Associated Institution Types**

- 1862 Extension

#### **3a. Outcome Type:**

Change in Action Outcome Measure

#### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	11873

#### **3c. Qualitative Outcome or Impact Statement**

##### **Issue (Who cares and Why)**

Real Money. Real World. (RMRW) programming will be of direct use to parents & youth. The curriculum is designed to increase youth awareness of: how education level & corresponding career choice influence personal income and financial security; money management tools used in daily spending for cost-of-living decisions; how income and lifestyle choices affect the amount of available money for discretionary spending. This curriculum will help make today's students more financially aware and responsible adults. Additionally, this program aids schools in meeting the economics and financial literacy content standards as prescribed by Ohio's educational requirements.

##### **What has been done**

Students receive 5 preparatory classroom lessons. The culmination of these lessons is an interactive simulation, where each student is assigned an occupation and corresponding salary. Students visit 14 booths that correspond to typical adult budget / expense considerations: housing, transportation, insurance, utilities, food, etc. These booths are staffed by volunteers from the local business community.

##### **Results**

19,421 RMRW participants completed the evaluation of RMRW programming. 61.1% of participants who completed the survey indicated an intent to create a plan for their money that includes both needs and wants. Comments from youth participants regarding future spending plans included: "[I learned] how much money we actually get to spend for our own wants after paying for our needs."; "[I learned] how much money you get a month is usually spent on needs

way before our wants."; "[I didn't know] how much of an adult's monthly income must be spent on their needs instead of their wants."; and "[I didn't know] how much parents have to budget for everyday needs like food, clothes, utilities, houses, and car payments."

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management
806	Youth Development

#### Outcome #18

##### 1. Outcome Measures

number of Real Money. Real World. participants who indicated they learned how to make wise financial decisions. (RMRW)

##### 2. Associated Institution Types

- 1862 Extension

##### 3a. Outcome Type:

Change in Knowledge Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2014	10975

##### 3c. Qualitative Outcome or Impact Statement

###### **Issue (Who cares and Why)**

Real Money. Real World. (RMRW) programming will be of direct use to parents & youth. The curriculum is designed to increase youth awareness of: how education level & corresponding career choice influence personal income and financial security; money management tools used in daily spending for cost-of-living decisions; how income and lifestyle choices affect the amount of available money for discretionary spending. This curriculum will help make today's students more financially aware and responsible adults. Additionally, this program aids schools in meeting the economics and financial literacy content standards as prescribed by Ohio's educational requirements.

###### **What has been done**

Students receive 5 preparatory classroom lessons. The culmination of these lessons is an interactive simulation, where each student is assigned an occupation and corresponding salary. Students visit 14 booths that correspond to typical adult budget / expense considerations: housing, transportation, insurance, utilities, food, etc. These booths are staffed by volunteers from the local business community.

###### **Results**

19,421 RMRW participants completed the evaluation of RMRW programming. 56.5% of participants who completed the survey indicated they learned how to make wise financial decisions. Comments from youth participants regarding making wise financial decisions: "[I learned] that children can be very expensive, how to make wise decisions and how to manage money."; "Choose wisely between needs and wants."; "Even if you make a good amount of money you should still budget wisely or you might run out of money."; "Everything is really expensive and if you don't get a good job or spend your money wisely you could get into financial trouble."; and "[I learned] how hard it is to support a family, including yourself, and how wisely you have to spend your money."

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management
806	Youth Development

#### Outcome #19

##### 1. Outcome Measures

number of youth participants who increased their knowledge of producing quality and safe animal products for consumers through responsible animal handling, care and welfare (Assuring Quality Care for Animals)

##### 2. Associated Institution Types

- 1862 Extension

##### 3a. Outcome Type:

Change in Knowledge Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2014	15212

##### 3c. Qualitative Outcome or Impact Statement

###### Issue (Who cares and Why)

The Ohio Department of Agriculture (ODA) requires every youth who plans to exhibit and sell livestock into the food system to attend annual training on animal quality assurance (QA). The QA training helps to ensure that food products entering the food system are as safe and nutritious as possible, and that animals are cared for and handled responsibly and ethically.

###### What has been done

4-H members are provided with activity and record books which help educate them, and provide resources to help them track the care of the livestock projects. The activity books teach lessons on topics such as: developing and implementing an effective health management plan; using

antibiotics responsibly; how to properly store and administer animal health products; how to properly follow feed processing protocols; how to practice good environmental stewardship; and how to provide proper animal handling and care. 4-H Educators administer pre- and post-session evaluation surveys to document knowledge gains of youth participants.

### **Results**

4-H Educators in 54 Ohio counties administered pre- and post-surveys to a total of 15,368 youth. The surveys contained 10 statements, relating to quality assurance practices; all statements were evaluated on a 5-point Likert scale. The 10 statements evaluated included items such as: how proper care can result in safe, quality animal products; how to properly identify animals; the proper services provided by a veterinarian; how to properly administer antibiotics; how to provide adequate space, food, and water for animals.

In 53 of the counties administering QA training, all youth in those 53 counties showed a knowledge increase related to the 10 indicators from pre-assessments to post-assessments. 98.98% of youth participating in quality assurance experienced knowledge gains from the curriculum.

## **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
806	Youth Development

### **V(H). Planned Program (External Factors)**

#### **External factors which affected outcomes**

- Economy
- Competing Programmatic Challenges

#### **Brief Explanation**

The data reported for all categories continues to be conservative, as were data collected in 2013. Also, the "new personnel" situation continues: there have been 30 new 4-H Educators hired in Ohio since February 2012; many are inexperienced with the data collection and reporting processes, which were changed again from ACCESS 4-H to 4HOnline at the end of 2013. At the same time, there continues to be less Extension Educators in other program areas, which demands more 4-H Educator resources in efforts other than reporting and data manipulation.

### **V(I). Planned Program (Evaluation Studies)**

#### **Evaluation Results**

4-H began in Clark County, Ohio in 1902. The intent behind the initial meetings was to teach boys and girls how to harvest corn, plant a garden, test soil samples, tie knots in ropes, and identify natural wildlife, such as weeds and insects. This group came to be known as the "Boy's and Girl's Agricultural Club". By 1905, there were over 2,000 youth within 16 counties engaging in programming similar to that of Clark County's 1902 club. Ohio is still very proud of its 4-H heritage.

Society has changed greatly since 1902; 4-H is no longer geared exclusively towards youth in farming communities. Despite the sprawl of 4-H programming to more urban and

suburban areas, the ultimate goal is still the same today as it was in 1902, to contribute to "the development of youth as individuals and as responsible, productive members of the community in which they live."

In 2014, Ohio 4-H programming had 216,140 direct contacts with youth through participation in organized clubs, school enrichment programs, special interest programs, and camping programs. Ohio's 4-H'ers live in many different and diverse areas of the state. In 2014, 23% of youth participants were from farming communities, 32% were from towns (less than 10,000 citizens and rural), 20% were from towns and cities (10,000 - 50,000 citizens), 10% were from suburbs (cities over 50,000 people), and 15% were from central / urban settings (cities over 50,000 people). Ohio 4-H is engaging youth all over Ohio, not just farming communities.

2014 4-H programming saw several notable outputs and outcomes. A new OSUE signature program, STEM Pathways, had over 20,000 direct contacts. STEM Pathways programming provides hands-on, problem based inquiry learning to Ohio youth. Additionally, the curricula for STEM Pathways are content-driven and align with Ohio's new Learning Standards for Science, thus supplementing traditional classroom education. In-school or after school enrichment programs were offered to over 15,000 students, teaching lessons about chick embryology, rockets and physics, weather, and the life cycle of plants (to name a few topics). Formal assessments are still under development for this program and its wide and diverse curriculum.

Another new OSUE signature program, Assuring Quality Care for Animals, had impressive outcomes in 2014. Of the 54 counties in which quality assurance programming was offered, all but 1 county had all youth who were assessed with pre-post self-assessments report that they had experienced knowledge gains on 10 indicators. Nearly 99% of all youth participating in Quality Assurance for Animals in 2014 met the learning objectives prescribed by the curriculum.

Real Money. Real World. is a well-established signature program. It has a documented history of strong learning gains by participants. 2014 was no exception. While some students indicated via post-program retrospective self-assessments that they "already knew" the topic being evaluated, of the remaining students who had no prior knowledge, at least half experienced learning gains on all topics evaluated. Students learned how to budget money, distinguish between needs and wants, plan for emergencies (by saving money) and got a glimpse of what it takes (financially) to maintain a household and to be a parent and have to budget for child-related expenses. 96.2% of youth participating indicated that they "believe participating in this program gave me a better idea of what is involved in earning, spending, and managing money." and 95.8% of youth indicated that they "believe participating in this program will help me in the future."

Whether youth are learning about science, technology, engineering, math, workforce development, basic life skills, budgeting money, or how to care for livestock, the outputs and outcomes in this planned program show that Ohio 4-H is engaging a diverse youth audience in activities that meet not only the goals of the 4-H curriculum in which they are participating, but also the goals first set forth in 1902: "the development of youth as individuals and as responsible, productive members of the community in which they live."

**Key Items of Evaluation**

**V(A). Planned Program (Summary)**

**Program # 17**

**1. Name of the Planned Program**

Strengthening Families & Communities (Extension)

Reporting on this Program

**V(B). Program Knowledge Area(s)**

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
703	Nutrition Education and Behavior	50%		0%	
724	Healthy Lifestyle	20%		0%	
801	Individual and Family Resource Management	20%		0%	
802	Human Development and Family Well-Being	10%		0%	
	<b>Total</b>	100%		0%	

**V(C). Planned Program (Inputs)**

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	20.0	0.0	0.0	0.0
<b>Actual Paid</b>	29.6	0.0	0.0	0.0
<b>Actual Volunteer</b>	12.1	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
1664330	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1664330	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

**V(D). Planned Program (Activity)**



## 1. Brief description of the Activity

- Conduct formal and informal needs assessments
- Develop programming materials and curricula
- Conduct meetings, workshops and educational sessions
- Conduct program evaluation and applied research
- Form and sustain community partnerships
- Train volunteers, paraprofessionals, and other community agency/organization professionals

## 2. Brief description of the target audience

'Strengthening Families and Communities' programming is tailored to meet the needs of each audience we engage. School programming is age-appropriate, whereas programs at Senior Centers are targeted to inform on safe food preparation for individuals living alone or with one other person. The end result is a program that has the potential to encompass all residents of the state. Below is a listing of the specific groups we intend to reach with targeted awareness, educational and skills-development programming:

- Parents of children ages birth to 18, including, but not limited to: teen, step, adoptive, foster, single, divorcing, incarcerated, fathers who have not yet established paternity, and grandparents;
- Adults in, or thinking about entering, intimate relationships;
- Young adults;
- Older adults and those who care for them;
- Baby boomers, especially women;
- Limited resource families, including mothers with young children and food stamp recipients;
- New employees;
- Bankruptcy filers;
- Debt burdened individuals and couples;
- First time homebuyers;
- Individuals with diabetes and their caregivers/family support members;
- Food establishment managers and food service employees;
- Volunteer food preparers;
- Child care providers;
- Teachers;
- Social service professionals;
- General consumers (other formal or informal education).

## 3. How was eXtension used?

eXtension was not used in this program

## V(E). Planned Program (Outputs)

### 1. Standard output measures

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	284550	176665	1900	52473

**2. Number of Patent Applications Submitted (Standard Research Output)**  
**Patent Applications Submitted**

Year: 2014  
 Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2014	Extension	Research	Total
<b>Actual</b>	21	0	0

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Educational sessions held with two or more participants

Year	Actual
2014	1884

**Output #2**

**Output Measure**

- number of volunteer hours given

Year	Actual
2014	25223

**Output #3**

**Output Measure**

- number of Dining with Diabetes classes taught

Year	Actual
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2014 76

**Output #4**

**Output Measure**

- number of volunteers participating in the planning and implementation of this event (DWD)  
Not reporting on this Output for this Annual Report

**Output #5**

**Output Measure**

- total number of volunteers participating in the planning and / or implementation of 'Strengthening Families and Communities' programming

<b>Year</b>	<b>Actual</b>
2014	5381

**Output #6**

**Output Measure**

- number of individuals participating in 'Dining with Diabetes' programming

<b>Year</b>	<b>Actual</b>
2014	341

**Output #7**

**Output Measure**

- number of individuals participating in the 'Live Healthy Live Well' program

<b>Year</b>	<b>Actual</b>
2014	8596

**Output #8**

**Output Measure**

- number of individuals participating in the 'Successful Co-Parenting' program

<b>Year</b>	<b>Actual</b>
2014	1356

**Output #9**

**Output Measure**

- number of individuals participating in 'Healthy Finances' programming

<b>Year</b>	<b>Actual</b>
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2014

782

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	# of participants who increased knowledge on topic presented as a result of the education program/session(s)
2	# of participants who plan to adopt one or more recommended practices as a result of the education program/session(s)
3	number of participants whose knowledge of diabetes management has increased (DWD)
4	number of participants who are able to count carbohydrates (DWD)
5	number of participants who are eating smaller portion sizes (DWD)
6	number of participants who have lowered blood sugar levels (DWD)
7	number of 'Dining with Diabetes' (DWD) participants that report engaging in cooking activities to help take control of their diabetes -- using healthy oils in cooking, substituting herbs and spices for salt and using nutrition labels
8	number of 'Dining with Diabetes' participants that report engaging in physical activities to help take control of their diabetes -- fitting exercise into their daily routine, exercising continuously for at least 30 minutes at least three times per week, and being physically active on a daily basis.
9	number of participants in the 'Live Healthy Live Well' program that report adopting one or more of the recommended practices that might help reduce their risk of developing chronic disease
10	number of individuals participating in the 'Successful Co-Parenting' program that feel more prepared to co-parent as a result of the program
11	number of individuals participating in 'Healthy Finances' programming that indicated the intent to change one or more behaviors as a result of attending an educational session.
12	number of individuals who gained knowledge of their level of skin damage due to sun exposure through DermaScans provided by OSU Extension employees.

**Outcome #1**

**1. Outcome Measures**

# of participants who increased knowledge on topic presented as a result of the education program/session(s)

Not Reporting on this Outcome Measure

**Outcome #2**

**1. Outcome Measures**

# of participants who plan to adopt one or more recommended practices as a result of the education program/session(s)

Not Reporting on this Outcome Measure

**Outcome #3**

**1. Outcome Measures**

number of participants whose knowledge of diabetes management has increased (DWD)

Not Reporting on this Outcome Measure

**Outcome #4**

**1. Outcome Measures**

number of participants who are able to count carbohydrates (DWD)

Not Reporting on this Outcome Measure

**Outcome #5**

**1. Outcome Measures**

number of participants who are eating smaller portion sizes (DWD)

Not Reporting on this Outcome Measure

**Outcome #6**

**1. Outcome Measures**

number of participants who have lowered blood sugar levels (DWD)

Not Reporting on this Outcome Measure

**Outcome #7**

**1. Outcome Measures**

number of 'Dining with Diabetes' (DWD) participants that report engaging in cooking activities to help take control of their diabetes -- using healthy oils in cooking, substituting herbs and spices for salt and using nutrition labels

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	276

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Diabetes is a health problem for many Ohioans. According to 2007 statistics released by the Centers for Disease Control and Prevention (CDC) and a study done by the Ohio Department of Health (ODH), more than 830,000 adult Ohioans have been diagnosed with diabetes. An additional 200,000 are estimated to have diabetes and don't know it. According to the American Diabetes Association, the direct (medical costs) and indirect (lost productivity) costs of diabetes total an estimated \$5.9 billion in Ohio. It is estimated that \$3.9 billion are direct costs and \$2 billion are indirect costs.

**What has been done**

Dining with Diabetes is a series of classes conducted by Ohio State University Extension and community health partners. This program helps individuals learn strategies to manage their carbohydrate counting, portion control, label reading, and taste testing healthy recipes.

**Results**

On the DWD post-test, 276 (81.1%) of participants reported that they "Often" or "Almost always" practice three significant healthy cooking practices -- using healthy oils in cooking, substituting

herbs and spices for salt and using nutrition labels. This was compared to only 66.6% on the pre-test.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle

#### Outcome #8

##### 1. Outcome Measures

number of 'Dining with Diabetes' participants that report engaging in physical activities to help take control of their diabetes -- fitting exercise into their daily routine, exercising continuously for at least 30 minutes at least three times per week, and being physically active on a daily basis.

##### 2. Associated Institution Types

- 1862 Extension

##### 3a. Outcome Type:

Change in Action Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2014	167

##### 3c. Qualitative Outcome or Impact Statement

###### **Issue (Who cares and Why)**

Diabetes is a health problem for many Ohioans. According to 2007 statistics released by the Centers for Disease Control and Prevention (CDC) and a study done by the Ohio Department of Health (ODH), more than 830,000 adult Ohioans have been diagnosed with diabetes. An additional 200,000 are estimated to have diabetes and don't know it. According to the American Diabetes Association, the direct (medical costs) and indirect (lost productivity) costs of diabetes total an estimated \$5.9 billion in Ohio. It is estimated that \$3.9 billion are direct costs and \$2 billion are indirect costs.

###### **What has been done**

Dining with Diabetes is a series of classes conducted by Ohio State University Extension and community health partners. This program helps individuals learn strategies to manage their carbohydrate counting, portion control, label reading, and taste testing healthy recipes.

###### **Results**

On the program post-test, 167 (49.0%) of participants reported that they "Often" or "Almost always" engage in three significant exercise practices: fitting exercise into their daily routine,



exercising continuously for at least 30 minute at least 3 times per week, and being physically active on a daily basis. This was compared to only 40.2% on the pre-test.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle

#### Outcome #9

##### 1. Outcome Measures

number of participants in the 'Live Healthy Live Well' program that report adopting one or more of the recommended practices that might help reduce their risk of developing chronic disease

##### 2. Associated Institution Types

- 1862 Extension

##### 3a. Outcome Type:

Change in Action Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2014	6876

##### 3c. Qualitative Outcome or Impact Statement

###### **Issue (Who cares and Why)**

Chronic diseases are the leading cause of death and disability in the United States. Conditions such as heart disease, stroke, cancer, diabetes, arthritis, and obesity are common, costly, and preventable health problems. These diseases can be addressed and mitigated with education and lifestyle modifications. These diseases have the potential to affect all Ohio citizens, depending on lifestyle choices.

###### **What has been done**

'Live Healthy Live Well' is one of the designated "signature programs" of Ohio State University Extension. The program educates Ohioans on nutrition, physical activity, and wellness issues. Utilizing social media, email wellness challenges, and lunch and learn lessons, the program strives to increase awareness and encourage adoption of healthy lifestyle behaviors. Programming targets working adults, public agencies or governments, and businesses with research-based information. By improving workforce health, employers may see reductions in insurance costs, improved morale and fewer employee sick days.

###### **Results**

6876 (80%) individuals who participated in the Live Healthy Live Well program reported adopting one or more of the recommended practices that might help reduce their risk of developing chronic

disease. These practices may include the following: losing weight, maintaining current healthy weight, choosing healthy foods as snacks, reading food labels to make healthier food choices, and using a coping technique to reduce stress. Some comments from program participants: "I started thinking before I would eat and asked myself, 'Am I really hungry or just stressed?' I have started reading food labels and eating just one portion. As a result, I have lost 5 pounds."; "I was able to use this information because it came in small amounts and I always had time to read it right then."; and "I was at my highest weight and knew I needed to do something. When I heard of the challenge, I started thinking that I could go through the holidays without gaining since I had done it in the past. I set my goal as losing 1 pound per week, knowing it would be a good average. Happily, I lost 10 pounds and continue the good health habits I have brought back into my life. Thanks for the encouragement and jump start!"

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle

#### Outcome #10

##### 1. Outcome Measures

number of individuals participating in the 'Successful Co-Parenting' program that feel more prepared to co-parent as a result of the program

##### 2. Associated Institution Types

- 1862 Extension

##### 3a. Outcome Type:

Change in Knowledge Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2014	1192

##### 3c. Qualitative Outcome or Impact Statement

###### Issue (Who cares and Why)

Experiencing a divorce is a stressful time for all family members and often the degree to which children are affected by their parents' divorce is overlooked. Research indicates that the impact of divorce on children's well-being can be minimized by parents' actions during this difficult period and that cooperative, mutually supportive, low conflict co-parenting relationships are advantageous for both children and adults.

###### What has been done

'Successful Co-Parenting' is a 2.5 hour program for parents who are in the process of obtaining a

divorce. As a result of participating in this program, parents understand the ways divorce impacts their children and learn skills to address the children's needs. The objectives of the program for parents are: 1) understand the practical and emotional processes of divorce (for adults and children); 2) learn how children react to divorce; 3) be able to identify behaviors that are harmful to their relationships with their children; 4) learn how to tell their children about the divorce process and learn skills for helping children cope; 5) learn how to communicate with a former spouse and learn guidelines for successful post-divorce parenting.

**Results**

1192 (89.3%) participants in the 'Successful Co-Parenting' program report feeling more prepared to co-parent as a result of the program. When asked, 'What is the most important thing you learned from this presentation that will help your child(ren) cope with divorce?', some respondents commented: "Always keep in mind the children come first"; "Both parents are equally important and my child needs to have us both in his life"; "How to better understand [my child's] reactions and that their emotions and hidden feelings are reasons for their behavior." When asked, 'What is the most important thing you will do differently as a co-parent as a result of this presentation?', some respondents commented: "Avoid falling into power struggles - focus on big picture - kids"; "Be business-like. Use positive language. I like the term 'co-parent' better than 'ex'. "; and "Be more aware of my child's emotional needs and behaviors."

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
802	Human Development and Family Well-Being

**Outcome #11**

**1. Outcome Measures**

number of individuals participating in 'Healthy Finances' programming that indicated the intent to change one or more behaviors as a result of attending an educational session.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	707

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

'Healthy Finances' programming assists families in improving both present and future economic well-being by helping them: assess their financial circumstances; increase their financial

management skills, including organizing financial records, tracking spending, and improving bill paying; reduce debt and begin or increase savings; and improve consumer decision-making abilities.

**What has been done**

FCS Extension educators help Ohio citizens develop healthier, stronger financial situations through face-to face instruction with individuals and families, training of professionals such as teachers and social workers who work directly with individuals and families, and through reaching people in their own homes through distance education.

**Results**

The 'Healthy Finances' programming uses an evaluation tool with a retrospective bank of questions. Of the 782 participants in 'Healthy Finances' programming in 2014, from before to after programming: 493 (88.8%) indicated a positive change in their ability to use written goals to guide financial decisions, 475 (85.6%) set aside money for emergencies, and 435 (78.4%) set aside money for occasional expenses. 621 (85.7%) participants indicated that they planned to make changes to their handling of financial matters within 1 month. Comments from participants: "I am really glad I took this workshop. Very well worth the time. I don't feel as overwhelmed and feel I can develop a workable plan" and "I thought this program was very helpful in showing me my thinking on spending money...and definitely changes I can make."

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
801	Individual and Family Resource Management

**Outcome #12**

**1. Outcome Measures**

number of individuals who gained knowledge of their level of skin damage due to sun exposure through DermaScans provided by OSU Extension employees.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	1500

**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Melanoma accounts for 73% of deaths from skin cancer, and studies show there is a definite link between the sun's rays and skin cancer. Skin damage from overexposure to the sun is cumulative over the years, and cannot be reversed. The most serious and lasting damage occurs before 18 years of age. Early education on sun safety is important for all Ohio citizens.

#### **What has been done**

Extension educators set up sun safety booths at county fairs around Ohio. Visitors to the booths were provided with sun safety education, including tips like avoiding direct sun exposure between the hours of 10am and 2pm, when the sun's rays are strongest and most damaging; choose sunscreen that blocks 99 - 100% of UVA and UVB rays; and remembering to reapply sunscreen regularly to maintain coverage that can be lost during the day. Additionally, the booths had "DermaScan" machines, which allowed individuals to see sun damage on their face. The curtained machine allows users to place their face inside the device, and using black lights and mirrors, the device highlights areas of the face that have been damaged by the sun.

#### **Results**

Over 1500 individuals had their faces scanned by the "DermaScan" devices at county fairs in 2014. Hardin County reported that 140 adults and 70 youth were scanned. Four of the Hardin County participants reported later that they sought additional care from a dermatologist and were treated for skin cancer. In Lucas County, 80% of participants stated they would use sunblock or a sun-safe hat in the future. In Champaign County, 300 people were scanned. 56% of Champaign participants reported using more sunscreen, 39% reported wearing hats more often, and 33% consulted a dermatologist because of the scan.

#### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
724	Healthy Lifestyle

#### **V(H). Planned Program (External Factors)**

##### **External factors which affected outcomes**

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

##### **Brief Explanation**

#### **V(I). Planned Program (Evaluation Studies)**

##### **Evaluation Results**

One of the most significant evaluation developments in 2014 was the continued and growing impact of the Successful Co-Parenting program. In a few short years since its

development at OSU Extension, it continues to show significant benefits to participants. The course is designed to equip parents with knowledge, skills, tools, awareness, and strategies to help their children adjust to their parents' divorce now and in the future. Retrospective (pre-post) self-assessments collected from program participants revealed the vast majority reported the following outcomes: learning new information (92.4%), plan to use the information (96.0%), feel more prepared to co-parent their children with their former spouse (89.4%), and found the program to be helpful (93.2%). For each of these four measures, the 2014 results are higher than the same indicators in 2013.

The Dining with Diabetes program evaluation continues to develop and capture the positive benefits of diabetes education. The program is evaluated using a pre-test and post-test, given before and then again after the series of classes. Attendees' identities are coded so that individual responses are tracked, allowing for a comparison at the participant level. When asked about the proportion of a meal that should be vegetables, 90% answered correctly after the class, compared to just 55.9% before the class. Participants also demonstrated knowledge gains around questions on carbohydrates and heart healthy foods, posting an average score of 15.8 out of a possible 20 points after the class.

OSU Extension offers a number of programs under the 'Healthy Finances' umbrella, including curricula on credit and debt management, financial recovery, smart spending, homeownership and budgeting. In 2014, participants in these programs reported a number of significant benefits to themselves and their families. 91.7% learned something new from a financial program and 95.3% planned to use the new information. Additionally, 85.7% of attendees planned to make a change to their financial situation within one month. Finally, after taking a 'Healthy Finances' class, 70.7% of participants reported "Almost always" paying their bills on time, up from only 38.9% before the class.

### **Key Items of Evaluation**

Holistic health programming continues to demonstrate sustained impact in Ohio. Results from the Ohio State University Extension signature program, 'Live Healthy Live Well' indicate an increase in participant knowledge of wellness, nutrition, and fitness topics in addition to an increased adoption of health behaviors to reduce chronic diseases. In response to 3 email health challenges, 90% of participants learned new information, 92% reported using the new information they learned, and 80% reported adopting one or more of the recommended new practices that might help reduce their risk of developing chronic disease.

**VI. National Outcomes and Indicators**

**1. NIFA Selected Outcomes and Indicators**

<b>Childhood Obesity (Outcome 1, Indicator 1.c)</b>	
263	Number of children and youth who reported eating more of healthy foods.
<b>Climate Change (Outcome 1, Indicator 4)</b>	
0	Number of new crop varieties, animal breeds, and genotypes with climate adaptive traits.
<b>Global Food Security and Hunger (Outcome 1, Indicator 4.a)</b>	
10776	Number of participants adopting best practices and technologies resulting in increased yield, reduced inputs, increased efficiency, increased economic return, and/or conservation of resources.
<b>Global Food Security and Hunger (Outcome 2, Indicator 1)</b>	
0	Number of new or improved innovations developed for food enterprises.
<b>Food Safety (Outcome 1, Indicator 1)</b>	
0	Number of viable technologies developed or modified for the detection and
<b>Sustainable Energy (Outcome 3, Indicator 2)</b>	
0	Number of farmers who adopted a dedicated bioenergy crop
<b>Sustainable Energy (Outcome 3, Indicator 4)</b>	
0	Tons of feedstocks delivered.