2012 Ohio State University Combined Research and Extension Annual Report of Accomplishments and Results

Status: Accepted

Date Accepted: 06/10/2013

I. Report Overview

1. Executive Summary

There is no other arena of economic activity, or field of science and innovation, that so directly addresses human survival and quality of life, global economic development, and prospects for an environmentally sustainable future as agriculture and agbioscience. Land-grant universities, through their experiment stations and extension services, are on the frontline of sustaining and securing America's leadership and competitiveness in what is and will be the key macroeconomic sector of our time. - from Power and Promise: Agbioscience in the Northeastern United States. 2011. Battelle Technology Partnership Practice and BioDimensions, Columbus, Ohio.Technology Partnership

Ohio Agricultural Research and Development Center (OARDC) and The Ohio State University Extension's (OSU Extension or OSUE) strategic focus for 2012 has been on fulfilling the College of Food, Agricultural and Environmental Sciences' (CFAES) land-grant mission and helping to meet the needs of the citizens of Ohio, and beyond. Collectively these research and extension efforts are all part of CFAES' contribution to The Ohio State University's (OSU) move from 'Excellence to Eminence' and to an Ohio-wide higher education collaborative focus entitled 'One University'.

OSU Extension and OARDC, administered through the Office of The Ohio State University (OSU) Vice President, Agriculture, and Dean, College of Food, Agricultural, and Environmental Sciences (CFAES), are charged to advance mission-oriented research and extension programming. That office is now guided by a new Vice President and Dean, Dr. Bruce A. McPheron.

Whether supporting Ohio's one billion dollar soybean industry with releases of new cultivars or cultivating relations with our over 400 business and industry partners, OSUE and OARDC are engaged, and are delivering impacts that make a difference. Engagement and impact-oriented programs continue to be our hallmark.

Throughout 2012, OARDC and OSUE have continued to manage within the current fiscal realities, with ever increasing demand for services, and in face of Ohio's critical need for advancing job growth and economic development. OARDC and OSUE continue to lead from a position that advocates that we must leverage the investments made in research and Extension within CFAES to expand the economy while ensuring the wise use of our social, environmental, and human capital.

OSU is Ohio's designated academic center of excellence in agriculture, food production, and bioproducts, so designated by the Ohio Board of Regents and the University System of Ohio. OSU is highly dependent on OARDC and OSUE for fulfilling the research and extension/outreach mission of this center. That mission is embedded in the concept of AGBIOSCIENCE. Agbioscience is defined as the physical, biological, environmental, chemical, engineering, social, and economic sciences utilized, independently or in combination, in food, agricultural, and environmental research and Extension programming. Research and Extension programs throughout the year have been highly focused on leveraging our inputs for economic development and job growth. Economic development and job growth within agbioscience are dependent on the wise use of the social, environmental, and human capital found throughout Ohio and the nation. OSU's agbioscience program underpins Ohio's $100 billion agricultural industry.

OSUE and OARDC have continued to focus on three signature areas in agbioscience, as defined in the CFAES strategic plan. These are (1) Food Security, Production and Human Health; (2) Advanced Bioenergy and Biobased Products; and (3) Environmental Quality and Sustainability. In 2012, OSU established three 'Discovery Themes' -- (1) Health and Wellness; (2) Energy and Environment; and (3) Food Production and Security. Given that CFAES' signature area programs align well with the Discovery Themes, CFAES contribution to these themes will be expedited. Across the university, these themes are expected to guide collaboration, allocation of new university resources, and program emphasis.

Embedded within these signatures areas and discovery themes is support for the highest priorities of the state of Ohio, for NIFA's priority areas, and for APLU/ESCOP Science Roadmap for Food and Agriculture. The National Bioeconomy Blueprint now describes five strategic objectives for a bioeconomy with the potential to generate economic growth and address societal needs. Land grant programs such as OSU are playing a critical role in helping to meet those objectives.

Within our three signature areas, multiple centers and collaborative programs have been established with both internal and external stakeholders and are working to advance research from discovery to application to commercialization, truly operationalizing the concepts of FARM TO FORK and CELL TO SELL. Our research and extension team was one of the recipients of the 2012 Experiment Station Section Award of Excellence in Multistate Research for its work to rapidly address the threat of soybean rust to U.S. agricultural production.

OSU Extension and OARDC are committed to maintaining core programs and serving our traditional clients, while at the same time, advancing new programs such as biobased products and sustainable energy. This advancement is done, for example, by assisting growers and producers in being more efficient, effective, economically viable, and environmentally sustainable on the production side. It is at the research - extension - development - marketing nexus where we research new value-added products and services to expand the traditional food and fiber markets. We maintain a business team and an industrial liaison office that is charged with finding new markets for our outputs with the aim of creating new value-added products and services.

CFAES' Industrial Liaison Officer (ILO) works collaboratively with other OSU ILOs for the purpose of further enhancing university - business/industry research collaborations. To further expand our capacity to move CFAES' outputs to impacts the college established a Technology Review Board in 2012.

CFAES continues to partner with law, engineering, business, and the health sciences at OSU to advance a Proof of Concept Center that can more rapidly commercialize university research that is determined to have great promise. That Center has capacity to build a business-case and invest to prove the concept, as well as attract external capital, increase start-up companies, and attract partners and collaborators. OSU's Technology Commercialization Office supports all of these efforts.

Perhaps more so than ever, OSUE and OARDC facilities and programs are critical as Ohio and the nation continue to recover from the severe economic downturn, face pressures to become more energy independent, have need for more sustainable systems, and are seeking approaches to lessen our impact on our environment. These and issues such as: the need for job growth, obesity, worldwide climate change, world hunger, and threats to a safe and secure food supply demand greater leadership and productivity from land-grant research and extension programs. To address these issues, and strengthen the land-grant's role relative to these issues, OARDC and OSUE have positioned CFAES-OSU as a transformational leader. By focusing on areas of research, extension, and development excellence that are of strategic importance to the state of Ohio and the nation, OARDC and OSUE have directed resources to new transformational strategies to generate technology-based economic development, supported by strong human capital enhancement programs. Advances in agbioscience depend on the discovery of new

knowledge and quality of the technology developed, as well as the successful translation of that technology into commercial utilization by producers and processors. OSUE provides a wide variety of information, technical knowledge, and education services for individuals and companies to support translation of technology.

Throughout the year, OARDC and OSUE have used 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 ensuring the best agricultural research, resources, information, and access for our stakeholders. In 2012, Farm Science Review celebrated its 50th year.

OARDC and OSUE, collectively employing nearly 1200 fulltime employees, work jointly on most CFAES agbioscience programs. Eighty eight (88) faculty members hold joint appointments in OARDC and OSUE and most have advising and varying levels of teaching duties in CFAES academic programs. Likewise, OSUE and OARDC work closely with CFAES' Agricultural and Technical Institute (ATI), the nation's largest program of its kind. ATI is ranked number one in the nation among two-year institutions in the awarding of degrees in agriculture according to Community College Week's 2012 Top 100 report. This close collaboration, a 'one college approach', results in seamless programs such as our agronomic field days annually held at one of our nine research stations across the state. Often, you find the scientist that has conducted the research related to a integrated pest management (IPM) standing in the middle of a row crop, surrounded by growers hearing the findings of the research, and exploring recommendations for adopting or adapting this latest science. That same research/extension faculty member may lecture about this research in CFAES academic courses, as well as help advise graduate students studying IPM issues. Teaching, research, and extension are highly integrated, often with the same faculty member in this tripartite role. We use every opportunity to focus on our signature and high priority areas, as well as the OSU discovery themes, both in and out of the formal classroom.

OARDC research supports approximately 200 graduate level and postdoctoral students each year. OARDC is also involved in youth outreach helping them build research skills and better understand the supporting science and opportunities within agbioscience. Each year, more than 50 high-school age and undergraduate students participate in the OARDC Research Internship Program (ORIP). STEM concepts are taught in laboratory and field settings and included in student seminars, project reports, and symposia. OARDC and CFAES academic program leaders have used 2012 to lay the groundwork for dramatically expanding the Summer Research Opportunity Program that serves as a gateway to graduate education for underrepresented students nationwide. Building the scientific workforce for tomorrow is critical to our state and nation's ability to regrow the economy and compete in the international marketplace.

Our efforts to extend knowledge are not limited by traditional topics and audiences. Instead, we address emerging needs as they arise, such as a new land use issue in Ohio. Reserves of oil and natural gas in Marcellus and Utica shale in Ohio have left landowners in need of information. The development of these reserves could mean thousands of Ohio jobs and potential significant economic returns for landowners contracting with oil and gas companies. But landowners also need to fully understand the potential financial, legal, and environmental ramifications of the highly complex leases that could last for generations; and public officials often need guidance on community implications as well. OSUE is providing such information. Its Shale Energy Education Work Group is examining the financial, economic, development, family, environmental, and safety issues regarding shale energy. Additionally, a CFAES faculty member serves as Associate Director of OSU's Subsurface Energy Resource Center that focuses on shale oil in Ohio.

Collaborative ventures provide leadership and outputs/impacts that are relevant to multiple audiences and contribute to food, economic, environmental, and national security. In 2012, OARDC managed $161 million in active sponsored research grants and contracts. Programs such as biobased

product research, spearheaded by the Ohio Bioproducts Innovation Center (OBIC), a state of Ohio designated Wright Center for Innovation, are key to this impact-oriented portfolio. OARDC has $14.5 million of Third Frontier grants in biobased product research. Third Frontier is Ohio's economic development initiative to build a world-class research capacity. Included are research into solid state anaerobic digesters, plant derived natural fibers, natural rubber from the Ohio Gold dandelion, biomass to energy, and granular technology to deliver fertilizers, pesticides, and the creation of other biologically active ingredients that are more economical and environmentally friendly. Most of these projects are matched and leveraged by industry collaborators.

OARDC and OSUE programs are far ranging, often highly unique in content and methods of delivery, and highly responsive to stakeholder needs, while building on the latest science. Our programs range from projects such as developing biogas generators suitable for small farmers in developing countries, to green technologies such as enhancing national rubber supply from the Ohio Gold dandelions, to breeding an ash tree that is resistant to the emerald ash borer, to studying chemicals that could result in an entirely new way of killing mosquitoes that spread malaria, a disease that claims the lives of one million children around the world each year.

Our programs impact Ohioans' daily lives. For example, antimicrobial-resistant (AMR) bacteria cost the American public an estimated $4 billion in health care annually. Each year there are about 63,000 cases of E. coli O157:H7 nationwide, resulting in about a $630 million burden to the public health system, which translates to about $10,000 per case. In Ohio, this translates to about 2,331 cases annually, costing the state $23 million a year. Our researchers obtained two food safety grants totaling $2.3 million from the U.S. Department of Agriculture to study how European starlings and raccoons can spread E. coli O157:H7 to farm animals. Researchers, including Jeff LeJeune, a microbiologist and veterinary scientist with OARDC, have determined that European starlings play an important role in transmitting several diseases to livestock and poultry among farms. OSUE work with farmers to take measures to prevent wild birds from contaminating livestock feeds, which will decrease the contamination of the food supply and may reduce the number of people that become ill from contaminated foods.

Our programs build cumulative knowledge overtime. For example, OARDC, OSUE, and our business partners have capitalized on a line of research that began well over a decade ago with composting research and exploration of a cow's stomach as a model biogas generator. As reported earlier, those lines of research have resulted in a significant portion of OSU Wooster campus' energy needs being met from biogas that is generated onsite. The business research partner, located in the BioHio Research Park on the OARDC Wooster campus, now helps fuel OARDC vehicles with biogas generated from food processing waste streams. In 2012, OARDC took delivery of three cars and one truck that are now fueled by biogas generated at the BiOhio Research Park from renewable, plentiful organic waste, such as chicken fat, rotten tomatoes, and the byproducts of making potato chips. The fuel costs only about two-thirds as much as gasoline and, when burned, emits about a third less greenhouse gas. A grant from Clean Fuels Ohio provided partial funding for the project.

The importance of this exemplary program is that it illustrates the involvement of OARDC and OSUE in the full value/supply chain network from idea inception to product development, delivery, and impact. BioHio Research Park was established to support such endeavors by commercializing ideas and products from food, agricultural, and environmental research laboratories and moving them to the marketplace. In 2012 the BiOhio Research Park moved to the next phase by formally naming its first president and executive director. Tenants continue to move into a newly remodeled building, and are partnering with our faculty and staff to advance new products and services. The research park is a model for federal, state, and local collaboration, demonstrating how to move science into society to advance economic, environmental, and social well-being, in partnership with business and industry. OARDC and OSUE are using the Park as a catalyst for local and regional development in agbioscience.

Both internal and external assessments, and continued support by federal, state, local governments, by stakeholders, and by private business and industry, attest to the value placed on the work of OSUE and OARDC. According to a recent Battelle Technology Partnership Practice assessment report, the foremost in-state driver of agbioscience research and development is OARDC, with OSUE leading in-state extension education and human capital development. Their assessment found OARDC to be a substantial economic engine for the state of Ohio. Battelle's most recent calculation is that OARDC's spending impacts in FY 2008 generated 1,609 jobs; $156.3 million in economic output; $59.2 million in personal income for Ohio residents, and $5.5 million in state and local taxes. The Battelle report further noted that the dynamic work of OARDC in targeting agbioscience growth is paying significant dividends, both for the institution and for the state of Ohio. OARDC is a premier institution committed to safe, healthy, and affordable food and agricultural products; sustainable food and agricultural systems; strong rural and urban communities; stewardship of natural resources and the environment; and keeping Ohio positioned favorably in a global economy.

According to the Battelle study, OARDC scientific research, innovation and technology development is providing large-scale and widespread functional economic impacts across Ohio, both in terms of the generation of positive impacts (through the development, for example, of high-value crops, biobased materials and technologies) and significantly reducing negative impacts (such as crop losses or disease impacts). The study points out that OARDC is a generator of significant economic impacts for the state in the form of: technology commercialization; new and improved crops, breeds, and products for Ohio producers; new and improved technologies for Ohio industry; and an enhanced and protected environment and quality-of-life for Ohioans. OARDC and OSUE's partnership with the private sector is key to creating meaningful impacts.

CFAES has long had a historical emphasis on working with the private sector in Ohio. For example, almost 400 companies have had grants, contracts, and agreements with OARDC in its role as CFAES' research arm in the last five years. OARDC designed our SEEDS program to recognize and create matching grant opportunities, which both expanded and enhanced the number of relationships with the private sector. Funds from SEEDS are to be used to explore creative ideas and to initiate novel research programs that are attractive to external sponsors and are consistent with the mission of OARDC. By providing seed money to develop the necessary preliminary data for a strong extramural grant application or by matching funds to leverage additional external funding, SEEDS has proved to be a valuable program for our scientists. One outcome of a SEEDS grant was the funding of the Ohio Bioproducts Innovation Center (OBIC) through the Third Frontier, a joint venture among the state of Ohio, CFAES, the Ohio Soybean Council, and Battelle. In 2012, 141 SEEDS applications were submitted to OARDC requesting $4,347,839 in funding; $1,361,225 was awarded in SEEDS grants. Thirty awards were made to faculty members for an investment of $1,256,291. There were four undergraduate, seven masters level, and 17 graduate awards made for an investment of $104,934.

OARDC has led CFAES' partnering with Ohio industries on a dozen state of Ohio Third Frontier awards generating over $40.7M before match. These partnerships also initiated a more active process to develop strategic relationships at higher company levels, a process that has become even more directed with the hiring of the college's ILO in 2011. We now invest in four FTEs related to development of industry partnerships.

Battelle (2005) reported that OSUE generated annually an equally robust impact: $159 million in total Ohio economic output (sales); 1,918 jobs in Ohio; $64 million in personal income for Ohio residents; and $4.8 million in annual tax revenue within Ohio. Institutional spending, capital projects, workforce development, creation of new products and businesses, and the creation of new business incubator sites on both the Wooster and South Centers campuses by OARDC and OSUE support job creation and growth of the agbioscience sector. All of the noted actions are intended to improve the human condition by advancing strong business/economic growth in a socially responsible manner that is oriented to protecting

a sustainable environment.

For 2012 OARDC and OSUE have reported an array of impacts that help to advance both society and science. The institution has moved beyond just creating food to creating energy and manufacturing materials such as domestic, non-food sources of natural rubber, biogas, and ethanol. Plant and animal genetics research, in combination food technologies, engineering, and plant and animal health research are supporting a safer, healthier food supply that is more sustainable, with less environmental impact. These programs will substantially contribute to reducing global hunger. For the most part, all of these are collaborative efforts involving OARDC and OSUE, as well as multiple business and industry partners, and multiple federal, state, local agencies and non-government organizations. OARDC and OSUE support research, extension services/outreach, and development across five OSU colleges, entering into multi- and interdisciplinary partnerships to address complex problems and issues that require broad thinking. Health and wellness, energy and environment, sustainable societies, and biobased-advanced materials are among the problem areas that were addressed this year in collaboration with both internal and external partners.

A primary goal of this institution is to advance research, grow human capital, and extend knowledge as a means of economic recovery, job growth, and advancements in societal and environmental well-being. It is at this nexus that OSUE connects with people in all stages of life, from young children to older adults, working with families and children, farmers and business owners, community leaders, and elected officials to build better lives, better businesses, and better communities. The organization delivers targeted, relevant, research-based information and programs to meet the needs of Ohioans. OSUE helps to enhance agriculture and the environment by working with farmers to strengthen their businesses, adopt new technologies, and improve efficiency while protecting the environment. Ohio's diverse agricultural, horticultural, and forestry industries contribute more than $100 billion to the state's economy every year. OSUE assists with technology, marketing and educational programming, protecting Ohio's position in the global marketplace. Their educators and specialists help to strengthen families and communities by teaching Ohioans how to apply science in their daily lives in order to make informed choices about everything from finances to healthy living and food safety. OSUE works to help build strong families and by offering programs and information to all Ohioans on childcare, parenting, family life, adult development and aging, and balancing life, jobs, and families. The Ohio 4-H Youth Development Program is part of a community of 300,000 Ohio youth, aged 5 to 19, experiencing hands-on learning in this extension effort through clubs, camps, and after-school programs in urban, suburban, and rural communities statewide. OSUE's 4-H Youth Development Program deliver skills in communication, math, science, and research and help Ohio's young people prepare for college, the workforce, leadership and life. OSUE helps to advance employment and income opportunities for Ohioans delivering economic, small business, and job development programs that are tailored to local community needs in every county, whether metropolitan, rural, or a combination. OSUE's work and model education programs have implications beyond Ohio. For example, we know obesity doubled in every region of the world between 1980 and 2008, afflicting five hundred million people. One billion people are now chronically hungry due to food insecurity. Outreach and extension education models developed at OSU can inform this dilemma.

Growing business sectors such as Ohio's green industry by improving workforce skills, and enriching the knowledge of professionals in turfgrass management, landscaping, and nursery is part of OSUE's efforts. Job readiness training to improve the skill level of potential employees is important in attracting new businesses and encourages retention and expansion among current employers. OSUE enhances communities and neighborhoods by partnering with businesses, current and emerging community leaders, and elected and appointed officials. Their programs inform residents, leaders, and entrepreneurs regarding local development issues and inform individual and community decision-making. Additionally, Extension programming protects Ohio's natural environment by working with landowners in managing woodlands and preserving streams and other water resources, such as Lake Erie. Collectively these Extension efforts were all focused on building a stronger Ohio that is competitive in rebuilding its economy and improving

the quality of life for all its residents.

OSUE's focus on local foods is one approach to building stronger communities. A 2010 study found that if northeast Ohio met 25% of its food demand with local food production, it would create 27,000 new jobs, increase annual regional output by $4.2 billion, and boost the tax base by $126 million. OSUE is helping make this shift happen by: (1) connecting more than 1,250 Ohio producers and buyers via MarketMaker; (2) assisting 225 producers to reach wholesale buyers since 2010 through this program; (3) providing technical assistance to 22 food co-ops across the state; and (4) by helping Ohio's 278 farmers' markets reach more consumers by setting up systems to accept food stamps: increasing from seven markets in 2008 to 55 in 2012.

OSUE and OARDC manage numerous independent and joint projects and programs. They work under the CFAES slogan of BRINGING KNOWLEDGE TO LIFE. There is a commitment to a broad array of research and extension programming ranging from introducing new cultivars, to obesity and diabetes education programs, to on-farm field days, to soil fertility research and outreach in Africa and India, as well as in the U.S. In one joint OARDC/OSUE program funded in 2012, we began a study on how to encourage low-income families to save money for long-term goals and pull them out of poverty and could ultimately decrease child hunger. But in the short-term, there's fear that participating in such programs could increase children's food insecurity as families divert some of their meager income into savings.

In 2012, OSU officially opened the university's India Gateway, an India-based program to improve recruitment, student experience, and alumni and corporate relations in the world's second-most populace country. The university referenced its historical collaborations with India by citing four programs; three of the four were led by CFAES. These three are ongoing initiatives: (1) Ohio State has been collaborating with universities and corporations in India since 1958, focusing on advancements in educational training and agricultural research with partners such as the Punjab Agricultural University; (2) Researchers from Ohio State and Pondicherry University have teamed up to study the evolutionary effects of gene flow between crops and their wild relatives, supporting further research in the areas of food production, safety and supply; and (3) Students from Ohio State's University Agricultural Technical Institute and Tamil Nadu Agricultural University in Coimbatore, India, are collaborating to study the challenges of marketing products internationally.

Ohio Agricultural Research and Development Center and Ohio State University Extension have worked throughout this reporting year to accomplish the land-grant mission of CFAES-OSU and to meet stakeholder demands while supporting federal, state, and local agendas. OARDC and OSUE leverage federal funding provided through NIFA to conduct both basic and applied research, and to manage comprehensive statewide extension efforts in program development, delivery, and evaluation. While OARDC and OSUE focus heavily on our applied impacts, OARDC conducts and reports a substantial amount of basic research impacts that other researchers, government agencies, and business and industry worldwide depend on for our scientific breakthroughs. Likewise, OSUE has long been a leader in producing methodologies and techniques that inform fellow outreach and extension programs worldwide. Federal, state, and local resources are combined with extramural funds, and with gifts, in-kind contributions, and volunteer support to make the Ohio program truly stakeholder-based. Stakeholders though are not limited to Ohio. Both OSUE and OARDC lead national and international efforts within their mission. To that end, we are dedicated to maintaining our land grant mission and vision, locally, throughout our nation, and the world.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	205.0	0.0	85.5	0.0
Actual	179.4	0.0	366.4	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

Within OARDC, OSU Extension, and the College of Food Agricultural, and Environmental Sciences (CFAES), merit review processes are critical to mission accomplishment and are mandated at all levels. Over the years the review process has been streamlined and, with introduction of digital media and social networking, we have seen dramatic changes in quality, quantity, and timeliness of reviews. Advisory committees and multiple internal and external stakeholder groups have provided feedback that aids in all facets of CFAES. Throughout 2012, these groups have been used for input on multiple matters including new facilities such as the food, agricultural, biological engineering building to be built on the Wooster campus, new dimensions for agbioscience initiatives, annual reports, and new hires. With the introduction of the University's new Discovery Themes, our advisory groups will be called on for input in this new dimension. Documents, such as annual reports and one page information sheets, are typically produced in draft form and targeted for review by individuals and groups who are both knowledgeable of, and vested in, the subject matter. They were asked to provide feedback on both content and how the story is told. This input has come from multiple levels such as partner business groups, advisory committees, elected officials, and commodity groups.

All of OARDC and OSUE's published matter, ranging from traditional print to social media outlets, have been compiled and reviewed by teams with both technical expertise and communication expertise. Most of these also had administrative review.

Each of the OSUE program areas continue to conduct long range strategic planning annually to prioritize programming. OARDC utilized its advisory committee this year, as well as various other committees, to focus on facilities, programs, operations, and long range planning. We had 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 exits for each program.

Given that all of OARDC and OSU Extension efforts are planned to benefit some targeted group or groups, we have engaged these groups at the beginning of the process, thus providing formative reviews. This holds true even in highly theoretical research in that multi- and interdisciplinary partners have been

engaged to advance these lines of inquiry. In this case the stakeholders may be internal to the organization, or found in other colleges and universities. Specialists from academic disciplines have provided insight from research trends and literature while county Extension personnel provide insight from local communities. Program area personnel have worked together to identify key issues that cut across disciplines. Special task forces, such as the aforementioned Shale Energy Education Work Group, collaborate to identify priority program efforts to address these issues. Funding is then allocated to support program priorities. In addition, these priorities direct from what sources grant funds are sought.

There has been a continual review of all plans to include the ability to be responsive to unanticipated issues. The system provides flexibility for educators to address these issues. In situations where grant monies were obtained, staff with specific, short -term employment contracts were 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 determine 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 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 OSUE 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 formative assessment to summative assessment is more important than ever to ensure resources are targeted to garner the greatest impacts. Throughout 2012 we have sought input, usually in an informal process, often one-on-one, or in working group meetings.

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. One of the most engaged programs is our Ohio Bioproducts Innovation Center, which brings together two of the largest industries in Ohio, agriculture and polymers. Also, our business innovation team (ATECH) and our industrial liaison office, are both charged to be continually engaged, providing both feedback and partnerships for CFAES.

The OARDC 2012 internal competitive grants program (SEEDS), referenced in the Summary of this report, is peer reviewed by an internal panel of faculty and administrators representing all academic departments within the College. Some of the larger competitive grants are reviewed by panels of faculty and administrators and leading stakeholders who have expertise in the area of the award, e.g. agbioscience grants. Occasionally, faculty from outside the College are used a reviewers. Combined panels of academics and non-academics were used to help define research programs so they can more readily move into the marketplace. Many of the CFAES larger projects that compete for internal monies are required to have an interdisciplinary science and extension team as well as external members who are part of the business community. Such teams can more effectively move research through the full value chain and deliver needed goods and services to society. The goal is to advance the "farm to fork" or "cell to sell" approach in a timely manner.

All OARDC and OSUE publications are either blind peer reviewed or peer reviewed/juried before publications either go to print or are distributed via electronic media. Peer review, both formal and informal, and assessments have long have been part of the business culture of OSUE and OARDC. Faculty members are encouraged to publish in the highest journal tier possible but are also encouraged to translate their more technical publications into trade journal articles, fact sheets, and, where appropriate, deliver their relevant ideas via social media. By placing more relevant information before stakeholders, the greater the chances that the feedback loops from those stakeholders will be complete.

As OSUE and OARDC strive to be more relevant, make wiser use of resources, and to maximize impact, stakeholder review, as well as internal and external peer review, are more important than ever. The organization is committed to, and had made use of, both informal and formal reviews at all levels of

the organization throughout 2012.

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 OSUE, and CFAES have continued to have wide support and active participation from among our stakeholders. Each year, including 2012, our networks continue to grow. New stakeholders and partners are constantly being sought out and are seeking us out, especially as we enter new areas such as oil shale, and renewable energy from waste streams and other sustainable biomass sources. As individuals and groups see meaningful engagement opportunities where they can influence outcomes, they are becoming more and more engaged. Our faculty and staff understand that each contact with a stakeholder is an opportunity for garnering their input and an opportunity for us to better understand needs. The key is meaningful engagement.

Over time, both formally and informally, we use all of the methods noted above. OSUE and OARDC are constantly engaged at some level with stakeholders. One technique we use is to ask some of the newly appointed government employees, some whom were not overly familiar with our organization, to make a site visit and make input on our priorities, how we are communicating our story, and even to review and comment on drafts fact sheets.

As an institution, new emphasis is continually being placed on business and industry participation and creating collaborative efforts that yield impacts such as 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. To make the public-private collaboratives more valued, we communicate that there are joint expectations for:

- Determining research agendas based on industrial need, with industry driving the process;
- Evaluating research coming out of the technology platforms to determine market opportunities through both technology and market assessments;
- Evaluating commercial potential of patented technologies;

- Forging partnerships with businesses interested in commercializing the agbioscience;
- Encouraging researchers to commercialize their research through licensing and spin-off opportunities and ongoing collaborations.

OARDC, OSUE, and most academic departments/schools within CFAES effectively use their external advisory committees and stakeholder groups as a forum to discuss current programs and gather input for future direction, e.g. strategic planning. During 2012, 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 electronic messaging. All county Extension offices have an overall advisory committee, as well as focused committees, providing input for program planning, implementation, and evaluation. Electronic media is critical to fostering this input, as time and money are not always available for the traditional face-to-face meetings. It is this commitment to the reduction in travel time that may be one of our best tools for encouraging participation.

OARDC gathers input in many one on one settings in addition to group level engagement with a private business or industry on a project-by-project bases, or with commodity or civic groups. Stakeholders report that they appreciate this opportunity to make input. In addition to the series of OARDC and OSUE Battelle studies from 2004 through 2009 that drew extensively on stakeholders, each program area within OSUE conducted stakeholder-based strategic plans to identify statewide priority programs. The process involved educators meeting with local advisory committees, reviewing demographic data, as well as economic and social trends in Ohio, and participating in a prioritization processes. As a result, each program area has focused teams, composed of campus and center 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 evaluating programs and educational materials and engage in planning. Some of the program teams include members from external organizations (statewide agencies, organizations, commodity groups) who are appropriate partners to enhance program outreach and delivery. County Extension Advisory Committees, as well as the State Extension Advisory Committee, have been engaged in reviewing and prioritizing new multi- and interdisciplinary programs as they relate to local communities. Multiple levels of stakeholders, due to their long history of engagement with OSUE and OARDC, maintain a strong commitment to making input into our programs, by identifying needs, and participating in both formative and summative assessments. Throughout 2012, OSUE and OARDC have worked to continue to make 'meaningful engagement' the mantra of our stakeholder relations.

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.

Each year our stakeholder base grows, and 2012 showed that growth, not only in numbers, but also in type of groups. The diversity of our stakeholder groups can be seen in the following

examples: traditional agricultural production, environmentally focused groups, food networks, and mothers of infants. One of the largest new groups was those looking information on leasing and environmental impact from oil and gas extraction from oil shale. Each group we work with is special, often having unique needs. While many seek us out, OARDC and OSUE make targeted efforts to find and link with representatives of all stakeholder groups. OARDC and OSUE utilized 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. As new contacts are made, they are asked to identify others who need to be included. This rolling process continues to serve the organization well.

This year, informal needs assessments have provided meaningful feedback. One-on-one sessions at our Farm Science Review, the state fair, county 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, and as a means to expand this institution's clientele list, knowledge of needs, and feedback on outputs and impacts. These contacts are logged and maintained.

County Extension committee members are most useful in linking with our traditional stakeholders and expanding the list of those within the county that should be contacted. They are expected to have a constitution and bylaws that identify the makeup of the committee. 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 the 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.

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 for the purpose of 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 to ensure 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 in III 2(B)1 are all 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, most of our efforts are informal. Our survey of various groups is often done in open forum interview/discussion settings, which generate more qualitative than quantitative data. That data, because of the robustness and the fact that the research scientist or extension expert working with the group gathers the data, is highly valued and informative. OSUE 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, and agencies, as well as advisory committees and friends groups, commodity groups, and 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, and who provide both formative and summative assessment of outputs and impacts.

In a 2009 published study of OARDC's Accomplishments and Growth Strategies for Economic Development, Battelle reported using extensive field interviews with stakeholders to identify how core competencies can be translated into sources of innovative technologies and products for development. CFAES used similar techniques in preparing our 2008 CFAES strategic plan, as did OSUE when they prepared their strategic plan in 2008-09. Now 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 remain engaged. We work on the premise that 'meaningful engagement' will yield meaningful data, both quantitative and qualitative, and that interpretation and internalizing that data will help lead the organization to meaningful partnerships, and that in turn will 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.

OSU Extension and OARDC, collectively and independently, advance both basic and applied research and build and test advance models for extension/outreach programming that meets client needs. To accomplish this requires close client/stakeholder/customer interaction. Throughout this reporting year, both OARDC and OSUE, through the College of Food, Agricultural and Environmental Sciences, have continued stakeholder engagement activities that reinforce that our organizational culture is customer - centered, customer - focused. At each juncture of our decision-making, our organization has sought to weight 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 input are critical in the state level budget process. Likewise, their input continues to inform the Plan of Work for federal base funding, as meeting client needs is key to fulfilling the land grant mission and demonstrating that stakeholder support exists for programs that fulfill their needs and contributes to national well-being.

Stakeholder input is reflected, for example, in the new APLU/ESCOP Science Roadmap for Food and Agriculture that CFAES personnel were active in the development of, as reported in 2010. That input is still relevant and useful today. We recognize that state, federal, and extramural supporters must see constituency benefits in order to justify funding decisions. As we join our stakeholders in meeting with elected officials at all levels of government, it is clear that stakeholder needs are being met and that the stakeholders and our organization are communicating common interest and need.

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. Clients remain our true partners, joining with faculty members and staff to identifying 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 bases, which provide our scientists with study questions. Once answered, the response is framed for the clients, as well as with other interested parties. The response includes intervention to effect change, deliver new goods, services, and ultimately to real impacts. These have, 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. As a public institution, it is imperative for society to see our organization reflecting their aspirations.

Input is considered at many levels of the organization. The Administrative Cabinet of OSUE 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 continues to prove most valuable. Both OSUE 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

As we grow in our partnerships, not only are we learning from stakeholders, but the stakeholders have a vested interest, and in many cases authority, to help set agendas, like our BioHio initiatives. 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; staying engaged has been a strong recommendation from a number of stakeholders who have pointed out that periodic mailings and webpages do not equate to staying engaged.
- Our science and services are highly valued; we are making real impacts that have positive social, economic, ecological, and ethical impacts, both quantitatively and qualitatively, for individuals, families, groups, communities, business and industry;
- Clients/stakeholders, both new and old, are willing to stay engaged if their role is meaningful and beneficial, i.e. 'meaningful engagement';
- OSUE and OARDC do not have the resources and personnel to meet all the demands, or take advantage of all the windows of opportunity, that present themselves; and
- The breath of demand is so wide, the quantity so great, and the shift so dramatic, that the organization must be engaged in constant planning to garner and optimize resources, invest those resources in very targeted programs, and generate impacts in a timely manner, while clearly articulating to the full array of stakeholders what we do and do not have capacity and resources to accomplish.

The institution-stakeholder interaction is providing OARDC and OSUE with better insights into stakeholder needs, willingness to participate and at what levels, and a willingness 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. OARDC and OSUE 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

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
10775315	0	7474985	0

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	10389457	0	7602598	0
Actual Matching	10389457	0	11393608	0
Actual All Other	0	0	0	0
Total Actual Expended	20778914	0	18996206	0

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous				
Carryover	3632888	0	252998	0

V. Planned Program Table of Content

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%		10%	
133	Pollution Prevention and Mitigation	40%		40%	
605	Natural Resource and Environmental Economics	10%		50%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	2.0	0.0	1.0	0.0
Actual Paid Professional	4.0	0.0	0.9	0.0
Actual Volunteer	5.0	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
231713	0	118745	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
231713	0	142934	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 include both basic and applied research. This research takes place in all academic programs within the College of Food, Agricultural, and Environmental Sciences. Laboratory-based experiments, pilot plants, a feedstock processing plant, greenhouses, and research plots and stations support this program. All functional laboratories and sites are improved over time as program need warrants. OSU Extension provides parallel programs in this Planned Program to advance knowledge, promote adoption and change, and develop human capital. OARDC and OSU Extension faculty and staff engage in appropriate levels of outreach, engagement, and consultation, with both internal and external stakeholders.

2. Brief description of the target audience

In the Climate Change Planned Program, targeted audiences 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;
- 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 (those in the 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

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	2759	14000	0	1145

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

Patent Applications Submitted

Year:	2012
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	3	12	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

Output #2

Output Measure

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

Year	Actual
2012	2759

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	Create strategies/technologies within our program mission to reduce atmospheric pollution that can contribute to global climate change.
3	Number of producers adopting methane recovery systems.
4	Number of animal units affected by methane recovery systems.
5	Number of producers using no-till techniques to sequester carbon in the soil.
6	2. Create strategies/technologies within our program mission to reduce atmospheric pollution that can contribute to global climate change
7	number of strategies / technologies created within our program mission to reduce atmospheric pollution that can contribute to global climate change (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

Create strategies/technologies within our program mission to reduce atmospheric pollution that can contribute to global climate change.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Agricultural scientists are seeking ways to improve the efficiency of food animal digestion and nutrient capture by the animal. This improvement needs to enhance environmental quality, as well as animal productivity and profitability. Emissions from food animals are considered a major issue in managing air quality and are a contributor to climate change. Globally, livestock are the largest source of methane from human-related activities, and are the third-largest source of this greenhouse gas in the United States, according to the United States EPA.

What has been done
OARDC efforts have isolated a bacterium (WG-1)from the gut of Australian Tamma wallabies that allows wallabies to consume and digest grasses, leaves, and other plant material without producing copious amounts of methane, as cattle do. This was determined by using a partial reconstruction of the bacterium's metabolism (nitrogen and carbohydrate utilization pathways and antibiotic resistance) to devise cultivation-based strategies that produced axenic WG-1 cultures. Research showed that methane emissions from Tammar wallabies amount to 1-2% of their digestible energy intake, compared roughly 10% in sheep.

Results
The Australian Tammar wallaby (Macropus eugenii) harbors a unique gut bacterium that produces only one-fifth the amount of methane produced by ruminants per unit of digestible energy intake. The scientists have isolated a dominant bacterial species (WG-1) from the wallaby microbiota that is related to lower methane emissions from starch-containing diets. This was achieved by using a partial reconstruction of the bacterium?s metabolism (nitrogen and carbohydrate utilization pathways and antibiotic resistance) to devise cultivation-based strategies that produced axenic WG-1 cultures. Pure-culture studies confirm that the bacterium is capnophilic and produces succinate, further explaining a microbiological basis for lower methane emissions from macropodids. This knowledge provides new strategic targets for redirecting fermentation and reducing methane production in livestock.

4. Associated Knowledge Areas

KA Code	Knowledge Area
132	Weather and Climate
133	Pollution Prevention and Mitigation

Outcome #3

1. Outcome Measures

Number of producers adopting methane recovery systems.

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Number of animal units affected by methane recovery systems.

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Number of producers using no-till techniques to sequester carbon in the soil.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	5000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Ohio farmers face many challenges including soil erosion, nutrient runoff, harmful algae blooms, soil compaction, and pest control. OSU Extension provides soil quality and health training on cover crops to enable Ohio farmers to protect and improve their soil for higher crop yields and increased farm profitability. Cover crops improve water infiltration, reduce nutrient runoff, absorb and recycle soluble crop nutrients which reduce waste, decrease soil compaction, and improve drainage.

What has been done
Multiple meetings on no-till techniques were conducted throughout 2012. Additionally, a Conservation Tillage Conference was held, where multiple break-out sessions were offered on no-till techniques. Conference attendance exceeded 900 producers.

Results
Meeting and conference participants indicated increased awareness on soil quality motivations, greater adaptation of sustainable practices to improve soil quality and increased farm income.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation
605	Natural Resource and Environmental Economics

Outcome #6

1. Outcome Measures

2. Create strategies/technologies within our program mission to reduce atmospheric pollution that can contribute to global climate change

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Livestock operations are estimated to cause about 50, 25, and 18% of ammonia, nitrous oxide, and methane emissions, respectively, in the United States. Ammonia reduces air quality, and nitrous oxide and methane are 310 and 25 times more potent, respectfully, than carbon dioxide for global warming potential. Dairy cattle present a strong opportunity for reducing emissions because the rumen microbial ecosystem creates a highly variable environment for ammonia and methane production. Manure nitrogen excretion is inevitable, but ?extra? excretion results from inefficiencies of ruminal fermentative processes. A strategy for methane mitigation is needed.

What has been done
OARDC scientists studied these inefficiencies while retaining safety factors of higher dietary protein needed to prevent depressions of feed intake and milk production by dairy cows. Culture and chemotaxis studies document that protozoal growth rate responds rapidly to dietary conditions, passage rate from the rumen, and substrate supply. Even when protozoa grow less efficiently, they are still produce ATP but are wasting that energy through biochemical pathways. Therefore, even when growing inefficiently or being exposed to inhibitors, protozoa still produce high amounts of hydrogen gas to fuel methanogenesis.

Results
An integrated methane mitigation approach can reduce methane emission from cattle. Reliably reducing dietary crude protein by 0.5% or improving fiber digestibility by 5% could save up to $30 to $40 per cow per year in feed costs. If these strategies are successful even for 10% of Ohio's 280,000 cows, savings in feed costs should provide approximately $7 million dollars to Ohio's annual economy while sustainably reducing environmental impact.

4. Associated Knowledge Areas

KA Code	Knowledge Area
132	Weather and Climate
133	Pollution Prevention and Mitigation
605	Natural Resource and Environmental Economics

Outcome #7

1. Outcome Measures

number of strategies / technologies created within our program mission to reduce atmospheric pollution that can contribute to global climate change (OSUE)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Climate change and its related impacts affect many factors that influence the daily lives of the general public, such as infrastructure, public health, agriculture, and water quality. Yet very few understand what impacts they could face from a state or Great Lakes regional perspective.

What has been done
OSU Extension produced 10 webinars reaching 2,650 participants and representing 200+ organizations, with another 150 people downloading webinars every month. A climate change website was developed (http://changingclimate.osu.edu); the site includes webinar archives and climate curricula. Extension professionals created a climate change curriculum training webinar that introduced 109 teachers across the region to new climate curriculum. Additionally, Extension professionals conducted a "Sustainable Water Resources & Climate Change Short Course", and developed 2 distance education programs.

Results
93% of webinar participants acknowledge they gained new information and would share it with others. 71% of respondents from one webinar indicated they learned something new that they would apply in their work or future decisions. In the after-course evaluation survey of the "Sustainable Water Resources & Climate Change Short Course", 90% of participants indicated they felt equipped to apply sustainability principles to water resources and climate change planning in their community, compared to pre-course evaluation results of the same question that indicated only 21% of participants feeling equipped.

4. Associated Knowledge Areas

KA Code	Knowledge Area
132	Weather and Climate

133	Pollution Prevention and Mitigation
605	Natural Resource and Environmental Economics

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
- Other (Social Acceptance of the Issue)

Brief Explanation

Climate change is a multi-dimensional, political, and socially debated topic, thus a shift in any or all of the above dimensions affect outcomes. Perhaps more impacting than any other dimension is the continuing erratic nature of weather patterns. We see examples of erratic weather patterns in the droughts experienced in Ohio, most of the Midwest, and Texas in 2012. Flooding and other highly irregular weather patterns also impacted the United States in 2012.

These errata will confound changes in public policy and environmental regulations, cause demands for action / inaction, and necessitate the creation of new weather predictive models.

Internal factors such as the availability of base funding to ensure a core faculty and staff, availability of extramural funds, availability of competitive funds, and programmatic demands that often exceed resources, also may affect outcomes. All of these climactic, public, and policy changes will be further compounded by a lack of worldwide consensus on how to respond, react and lead in the arena of climate change.

While we have no data that points to climate change as the cause, we do know the losses that can be attributed to weather factors for research projects and to production losses throughout the state.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Researchers and Extension personnel have worked with stakeholders to gather the most relevant data regarding variations in productivity, pest damage, drought or excess water; all of which are impacted by climate change. Based upon this data, personnel from the College of Food, Agriculture, and Environmental Sciences have sought to find strategies to mitigate impacts.

Evaluation results of OSU Extension programming in no-till methods and cover crop use shows that each year the number of acres of cover crops planted has been doubling and tripling in number. For example, in Mercer County alone, farmers planted 3,400 acres of cover cops in 2012. 17% of Mercer County crop land is now planted in cover crops annually, with the nationwide average estimated to be only 3% to 5%. 16% of farmers

surveyed reported more consistent crop yields during wet and dry weather periods due to cover crops. Evaluation results of Climate Change-related programming shows 93% of webinar participants acknowledge they gained new information and would share it. 71% of respondents from one webinar learned something new that they would apply in their work or future decisions. In the after-course evaluation survey of the "Sustainable Water Resources & Climate Change Short Course", 90% of participants indicated they felt equipped to apply sustainability principles to water resources and climate change planning in their community, compared to pre-course evaluation results of the same question that indicated only 21% of participants feeling equipped. Evaluation results from Extension programming on topics related to the planned program of "Climate Change" all show positive gains in knowledge and intended behavior changes.

Key Items of Evaluation

Perhaps one of the key examples of feedback being received relates to the monitoring and response to soybean rust. This year, Ohio Agricultural Research and Development Center (OARDC) is one of the recipients of the 2012 Experiment Station Section Award of Excellence in Multistate Research for its work to rapidly address the threat of soybean rust to U.S. agricultural production. OSU Extension is a critical part of the network receiving this National Institute of Food and Agriculture (NIFA) and the Association of Public and Land-grant Universities (APLU) award in recognition of successful, well-coordinated, high-impact, multi-institution research efforts.

OARDC scientists earned the award along with colleagues from more than 30 U.S. and Canadian land-grant universities, federal agencies and industry associations involved in the project, officially called NCERA-208 (North Central Extension and Research Activity), "Response to Emerging Soybean Rust Threat." The award recognizes the fact that a multistate research network enables the land-grant colleges of agriculture to rapidly mobilize to meet and address research needs on emerging threats, as well as to coordinate research activities on priority regional and national topics.

NCERA-208 has identified management strategies for soybean rust, a fungal disease that poses a serious threat to soybean production. First detected in the U.S. in 2004, soybean rust has caused serious concern due to high yield losses from the disease, as experienced in South America. Since then, it has spread through the southern and midwestern U.S., with some states experiencing severe yield losses in isolated areas.

Among many accomplishments, the NCERA-208 team has closely tracked the disease using an extensive network initially of over 2,300 "sentinel plots," helping farmers know more precisely where the disease is likely to occur and when and what types of fungicides to use. Timely, accurate information has greatly reduced the amount of fungicide used by growers, saving the soybean industry hundreds of millions of dollars and reducing human and environmental health.

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	20%		100%	
608	Community Resource Planning and Development	80%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	2.0	0.0	3.5	0.0
Actual Paid Professional	4.5	0.0	1.8	0.0
Actual Volunteer	15.0	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**
260678	0	195619	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
260678	0	601377	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 inform sustainable energy and advanced materials programs include both basic and applied research. This 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 support this program. All functional laboratories and sites are improved over time as program need warrants. OSU Extension provides parallel programs in this Planned Program to advance knowledge, promote adoption and change, develop human capital, and support economic development activities. 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: business, industry, 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; 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; 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; and news organizations.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	1000	15000	50	150

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

Patent Applications Submitted

Year:	2012
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total

Actual	8	8	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

Output #2

Output Measure

- Educational Workshops and Seminars

Year	Actual
2012	60

Output #3

Output Measure

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

Output #4

Output Measure

- Community energy project assistance & planning
  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	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 2012, the program will contribute at least one alternative to a petroleum-based product or process that meets client needs with an acceptable point of purchase price.
6	Support, though research, the building of biobased development that annually, beginning in 2012, 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 2012, 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
9	Implement change in energy usage by workshop participants
10	Complete installation of alternative energy activity
11	Complete plan for community or business energy activity

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.

   Not Reporting on this Outcome Measure

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 2012, the program will contribute at least one alternative to a petroleum-based product or process that meets client needs with an acceptable point of purchase price.

2. **Associated Institution Types**

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
As the US seeks to become more energy independent we are seeking biobased products to replace those from non-renewal sources such as petroleum. Likewise we are seeking materials to make greater use of the nation?s plentiful biomass supply.

What has been done
OARDC has partnered with Natural Fiber Composites Corporation (NFCC), to engineer composites from jute, soy hulls, corn, and wheat straw, and other plant-based sources to replace materials such as fiberglass. These natural fiber-reinforced composites are targeted for use in transportation, construction, packaging and industrial products. Project support has come from the Ohio Corn Growers Association, Ohio Soybean Council, and Ohio Wheat Growers Association, OARDC, and the state of Ohio's Third Frontier program.

Results
NFCC and OARDC scientists, in cooperation with CFAES - Ohio Bioproducts Innovation Center, have built capacity to annually produce some six million pounds of composite materials for various product formulations.

4. Associated Knowledge Areas

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

Outcome #6

1. Outcome Measures

Support, though research, the building of biobased development that annually, beginning in 2012, utilizes Ohio and the region's plentiful supply of biomass, including waste steam materials in such manner as to improve the economy.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Most anaerobic digester technology are dependent on a supply of wet feedstocks. A large amount of dry organic products would lend themselves to anaerobic digestion if the technology were available.

What has been done
OARDC scientists explored how to build an anaerobic digester that accepts dry matter such as such as yard trimmings, crop residue, corn silage, and lignocellulosic food waste; these are not suitable to existing anaerobic digestion systems. This allows for the production of biogas from a large number of organic materials with high solids content. This solid state technology, reported in an earlier ROA, has now been fully tested, linked with a wet digester, and is ready to be commercialized.

Results
OARDC scientists have developed an integrated system, known as iADs.
It is known as an integrated system in that it couples the traditional wet digester technology with the new dry technology. A Cleveland-based company, quasar energy group, has broken ground on installation of this integrated anaerobic digestion system, a patent-pending technology developed by the OARDC to increase the types of waste that can be converted to biogas for energy and fuel uses. The fully commercialized system is currently under construction in Zanesville, Ohio. This digester annually processes close to 30,000 tons of agricultural and food waste and can produce 7,800 megawatt-hours of electricity. The company operates additional digesters in Ohio and Massachusetts, including its flagship facility on the OARDC - Wooster campus.

4. Associated Knowledge Areas

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

Outcome #7

1. Outcome Measures

Support the building of biobased development that, beginning in 2012, 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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	168

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Due to their abundance of natural resources and extensive open spaces, rural Ohio communities are positioned to play a central role in future energy development. Energy development presents both opportunities and challenges to the impacted communities. "Energize Ohio", an OSU Extension signature program, provides non-biased, research-based information to address critical energy issues impacting Ohioans. The ultimate goal of "Energize Ohio" is to enhance community leaders' and local residents' knowledge of energy drivers and development in order to promote informed decision-making and best practices.

What has been done
Roughly 35 educational sessions have been conducted producing an estimated 45 local community volunteer hours.

Results
Results from a pre/post test evaluation survey indicated 98% of the program participants felt the program provided valuable information that they would recommend to other Ohio communities.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

Outcome #9

1. Outcome Measures

Implement change in energy usage by workshop participants

Not Reporting on this Outcome Measure

Outcome #10

1. Outcome Measures

Complete installation of alternative energy activity

Not Reporting on this Outcome Measure

Outcome #11

1. Outcome Measures

Complete plan for community or business energy activity

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 (Supply and cost of crude oil)

Brief Explanation

While all factors noted above still effect the outputs and impacts in this area, the greatest impact may be the rapid development of shale gas in Ohio. The plentiful supply of

natural gas will more than likely directly compete with adoption of biobased products made from renewable biomass. Given this is a market force decision, the real outcomes/impacts will not be known until market decisions are made.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The Ohio BioProducts Innovation Center (**OBIC**), a research and extension center within the College of Food, Agriculture, and Environmental Sciences, connects different segments of the bioproducts community to nurture business ecosystems and facilitate commercialization of new sustainable bioproduct technologies. Out of these alliances come our most relevant sources of feedback.

The most important accomplishment this reporting year in terms of feedback was the establishment of The Bioproduct Network, established in November of 2012. It is an OBIC program to link members across the bioproduct supply chain.

Biomass producers, processors, chemical and polymer companies, product manufacturers, researchers and procurement officials (corporate and governmental) can network with each other under the guidance of the nation's leading bioproduct commercialization organization. Members collaborate to drive "bottom-line" value and support consumers seeking products in line with environmental stewardship values.

In terms of specific feedback, a key biomass-to-energy research partner at the BiOhio Research Park on the OARDC Wooster campus provided the following assessments.

"This technology (referring to the iADs dry biodigester developed by OARDC researchers) will allow quasar to accept and process a wider range of high-solids feedstocks, including high-volume off-spec and major market recall material--expanding our business to offer customers a full-service solution to their waste management challenges. The partnership with OARDC applies research to improving the way we do business."

- Mel Kurtz, President, quasar energy group.

"The OARDC/quasar CNG conversion pilot project is a great example of university research institutions and industry working together to develop real-world solutions to meet our energy challenges. OARDC and quasar were already well out in front on the issue of utilizing CNG as an alternative transportation fuel and have emerged as clear leaders in this important market--a market that promises significant economic growth potential for our region."

- Dave Karpinski, vice president, NorTech, and director, NorTech Energy Enterprise, Cleveland

One key goal of OSU Extension work is to enhance community leaders' and local residents' knowledge of energy drivers and development in order to promote informed decision-making and best practices. Roughly 60 educational sessions were conducted producing an estimated 45 local community volunteer hours. Retrospective pre/post-test evaluation results indicated 98% of the program participants felt the program provided valuable information that they would recommend to other Ohio communities.

In 2012, OSU Extension professionals taught more than 1,000 Ohioans how to

prepare for and attract potential renewable energy developments. Also of note in 2012, OSUE and the OSU Subsurface Energy Resource Center (SERC) had conducted 149 programs, reaching more than 14,000 people on shale energy-related topics, such as legal and financial aspects of leases, and water and environmental issues. The benefits of that education can be seen in Jefferson County, Ohio. In Jefferson County alone, landowners who participated in OSUE programs received, on average, $402 more per acre for shale mineral leases.

Key Items of Evaluation

Bioenergy & Bioproducts Education Programs provide professional development and hands-on teaching tools for educators (grades 6 - 16 in service and pre-service teachers and Extension educators) who want to learn and teach about the Bioenergy and Bioproducts systems currently in use and under development in the United States. Through the collaborative efforts and expertise of six institutions of research and higher learning, this program aims to inspire today's students to pursue careers in math and science by aligning concern for the natural environment with the emerging bioenergy and bioproducts industries. OBIC participates in this program

To date, 20 teachers have participated in the Bioenergy and Bioproducts Education Program (NIFA Education CAP with Cornell). These teachers have subsequently reached out to other teachers in their discipline and communities. An additional 25 teachers were trained via ATI's Bioenergy workshop. It is estimated that these efforts have reached between 1,500 and 2,000 students in Ohio.

Campus-based activities have reached nearly 100 fourth and fifth grade students, 150 undergraduate students, and 35 graduate students. These efforts have increased awareness of the bioproduct industry as an emerging sector within the larger industry of agbioscience.

During 2012, 23 Ohio State students were employed by OBIC in bioproduct development projects. These activities ranged from technology assessment, market studies, business case reviews, industrial design, and bioproduct educational/ communication activities.

This level of participation is viewed as a surrogate measure of importance in this program area.

OSU Extension evaluation noted that more than 98% of program participants increased their knowledge of energy drivers and energy development opportunities leading to better-informed decision-making and best practices.

In 2012, OSU Extension professionals taught more than 1,000 Ohioans how to prepare for and attract potential renewable energy developments. Also of note in 2012, OSUE and the OSU Subsurface Energy Resource Center (SERC) had conducted 149 programs, reaching more than 14,000 people on shale energy-related topics, such as legal and financial aspects of leases, and water and environmental issues. The benefits of that education can be seen in Jefferson County, Ohio. In Jefferson County alone, landowners who participated in OSUE programs received, on average, $402 more per acre for shale mineral leases.

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%		70%	
703	Nutrition Education and Behavior	60%		15%	
724	Healthy Lifestyle	30%		15%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	20.0	0.0	1.0	0.0
Actual Paid Professional	8.0	0.0	1.3	0.0
Actual Volunteer	1.0	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
463427	0	152997	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
463427	0	117798	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 areas is broadly supported in scientific areas 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 offer 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

Within the Childhood Obesity Planned Program targeted audiences include, but are not limited to: specific individuals, families, and groups who have an expressed a need, or where there are latent needs, for related 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 OARDC and OSU Extension 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. 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?

OSU Extension used eXtension as a source of additional information and support for program participants, emphasizing the Families, Food & Fitness area.

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	17519	50631	12345	46529

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

Patent Applications Submitted

Year:	2012
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	0	2	2

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

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

Output #2

Output Measure

- number of educational sessions held

Year	Actual
2012	571

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	Advance extension activities ranging from how to provide policymakers better insight about how to help individuals overcome their inability to adhere to weight-loss plans to impacts on individual and groups' lives, both in terms of weight loss and in overall improvements in health.
5	Number of participants who learned new information from this program. (OSUE)
6	Number of participants who plan to increase their level of daily physical activity. (OSUE)
7	Number of participants who plan to increase their consumption of fruits and vegetables. (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**

   Advance extension activities ranging from how to provide policymakers better insight about how to help individuals overcome their inability to adhere to weight-loss plans to impacts on individual and groups' lives, both in terms of weight loss and in overall improvements in health.

   Not Reporting on this Outcome Measure

Outcome #5

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

Year	Actual
2012	17519

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 can negatively contribute to the obesity issue.

What has been done
A wide variety of Extension educational programs offered are designed to help participants acquire the knowledge, skills, attitudes and behaviors necessary for nutritionally sound diets. We present new / alternative approaches for a healthier lifestyle via demonstration, hands-on participation, and lecture. The long term goal of this program is for individuals to change their eating habits and become more physically active.

Results
Participants increased their awareness, knowledge, skills, improved their attitudes, and indicated an intent to change behaviors regarding the importance of making healthful food purchases, more healthy food preparation methods, adequate (vs. too large) portion sizes, and the role exercise and daily physical activity play in promoting and maintaining good health.

4. Associated Knowledge Areas

KA Code	Knowledge Area
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior
724	Healthy Lifestyle

Outcome #6

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	11213

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 can negatively contribute to the obesity issue.

What has been done
A wide variety of Extension educational programs offered are designed to help participants acquire the knowledge, skills, attitudes and behaviors necessary for nutritionally sound diets. We present new / alternative approaches for a healthier lifestyle via demonstration, hands-on participation, and lecture. The long term goal of this program is for individuals to change their eating habits and become more physically active.

Results
Participants increased their awareness, knowledge, skills, improved their attitudes, and indicated an intent to change behaviors regarding the importance of making healthful food purchases, more healthy food preparation methods, adequate (vs. too large) portion sizes, and the role exercise and daily physical activity play in promoting and maintaining good health.

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle

Outcome #7

1. Outcome Measures

Number of participants who plan to increase their consumption of fruits and vegetables. (OSUE)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	9830

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 can negatively contribute to the obesity issue.

What has been done
A wide variety of Extension educational programs offered are designed to help participants acquire the knowledge, skills, attitudes and behaviors necessary for nutritionally sound diets. We present new / alternative approaches for a healthier lifestyle via demonstration, hands-on participation, and lecture. The long term goal of this program is for individuals to change their eating habits and become more physically active.

Results
Participants increased their awareness, knowledge, skills, improved their attitudes, and indicated an intent to change behaviors regarding the importance of making healthful food purchases, more healthy food preparation methods, adequate (vs. too large) portion sizes, and the role exercise and daily physical activity play in promoting and maintaining good health.

4. Associated Knowledge Areas

KA Code	Knowledge Area
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior
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.)
- Other (Support in schools for programs)

Brief Explanation

All items indicated above are still important factors impacting childhood obesity. Funds for research and Extension programming are a key limiting factor. Even where Extension programs are in place, support from families and schools to implement, adopt, and/or participate is still problematic. Of course poverty and lack of access to proper foods are still key limiting factors to program success.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

OSU Extension (OSUE) has had a long-standing program addressing obesity. OSU Extension has seen positive results from the evaluations issues to participants of programming related to Childhood Obesity. The following evaluation studies were used in conjunction with OSUE programming: after-only (post-program), retrospective (post-program), before-after, and case studies. 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.

In 2012, leadership of Ohio's "Farm to School" program was transferred from the Ohio Department of Education to OSU Extension. The goal of the "Farm to School" 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 healthier lifestyle.

One success story of the "Farm to School" program is in the Granville school district. Their business operations director stated, "We realized our cafeteria didn't match our wellness policy. We wanted to provide our students with fresh-cooked meals with local products. Before the Farm to School initiative, only 22% of our students purchased school meals. We now serve 65% of our kids. I firmly believe every school district can do this to some extent."

Building institutional capacity to assess needs and respond is key to success. At this point, OSU is building great capacity to both assess and respond. Over the past several years, the OSU Food Innovation Center (OSU-FIC) has built capacity in this area as well. OSU-FIC, of which the College of Food, Agrilculture and Environmental Sciences

(CFAES) is a primary participant, is investing in transdisciplinary solutions to address the obesity epidemic. To make significant progress, they seek to engage agricultural, behavioral, biological, environmental, medical, policy, and socioeconomic experts. FIC members from across Ohio State University and Nationwide Children's Hospital are collaborating to tackle this epidemic. Key programs are:

1. A Transdisciplinary Approach to Obesity Prevention in Preschool Age Children
2. Zinc Deficiency Enhances Chronic Systemic Inflammation in Obesity
3. Simple Suppers: A Novel Approach to Childhood Obesity Prevention
4. Maternal Obesity and Child Temperament as Predictors of Childhood Obesity: Mediating Role of the Intestinal Microbiota
5. The Primary Care Obesity Network (PCON): Incorporating principles of self-regulation of intake
6. Creating Healthy Habits Index for Kids (CHHIK)

To build greater capacity, an e-newsletter of OSU-FIC provides a periodic obesity update to scholars from across the university with references and links to scholarly articles, lay press articles, grant opportunities, webinars, and conference information subscribe. Additionally a database of obesity investigators within The Ohio State University is being created.

Educating the next generation is key within OSU-FIC. Leaders of the FIC Obesity initiative are exploring the creation of a Graduate Interdisciplinary Studies program in Obesity Sciences. The program would allow Ohio State graduate students to take courses and explore topics outside of their own field of study and view the obesity epidemic through multiple perspectives. This program will engage interdisciplinary collaborations that set out to solve real world problems in obesity science from farm to fork.

Each of these efforts is considered a way of gathering and sharing data, each building greater capacity for us to assess outputs and impacts.

Key Items of Evaluation

As a result of OSUE evaluations, it was determined that 95% of participants of programming related to Childhood Obesity leared "some" or "a lot" of new information, while 86% reported planning to make "some" or "a lot" of changes after coming to OSUE programs.

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
703	Nutrition Education and Behavior	90%		0%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	10%		100%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	15.0	0.0	1.5	0.0
Actual Paid Professional	5.0	0.0	0.8	0.0
Actual Volunteer	1.0	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
289642	0	103487	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
289642	0	195921	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

Food safety research to advance broad food safety goals includes both basic and applied research. Research ranges from microbial studies to packaging. Laboratories, pilot plants, farms, and multiple business sites are available throughout state to permit data gathering and to continue long-term experiments. All functional laboratories and sites are improved over time as program needs warrant. Parallel OSU Extension programs are 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 is a primary program goal of OSU Extension and OARDC. Specific activities for the food safety education for consumers include: 1) Conduct food safety education classes with participants in the FNP and EFNEP program; 2) Conduct ServSafe classes with food establishment managers and employees; 3)Conduct Safe Food Handling for Occasional Quantity Cooks classes with volunteer food preparers; and 4)Provide 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 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
- Business and industrial groups
- Food stamp or food stamp eligible families (FNP)
- Low income families with young children (EFNEP)
- Food establishment managers (ServSafe manager training
- Food service employees (ServSafe employee training)
- Volunteer food preparers (general population) (OQC)
- General consumers (other formal or informal education)

3. How was eXtension used?

OSU Extension referred program participants to eXtension for additional information, particularly within the food safety area.

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	13809	26000	9235	30000

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

Patent Applications Submitted

Year:	2012
Actual:	2

Patents listed

- Reference # 2005-011; Issue # 8,299,020; Novel Antimicrobial Peptides and Methods of Their Use
- Reference # 2001-052; Issue # 296032; Methods for Decontaminating
Shell Eggs

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	6	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

Output #2

Output Measure

- Number of educational sessions held

Year	Actual
2012	287

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)

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.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Viruses are the major causative agent of foodborne gastroenteritis, accounting for more than 67% of foodborne illnesses worldwide. Commonly known foodborne viruses are human norovirus, hepatitis A virus, and rotavirus. Approximately 21 million people suffer from norovirus-induced gastroenteritis each year in the United States; 90% of outbreaks of acute nonbacterial gastroenteritis are caused by noroviruses. Fruits and vegetables are major vehicles for transmission of food-borne enteric viruses. Currently, there is no effective method to eliminate the viruses from fresh produce.

What has been done
OARDC scientists have systematically investigated the effectiveness of high pressure processing (HPP) on inactivating enteric foodborne viruses in aqueous medium and fresh produce. The study demonstrated that HPP treatment at 400 MPa for 2 minutes is capable of inactivating most viruses. More than a 5-log virus reduction was achieved in all tested fresh produce (lettuce, cabbage, strawberry, and blueberry) under these conditions. However, pressure, pH, temperature, and salts affect the effectiveness of the viral inactivation. In addition, food matrix can provide protective effects for virus inactivation.

Results
OARDC scientists demonstrated that human norovirus and its surrogates (murine norovirus and Tulane virus) attached tightly to the fresh produce and became efficiently internalized and disseminated to other portion of the plants. This suggests that viral internalization may be an important route for contamination of fresh produce. By optimizing processing parameters, scientists found that high pressure processing (HPP) is capable of inactivating most food- and water-borne viruses including human norovirus, surrogates (murine norovirus and Tulane virus),

hepatitis A virus, and rotavirus, without having significant impacts on food quality. Thus, HPP may be a novel intervention to eliminate virus contamination in fruits intended for frozen storage and related products such as purees, sauces, and juices.

4. Associated Knowledge Areas

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

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.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Internalized human pathogens in fresh produce are not effectively removed during conventional washing, thus the consumption of raw vegetables may cause foodborne illnesses. Effective non-thermal processes are needed to prevent this risk.

What has been done
Protein-tagged Salmonella typhimurium was either sprayed on iceberg lettuce or injected into the bulb of green onions to induce bacterial internalization. The contaminated vegetables surfaces were then disinfected with chlorine and peracetic acid (PAA). No significant reduction was observed in either lettuce or onion when chlorine or PAA was used alone. Next, different treatments of UV-C radiation were applied, followed by UV-C radiation plus chlorine and PAA were applied, both to examine the inactivation efficiency of internalized bacteria.

Results
Reduction in the internalized Salmonella was achieved when the lettuce was treated with higher levels of UV-C or UV-C combined with disinfectants. Significant reduction in internalized Salmonella was observed in green onion treated with UV-C or UV-C/chlorine/PAA. The food

quality measure of firmness was not changed during any treatments. High-level UV-C can significantly inactivate the internalized Salmonella in lettuce and green onion while maintaining the food quality. This research provides applicable research outcomes for developing nonthermal methods to inactivate internalized pathogens in fresh produce.

4. Associated Knowledge Areas

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

Outcome #3

1. Outcome Measures

Reduce food borne pathogens in the food supply chain.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Human norovirus (NoV) is currently the leading cause of foodborne disease. The virus does not grow in cell culture and hence its survival in leafy greens under different environmental stressors cannot be determined in vitro. Understanding how to reduce NoV in foods, primarily leafy greens is needed.

What has been done
OARDC scientists used an enteric calicivirus, porcine sapovirus (SaV), as a surrogate to study the uptake and dissemination of NoV in lettuce and spinach under different environmental stressors. Green house experiments were conducted whereby the plants were subjected to either physical (leaves cracked in the middle) or heat stresses before being inoculated with SaV. The virus was inoculated through the roots and the roots and leaves were tested after exterior disinfection with chlorine. Sampling and RNA extraction was followed by SaV-specific real-time reverse transcription.

Results
OARDC scientists found: (i) virus can be internalized inside roots and transferred from roots to

leaves; (ii) virus can persist for a prolonged period inside roots and leaves under environmental stress, and (iii) roots and leaves of spinach plants retained the virus at a higher level than lettuce plants under physical and heat stresses. The persistence of the virus inside leafy greens and the higher susceptibility of spinach plants to viral contamination suggest the need for more rigorous pre-harvest measures to reduce contamination. In summary, a better understanding of the survival of enteric caliciviruses within leafy greens will permit development of improved prevention and disinfection strategies for foodborne viruses, both pre- and post-harvest.

4. Associated Knowledge Areas

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

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

Year	Actual
2012	13809

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Adult and youth consumers in Ohio handle food that has the potential of making them ill. Foodborne illnesses cost $1-7.2 billion in health care, effect quality of life, and work productivity costs, which emphasizes the need for food safety education.

What has been done
Numerous food safety education opportunities are provided, including ServSafe, home food preservation courses, 4-H projects, as well as EFNEP & FNP programming. Extension staff and volunteers complete a Safe Food Handling class.

Results
13,809 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
2012	11715

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Adult and youth consumers in Ohio handle food that has the potential of making them ill. Foodborne illnesses cost $1-7.2 billion in health care, effect quality of life, and work productivity costs, which emphasizes the need for food safety education.

What has been done
Numerous food safety education opportunities are provided, including ServSafe, home food preservation courses, 4-H projects, as well as EFNEP & FNP programming. Extension staff and volunteers complete a Safe Food Handling class.

Results
11,715 participants reported on end-of-program evaluations that they intended to adopted one or more 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

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

While the United States has perhaps the world's safest food supply, public demand for safer food, the human health costs associated with food borne diseases, and the cost to all sectors in the supply chain when there is a report of contamination, even at one isolated location, is dramatic. Each of these factors, and the above noted factors, all affect outcomes and impacts. As in all of our planned programs, and for the most part throughout the land grant system, public demand and need outweigh resources to respond.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Studies have shown that food service outlets are responsible for 7 in 10 outbreaks of foodborne illness. This results in an estimated 48 million illnesses, 128,000 hospitalizations, and 3,000 deaths, all costing this nation $77.7 billion a year. OSUE offers training to food safety training to food service workers at restaurants, schools, hospitals, child care centers, nursing homes, and anyone else who might serve food to the public.

As anecdotal evdience of the success and quality of OSUE food safety programming, Oberlin College invites OSUE Educators to conduct annual food safety trainings. Oberlin's director of dining and business operations says this of OSUE's program, "It's a job expectation. Food temperatures are logged and measured from delivery and storage to cooking, holding, cooling, and reheating. It's made us a much more educated organization."

In OSU Extension programming related to 'Food Safety', across all targeted audiences, there were significant differences between before and after scores for all four Food Safety indicators ("Wash hands with soap and water before preparing food," "Use a thermometer to check if foods were fully cooked," "Wash knives and cutting surfaces with hot, soapy water after preparing meat," and "Leave meat or leftovers at room temperature for more than two hours") ($p<0.001$).

Key Items of Evaluation

Antimicrobial-resistant (AMR) bacteria cost the American public an estimated $4 billion in health care annually. Controlling small birds on farms may be the answer to lowering those costs and preventing the transmission of bacteria and viruses among food-producing animals.

That is part of the discovery from work conducted by Ohio Agricultural Research and Development Center researchers who obtained a pair of food safety grants totaling $2.3 million from the U.S. Department of Agriculture. The OARDC scientists are studying how European starlings and raccoons can spread E. coli O157:H7 to farm animals. OSU Extension has been helping stakeholders utilize this new information.

A response from a key stakeholder, Kurt Steiner, a sixth generation farmer who partners with his brother, Eric Steiner, and his uncle, John Steiner, to run Steinhurst Farms in Creston, Ohio, was:

"Dr. Jeff LeJeune's work has helped me identify the causes of some of the problems I have on my dairy farm and helped us put together a vaccine program to try to counteract some of the diseases that he's identified."

This example illustrates our efforts to identify a problem, conduct the research, and provide science based extension program to encourage adoption of the research findings. This is an example of an effective program that is being adopted.

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	5%		10%	
503	Quality Maintenance in Storing and Marketing Food Products	10%		15%	
607	Consumer Economics	10%		5%	
701	Nutrient Composition of Food	15%		10%	
702	Requirements and Function of Nutrients and Other Food Components	10%		10%	
703	Nutrition Education and Behavior	10%		0%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	20%		10%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	20%		20%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	20.0	0.0	9.5	0.0
Actual Paid Professional	10.0	0.0	6.5	0.0
Actual Volunteer	1.0	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**
579284	0	877437	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
579284	0	1098128	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 includes microbial studies, packaging, food taste tests, consumer preferences, and behavior. Laboratories, pilot plants, farms, and multiple business sites are available throughout state to permit data gathering and to continue long - 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 appropriate levels of outreach, engagement, and consultation, with both internal and 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 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

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	2398	9800	7800	8900

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

Patent Applications Submitted

Year: 2012

Actual: 2

Patents listed

- Reference # 2003-050; Issue # 2528210; Method and Apparatus for Peeling Produce
- Referene #2007-033; Issue # 8,274,293; APPARATUS AND METHOD FOR MEASUREMENT OF pH OVER A WIDE RANGE OF PRESSURE

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	3	34	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

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

Output #2

Output Measure

- Number of participants attending educational programs of one teaching hour or more.
  Not reporting on this Output for this Annual Report

Output #3

Output Measure

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

Year **Actual**

2012	8

Output #4

Output Measure

- total number of participants in events related to 'Global Food Security and Hunger' (Extension)

Year	Actual
2012	13008

Output #5

Output Measure

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

Year	Actual
2012	325

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	Advance the study of stacking functional foods that have a lower than expected societal demand (e.g. soy) with more desirable foods such as tomato products as a means of providing consumers with more access than is currently present.
4	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.
5	Reduce health risk by releasing at least one major study each five years demonstrating nutritional health benefits, e.g. carotenoids and cataracts, anthocyanins and colon cancer or as a substitute for artificial dyes.
6	Reduce health risk by releasing at lest one major study each five years demonstrating negative nutritional side effects, fatty acids and obesity or obesity-related hepatic stealosis or prostate cancer.
7	Advance the understanding of the potential role of trace minerals such as the role of selenium in protection against breast cancer or copper's protecting against cardiovascular diseases to that extent society can make science-based choices.
8	Inform the process of collecting, storing, processing, and distributing waste products from plant and animal agriculture to the extent that there are demonstrated gains among multiple outcomes.
9	Processing technology research such as pulse electronic field, high pressure, ohmic heating, and microwave will provide processors with a set of alternatives leading to efficiency and quality gains within economic realities.
10	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.
11	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.
12	Advance and document improvements in quality and quantity of food stocks to meet global food security and hunger goals.
13	Ohio Market Maker results will indicate food preferences and number of farmers/retailers networks established (measured in number of networks established).
14	Establishment of a number of local/regional food systems.
15	The primary long term outcome measure for OSUE programming on this issue is the growth of direct farm sales in Ohio as reported through the Census of Agriculture and other Direct Marketing team activities that provide insight into improved economic and social conditions. (measured in dollars)
16	improvement in economic and social conditions, as indicated by the number of dollars in direct farm sales (Extension)

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

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**

Advance the study of stacking functional foods that have a lower than expected societal demand (e.g. soy) with more desirable foods such as tomato products as a means of providing consumers with more access than is currently present.

Not Reporting on this Outcome Measure

Outcome #4

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 #5

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

Reduce health risk by releasing at lest one major study each five years demonstrating negative nutritional side effects, fatty acids and obesity or obesity-related hepatic stealosis or prostate cancer.

Not Reporting on this Outcome Measure

Outcome #7

1. **Outcome Measures**

Advance the understanding of the potential role of trace minerals such as the role of selenium in protection against breast cancer or copper's protecting against cardiovascular diseases to that extent society can make science-based choices.

Not Reporting on this Outcome Measure

Outcome #8

1. **Outcome Measures**

Inform the process of collecting, storing, processing, and distributing waste products from plant and animal agriculture to the extent that there are demonstrated gains among multiple outcomes.

Not Reporting on this Outcome Measure

Outcome #9

1. **Outcome Measures**

Processing technology research such as pulse electronic field, high pressure, ohmic heating, and microwave will provide processors with a set of alternatives leading to efficiency and quality gains within economic realities.

Not Reporting on this Outcome Measure

Outcome #10

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 #11

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 #12

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 Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Tanzania, a country of 42 million nestled on the east coast of Africa, is undergoing a significant change demographically. Currently, about one-third of Tanzanians live below the poverty line, and more than 4 of 10 Tanzanian children suffer from stunting due to malnutrition. By 2050, Tanzania's population is anticipated to double and its urban population will exceed its rural population. To keep pace with these demographic changes and to reduce high rates of malnutrition, agricultural productivity must increase.

What has been done
Tanzania is a focus country of FEED THE FUTURE, the Global Hunger and Food Security Initiative of the U.S. government. Eight Tanzanians are currently enrolled in advanced degree programs in OSU - CFAES, and other students are studying at five partner land-grant universities and at African institutions as part of The Innovative Agricultural Research Initiative funded by the Agency for International Development (USAID), which is, part of a Feed the Future program led by Ohio State.

Results
The impact is that this complex project has been implemented with graduate education underway. A needs assessment focusing on the current state of agricultural training and research in Tanzania is complete and identifies capacity gaps in Sokoine University of Agriculture (SUA) and in the Ministry of Agriculture, Food Security, and Cooperatives (MAFC). This needs assessment provides information for planning activities to be undertaken over the next five years. Information about training and research needs in the agricultural sector and the resources and outputs of SUA and MAFC is not readily accessible. The first knowledge gap to be addressed is the lack of information about the current capacity of these two organizations and the needs of their clientele. This information will be useful for the planning and implementation of iAGRI but may also be useful to other entities involved in agricultural training and research.

4. Associated Knowledge Areas

KA Code	Knowledge Area
502	New and Improved Food Products

Outcome #13

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1598

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Increasingly, across Ohio and the US, there is a growing public demand for fresh, locally grown food products. Making the connections between consumers, local agricultural producers and wholesale markets is needed. Creating efficiency in market connections is precisely the service that MarketMaker provides.

What has been done
MarketMaket is an interactive mapping system with business and market data for food products in Ohio. The MarketMaker mapping system provides important business information for agricultural entrepreneurs an a critical link between food producers and buyers. The program is part of a national network of state websites connecting farmers with food retailers, grocery stores, processors, caterers, chefs, and other food supply chain contacts. It boasts one of the most extensive, searchable food industry-related data collections in the US.

Results
1,598 producers registered with MarketMaker as of the end of 2012. More than 8000 people have visited the Ohio MarketMaker site to locate farmers, farmers' markets, food retailers, eating places, and agritourism sites.

4. Associated Knowledge Areas

KA Code	Knowledge Area
607	Consumer Economics

Outcome #14

1. Outcome Measures

Establishment of a number of local/regional food systems.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Can agriculture boost the use of abandoned urban lands? Can such use help people who live in urban food deserts - areas having little or no access to affordable, nutritious foods -- grow more of their own food such as tomatoes, spinach and other fresh produce?

What has been done
OARDC, OSU Extension, and Cleveland Crops, an urban farming program, joined together to assess the potential of fruit and vegetable polyculture using ecologically designed mixed-crop plots in abandoned or under-utilized urban lands.

Results
The OSU team found in their study of fruit and vegetable polyculture that economic returns alone are equivalent of nearly $100,000 an acre a year. Community pride and job creation also resulted. Cleveland Crops, an urban farming program managed by the Cuyahoga County, Ohio, Board of Developmental Disabilities (CCBDD), was able to expand the growing season and keep people whom CCBDD serves employed year-round. They accomplished this by using a variety of season-extending techniques, such as high and low tunnel greenhouses, to grow as many vegetables as possible for as long as possible. Examples include lettuce, beets and carrots in December and January and parsley and other herbs throughout most of the winter.

4. Associated Knowledge Areas

KA Code	Knowledge Area
502	New and Improved Food Products
607	Consumer Economics
703	Nutrition Education and Behavior

Outcome #15

1. Outcome Measures

The primary long term outcome measure for OSUE programming on this issue is the growth of direct farm sales in Ohio as reported through the Census of Agriculture and other Direct Marketing team activities that provide insight into improved economic and social conditions. (measured in dollars)

Not Reporting on this Outcome Measure

Outcome #16

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	54000000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Producers are exploring and entering direct-to-consumer and direct-to-wholesale markets.

What has been done
To help prepare for new market entry, more than 200 producers participated in "MarketReady" workshops in 2012. This curriculum guides producers through decisions of product selection, packaging, labeling, distribution, promotion methods and business / marketing planning.

Results
According to the 2007 USDA Census of Agriculture (we assume similar statistics for the reporting year of 2012), Ohio is one of the top 10 states for direct sales, with 6,827 farms reporting more than $54 million in agricultural products were sold directly to individuals for human consumption. In 2012, there are more than 260 farmers markets and more than 160 Ohio wineries.

4. Associated Knowledge Areas

KA Code	Knowledge Area
503	Quality Maintenance in Storing and Marketing Food Products
607	Consumer Economics

Outcome #17

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	100

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
As interest in local food expands into school cafeterias and classrooms, evidence of farm to school projects are evolving throughout Ohio. By increasing the number of schools that purchase Ohio-produced food, we keep money within the state, thus supporting our own economy.

What has been done
An Ohio Farm to School Advisory group, Farm to School website and educational materials were established. More than 600 producers, school personnel and local food advocates learned about the Farm to School program through event presentations and 1800 people visited http://farmtoschool.osu.edu in 2012.

Results
More than 100 schools purchased Ohio-produced food in 2012. A USDA Farm to School census is being conducted in 2013 and there are plans for statewide network development in 2013, which will provide additional data.

4. Associated Knowledge Areas

KA Code	Knowledge Area
503	Quality Maintenance in Storing and Marketing Food Products
607	Consumer Economics
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources

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 (World conflict and terrorism)

Brief Explanation

Each factor noted above is a key variable in affecting outcomes and impacts. As to which variables are most important, this is situational. As with other Planned Programs in this report, perhaps the greatest external factor is that need far exceeds resources available to land grant programs to respond.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The OSU Food Innovation Center (OSU-FIC), of which College of Food, Agriculture, and Environmental Sciences (CFAES) research and Extension are key components, is a primary link for feedback related to food security, as are other OSU Extension programs related to advancing food security. The premise of OSU-FIC, and that of all of CFAES's research and Extension programs, is that food is basic to life, but our global food system must improve and innovate. To sustain a projected eight billion people by 2025, world food production must increase by a staggering 40%. We currently lose ~40% of our food to flaws in process, economics, safety, health, nutrition, security, technology, and policy. Food discovery at Ohio State is ingenuity that cuts across disciplines; it is the best ideas from academia, government, and industry that solve these challenges. Food innovation is required to attack local, national and global food problems. We now have the tools and talent to improve access to abundant, safe, health-promoting food. These OSU networks are now providing both internal and external feedback related as to (1) need, (2) funding, (3) opportunities, and (4) assessment of impact.

OSU Extension notes the following evaluation results related to "Global Food Security and Hunger" programming efforts. To help help them prepare for new market entry, more than 200 producers completed MarektReady workshops and improved their skills/knowlege of product selection, packaging, labeling, distribution, promotions and business/marketing planning. More than 8000 people visited the Ohio MarketMaker website to locate farmers, farmers' markets, food retailers, eating places, and agritourism. More than 100 schools purchased Ohio-produced food in 2012.

Key Items of Evaluation

The Innovative Agricultural Research Initiative (iAGRI), funded through USAID's Feed-the-Future Initiative, and led by Ohio State University's College of Food, Agricultural, and Environmental Sciences (CFAES), is an investment in development-enabling knowledge. A dynamic agricultural knowledge information system is vital for improving farm-level productivity, value-chain efficiency, and the nutritional status of food-insecure populations. Gaps in the capacity to generate useful agricultural knowledge limit farmers' livelihoods and threaten national food security. We have helped to develop an iAGRI Report Series focusing on the current state of agricultural training and research in Tanzania and identified capacity gaps in two major knowledge-generating organizations: Sokoine University of Agriculture (SUA) and the Ministry of Agriculture, Food Security, and Cooperatives (MAFC).

This needs assessment study, a key formative evaluation component, provides a factual foundation for planning activities to be undertaken by iAGRI over the next five years. Information about training and research needs in the agricultural sector and the resources and outputs of SUA and MAFC is not readily accessible. The first knowledge gap, therefore, to be addressed by iAGRI is the lack of updated information about the current capacity of these two organizations and the needs of their clientele. This information will be useful for the planning and implementation of iAGRI but may also be useful to other entities involved in agricultural training and research.

OSU Extension would like to offer the following key items of evaluation as documentation of success, as well as looking to the future in programming for "Global Food Security and Hunger."

- One stakeholder provided the following assessment in reference to a CFAES faculty member's urban gardening research and extension contributions:

"Joe's research provides useful information for urban farming, container gardening, and year-round produce production. His work has been groundbreaking in demonstrating how small-scale farmers can integrate tree crops, fruits, and vegetables. The state dollars invested in this project will continue to guide innovative farmers for years to come."

--Meagan Tehua, program director, Goodness Grows, a greater Youngstown nonprofit sustainable farming ministry that participated by invitation in a March 2012 local foods meeting at the White House.

- A USDA Farm to School Census is being conducted in 2013, and there are plans for statewide development in 2014, which will provide additional data.

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%		15%	
103	Management of Saline and Sodic Soils and Salinity	0%		5%	
111	Conservation and Efficient Use of Water	0%		10%	
112	Watershed Protection and Management	0%		15%	
131	Alternative Uses of Land	0%		10%	
132	Weather and Climate	0%		5%	
133	Pollution Prevention and Mitigation	0%		20%	
141	Air Resource Protection and Management	0%		10%	
	Total	0%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	6.5	0.0
Actual Paid Professional	0.0	0.0	3.9	0.0
Actual Volunteer	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	543816	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	503765	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 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 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 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

Targeted audiences include, but not limited to: 1) 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; 2) 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; 3) Populations who have not requested the information but will likely benefit from that information, e.g. immigrant populations; 4) Other scientists and scientific groups; 5) Political entities; 6) Extension personnel; 7) Students from pre-school to post doctorate studies; 8) News organizations; and 9) 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

2012	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:	2012
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	0	44	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.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Nitrogen runoff from agricultural fields is a major environmental problem.

What has been done
OARDC scientists compared the two - stage ditch, wetlands, and cover crops, in terms of cost per unit to remove nitrogen, under a range of interest rates and time horizons.

Results
Wetlands were found to be the most cost-effective practice for nitrogen removal, with an average cost of < $2/kg N removed. Two-stage ditches were the second-most cost-effective, over a 50-year time horizon; cover crops were the second-most cost-effective, over a 10-year time horizon. The study also revealed that two-stage ditches are more cost-effective under a CRP-style funding configuration (i.e., 50% cost-share on implementation, followed by annual rental payments), compared to EQIP funding (i.e., 75% cost-share on implementation, with no annual rental

payments).

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation
141	Air Resource Protection and Management

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.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Soluble phosphorus runoff has long been associated with water quality issues, such as algae blooms resulting in negative ecological, aesthetic, and economic impacts and water that are unsafe for drinking and watersports. The result is significant reductions in visitors who contribute to Ohio?s $11 billion-a-year Lake Erie tourism industry. A five percent decline in Lake Erie tourism could cost Ohio more than $500 million and approximately 6,000 jobs.

What has been done
OARDC and OSU Extension personnel, working as part of a national team, are identifying phosphorous sources and best management practices to mitigate water quality issues. One option is the potential role of fluidized gas desulfurization (FDG) gypsum (a synthetic form of gypsum) derived from flue gas desulfurization (FGD) systems at electric power plants. Sulfur dioxide emission control systems used by coal-fired power plants remove sulfur from combustion gases using scrubbers. It has long been established that naturally occurring, mined gypsum is an

effective soil amendment and fertilizer for farming.

Results
FDG, an abundant byproduct from coal-burning power plants, if spread on farmers? fields, could help control Lake Erie?s harmful algal blooms according to the study. Gypsum reduces soluble phosphorus, the form that can run off into rivers and lakes, by 40 to 70 percent. Synthetic gypsum costs farmers $25 to $45 a ton and can boost corn yields by five bushels an acre. At a rate of one ton per acre every two or three years and a conservative corn price of $5 a bushel, the gypsum can almost pay for itself the first year, Thus, a 1,000- acre farm using gypsum could net an extra $25,000 every other year. Additionally much of the environmental impact could be mitigated, protecting both the environment and associated industries such as tourism.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation

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.

Not Reporting on this Outcome Measure

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.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Organic farming is a growing market in Ohio and the nation. With soil health recognized as the basis for organic production systems it is essential that new soil management strategies be developed to take full advantage of market opportunities.

What has been done
Maintaining soil health and productivity are on going concerns in no-till organic crop production systems. It is of primary concern to OSU Extension and OARDC specialist at OSU South Centers. With support from USDA the scientists sought to better understand how to assess and maximize organic ecosystem services. They focused on the use of Zeolite, oilseed radish, and winter pea as multi-functional cover crops in no-till organic systems.

Results
OSU research showed that by planting only 2 lbs. of oilseed radish and 25 lbs. of winter pea with 100 lbs. of Zeolite per acre after crops are harvested, radishes can grow more than 30 inches deep to break-up plow layer compaction, provide required nitrogen, and facilitate water infiltration. Oilseed radishes recycle more than 100, 30, and 30 lbs. of nitrogen, phosphorus, and potassium respectively, when applied with manure or biosolids. Zeolite was found to hold ammonium-N (NH4+) and other nutrients, and increases the nutrient-use efficiency by reducing nitrogen and phosphorus application needs. Furthermore, Zeolite was found to retain a higher volume of water and mitigate drought effects. At OSU South Centers their studies on the use of Zeolite, oilseed radish, and winter pea as multi-functional cover crops in no-till organic systems found a potential savings of up to $100,000 per year for organic farmers in Ohio.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
131	Alternative Uses of Land

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

Soil, air and water resources underpin all programs within the college. All items above continue to affect outcomes in production and processing. Extramural funding remains a problem in this area.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

No specific evalation data collected in this planned program.

Key Items of Evaluation

In OARDC 2012 Annual Report, two stakeholders offered the following:

"Water quality is a top concern in Ohio, and farmers want to be part of the solution. Ohio State's research to validate and update the Phosphorus Risk Index will help us determine what the next best management practices are when it comes to phosphorus use on the farm."
- Tom Fontana, Director, New Use Development, Ohio Soybean Council

"Good stewards of the public trust bring their expertise and resources to protect and restore natural resources, and work to find sustainable solutions to threats to our environment; this is what Warren Dick, his OARDC colleagues, and their many partners have been doing for years. Their research informs best agricultural practices with sound science."
- John A. Anderson Jr., president, Greenleaf Advisors, Chicago, and former director of The Nature Conservancy's Great Lakes Project

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
122	Management and Control of Forest and Range Fires	0%		5%	
123	Management and Sustainability of Forest Resources	0%		20%	
124	Urban Forestry	0%		15%	
125	Agroforestry	0%		10%	
134	Outdoor Recreation	0%		10%	
135	Aquatic and Terrestrial Wildlife	0%		25%	
136	Conservation of Biological Diversity	0%		15%	
	Total	0%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	3.0	0.0
Actual Paid Professional	0.0	0.0	2.0	0.0
Actual Volunteer	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	241390	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	394459	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

Natural resource and environmental systems program includes both basic and applied research. 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

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; and community collations 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

2012	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: 2012

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	0	25	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 private forest land in Ohio.
2	Improve the flow of forest raw materials to the extent it meets the needs of Ohio industries within ten years.
3	Increase the production of oak and reduce maple to eventually achieve a balance equivalent to forest with natural fire regimes.
4	Meet federal and state needs for research data related to Ohio ecosystems as the demand arises
5	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.
6	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.
7	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.
8	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.

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 private forest land in Ohio.

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

Improve the flow of forest raw materials to the extent it meets the needs of Ohio industries within ten years.

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

Increase the production of oak and reduce maple to eventually achieve a balance equivalent to forest with natural fire regimes.

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

Meet federal and state needs for research data related to Ohio ecosystems as the demand arises

Not Reporting on this Outcome Measure

Outcome #5

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.

2. **Associated Institution Types**

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Created wetlands have potential to increase groundwater, reduce runoff from agricultural lands, restore hydrological process, sequester carbon, sequester pollutants, enhance wildlife populations, etc. Once artificial wetlands, the question is how do we add plants to them to increase functionality or should we?

What has been done
In a nearly 15-year study, OARDC scientists have led the effort to compare the behavior of two experimental marshes on the Columbus Ohio campus. One wetland was planted in 1994 with wetland vegetation, and the other one was left to colonize plant and animal life on its own. When the two marshes were created, researchers planted 13 common wetland species in one marsh and left the other to develop naturally. Water from a nearby river has been continually pumped into both marshes at rates designed to mimic water flow in a freshwater river wetland setting.

Results
The two wetlands now contain nearly the same number of plant species, and almost 100 more species than existed 15 years ago. The two wetland general similarities have persisted even after muskrats spent the winter of 2000-01 destroying most of the plants in both wetlands, either eating them or using them to build dens. These developments suggest that the initial conditions of the wetlands matter less than how they develop naturally on their own. Both wetlands are examples of what the lead scientist calls self-design with humans involved in the beginning, but ultimately the system designs itself over time.

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity

Outcome #6

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.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
What is the value of an urban tree? Urban governments spend a substantial amount on the planting and care of trees, often with an eye to only the aesthetics.

What has been done
OARDC scientists investigated the value or urban trees relative to the crucial environmental services that they provide. Trees (3,229) in Wooster, Ohio was inventoried and attributes recorded, such as tree trunk circumference and foliage condition. The U.S. Forest Services' i-Tree Streets software was used to calculate the value of the environmental services, including carbon storage and air-pollution removal.

Results
Given the loss of trees in Ohio to invasive species such as the emerald ash borer, and emphasis on better understanding carbon sequestration, the research is most timely. The result: $270,153, or roughly $83 per tree, in annual services. This figure includes $85,310 in aesthetic and related benefits, $83,343 in energy conservation, $77,457 in storm water remediation, $13,361 in air-pollution removal, and $10,682 worth of carbon (646 tons) removed from the atmosphere. Wooster's street trees also store 3,980 tons of carbon, valued at $65,808, in above ground tissues, such as branches and stems. The value of carbon storage is not included in the $270,153 figure because it's not considered an annual function of the trees.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources

124	Urban Forestry
125	Agroforestry
134	Outdoor Recreation

Outcome #7

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.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Tracking and monitoring the health, behavior, and population stability of birds has long been accomplished at the state level. Understanding these parameters is both ecologically and economically important. Underlying the importance of this type of ornithological study is a recently completed Ohio Sea Grant project showing that bird watching along Ohio's Lake Erie coast contributes more than $26 million annually and 283 jobs to northern Ohio's economy.

What has been done
OARDC and OSU Extension have led in the completion on an Ohio Breeding Bird census. This was a six-year citizen science project involving nearly 700 volunteers, making over one million bird observation. These Ohioans annually contribute approximately $300,000 in in-kind support through donated time. Over two hundred species were recorded; 193 are confirmed breeding birds.

Results
The study yielded critical data for those who manage birds, are recreational watchers, or whose business is impacted by bird population trends. Understanding these impacts will help local governments, park managers, and conservation groups to better support bird watching and market Ohio to attract more bird enthusiasts. There are nearly 2.4 million birders throughout the state and birding makes up a large portion of Ohio's $39 billion tourism industry. The compilation

of the six-year study will be published as the Ohio Breeding Bird Atlas II in 2013.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
134	Outdoor Recreation
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity

Outcome #8

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

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

All factors noted above impact what we do. In particular as resources have become more scarce, our ability to allocate additional resources, money and personnel, to this planned program has been limited. In particular our inability to fill faculty and staff vacancies in this area has been a key limiting factor.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The following is an example of the type of program feedback this planned program is receiving:
All of the workshop participants completing the pre-post evaluation reported significant increases in knowledge (100% response rate in 2 workshops and 81% in the third workshop). Participants reported the greatest increase in understanding about the options available to reduce erosion, how to take action without spending too much time or money, who to contact about

questions, and how to find incentive programs for taking action. All of the short course participants completed the course evaluation and reported a significant increase in knowledge. Specifically, when asked, "Because of this course, I have gained knowledge and/or skill that will help me do my job better" 83% (5/6) of respondents agreed with this statement and 16% (1/6) strongly agreed. Change in action. All of the workshop participants completing the pre-post evaluation reported significant increases in intentions to engage in new conservation practices on their property. Specifically, 52% strongly agreed that they would use knowledge gains in the workshop, specifically by improving streamside buffers and dedicating more time to evaluating their stream's health and finding more information about healthy stream practices. 90% of participants stated that they planned to try a practice learned about in the workshop (e.g., improving buffer zones, not dumping yard waste). 83% of participants in the online short course stated that they plan to use the knowledge gained in their professional life. Specifically that they would think more deliberately about communication efforts, use other techniques to surveys such as focus groups, connect theory to practice and knowing what strategies work or do not work, and change the way they communicate about an upcoming watershed health workshop. 67% agreed that they could prepare and implement a communication plan because of this course, and 50% agreed that they were able to communicate better because of the course. Change in conditions. Plain and Jefferson Township administrators were in attendance for the community workshops and have requested that they be offered annually as part of their municipal storm water education program. Plain township administrators also agreed to host a spring 2013 streamside landowner workshop in conjunction with the installation of a streamside buffer on municipal property. OSU Extension and the Franklin County SWCD will also offer two more spring field focused workshops on streamside buffer installation, while the Ohio Watershed Network will host a national webinar on Effective Stream Health Communication in early 2013.

Key Items of Evaluation

From one of the impacts reported in this planned program.....

OARDC and OSU Extension have led in the completion on an Ohio Breeding Bird census. This was a six-year citizen science project involving nearly 700 volunteers, making over one million bird observation. These Ohioans annually contribute approximately $300,000 in in-kind support through donated time. Over two hundred species were recorded; 193 are confirmed breeding birds.

The contribution of this much time and effort by this many volunteers is a surrogate feedback measure attesting to the value placed on OSU Extension and OARDC work by these citizen scientists.

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%		15%	
202	Plant Genetic Resources	0%		10%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		15%	
204	Plant Product Quality and Utility (Preharvest)	0%		10%	
205	Plant Management Systems	0%		15%	
206	Basic Plant Biology	0%		5%	
211	Insects, Mites, and Other Arthropods Affecting Plants	0%		5%	
212	Pathogens 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%		10%	
	Total	0%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	30.5	0.0
Actual Paid Professional	0.0	0.0	24.1	0.0
Actual Volunteer	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	2892233	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	3417680	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 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 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

Targeted audiences 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 for pre-school to post doctorate studies; and news organizations.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2012	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:	2012
Actual:	2

Patents listed

- Reference # 2009-048; Issue # 8,241,889; Prothioconazole Tolerant Cryptococcus Flavescens Strains for Biological Control of Fusarium Head Blight
- Reference # 2008-116; Issue # 8,227,186; CLAVIBACTER MICHIGANENSIS SUBSP. MICHIGANENSIS BIOLUMINESCENT MUTANTS AND APPLICATIONS

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	0	110	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	Provide new contributions to the body of literature that will positively advance plant genetics, e.g. molecular techniques and materials to aid in low temperature plant tolerance research.
3	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.
4	Enrich the gene pool, and knowledge thereof, to meet identified stakeholder turf needs for nutrient uptake efficient materials, turf with greater traction, etc.
5	Enrich the gene pool and knowledge thereof in disease/pest resistance, and gene recombination and interaction studies.
6	Enrich the gene pool and knowledge thereof in disease resistance of rootstocks such as for apple trees and green industry, and for resistance to plant stresses, e.g. discoloration in products such as tomatoes reducing a $60 million loss annually in tomato industry.
7	Enrich the gene pool and knowledge thereof in the areas of molecular studies to better understand how immune systems in plants in inhibit diseases and how bacteria perturb the immune system.
8	Annually provide adequate preharvest research findings, including field trial data, to support Ohio's status as a top soybean and corn producer
9	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.
10	Continually participate in and promote the development and timely release of modeling/forecasting programs that are cost effective and cost efficient for producers, e.g. WEEDCAST.
11	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.

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.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Tomatoes represent a $2 billion market in the United States. USDA estimates that Americans consume, on average, more than 72 pounds of tomato products annually. To take full advantage of the tomato as a food crop, scientists and the tomato industry need to understand the genetic code of the plant and the traits governed by this code.

What has been done
OARDC scientists, working as part of a 14 - nation effort, have helped to sequence the tomato genes for the Heinz 1706 genome. An impact reported in an earlier OSU ROA reported OSU discovery of SUN gene that controls tomato shape.

Results
Scientists can now pinpoint the differences that lead to changes in color, taste, texture, size, and shape. The genome is also important in that the tomato is very different from its genetic relatives in the nightshade family. Scientists can now learn more about how genes have changed giving each of these species their distinct flavor and look. In addition to having the ability to improve product attributes such as shape, color, and firmness, the new gene sequence will advance studies in disease resistance, root development, nutritional qualities, and similar.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms

202	Plant Genetic Resources
206	Basic Plant Biology

Outcome #2

1. **Outcome Measures**

Provide new contributions to the body of literature that will positively advance plant genetics, e.g. molecular techniques and materials to aid in low temperature plant tolerance research.

Not Reporting on this Outcome Measure

Outcome #3

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 #4

1. **Outcome Measures**

Enrich the gene pool, and knowledge thereof, to meet identified stakeholder turf needs for nutrient uptake efficient materials, turf with greater traction, etc.

Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

Enrich the gene pool and knowledge thereof in disease resistance of rootstocks such as for apple trees and green industry, and for resistance to plant stresses, e.g. discoloration in products such as tomatoes reducing a $60 million loss annually in tomato industry.

Not Reporting on this Outcome Measure

Outcome #7

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

Outcome #8

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 #9

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 #10

1. **Outcome Measures**

Continually participate in and promote the development and timely release of modeling/forecasting programs that are cost effective and cost efficient for producers, e.g. WEEDCAST.

Not Reporting on this Outcome Measure

Outcome #11

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

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

Perhaps the greatest limiting factor within this program is funding for personnel.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

In a statement summing up the contribution of OARDC to Ohio's wine industry the following assessment was offered by Andy Troutman, co--owner of The Winery at Wolf Creek near Akron, Ohio.

Troutman assessment was that OARDC's long--established grape and wine research program, which is credited, among other things, with almost single--handedly saving Ohio's wine industry in the '60s, "has not only allowed us to plant varieties and develop products that we think will have long--term viability in Ohio, but having that resource essentially in our backyard has been vitally important to the long--term success of our business'.

A group of OSU Extension/OARDC faculty members working in Integrated Pest Management reported:

During the Indiana Flower Growers Association presentation 96% of growers understood that using a systemic insecticide as a drench was better than a spray. 2) During the Tri State Expo, 100% of growers understood that using a systemic insecticide as a drench was better than a spray; 75% of growers learned that poinsettias with light green leaves are more susceptible to whitefly attack and 86% learned that fungus gnats can be managed appropriately by controlling soil moisture. 3) Through the Pesticide Education Training Program a couple of short publications produced to provide recommendations to manage insects in the greenhouse. 4) During the OFA program, 92% of audience learned that biological control programs against thrips work better when used as prevention tools. We also saw changes in action, for example: 1) Very good results were obtained when the fungi Beauveria bassiana (BotaniGard) was used in combination with the nematode Steinernema feltia (Nemasys) to control thrips in a commercial greenhouse. The information is already being used by the largest commercial facility in Ohio to manage thrips. 2) Recommendations from efficacy tests are being used by industry to develop products that will be introduced on the ornamental market in the next few years. 3) Growers in Ohio have increased the use of biological control agents and prevention methods because of the information provided about insect management.

Key Items of Evaluation

One key stakeholder reported in OARDC's 2012 Annual Report:

"Many of the trees that the Asian Longhorned beetle and thousands of cankers disease affect staple landscape trees in our area. If we lose them, it will devastate Ohio's nursery and landscape industry. The research that Dan Herms and his colleagues (referencing both OARDC and OSU Extension personnel) are doing is paramount in preventing another loss like that of the ash tree.'

-Wm. Kyle Natorp, President and CEO, Natorp's Inc. and Wm. A. Natorp Company, Mason, Ohio

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%		10%	
302	Nutrient Utilization in Animals	0%		10%	
303	Genetic Improvement of Animals	0%		15%	
304	Animal Genome	0%		5%	
305	Animal Physiological Processes	0%		10%	
306	Environmental Stress in Animals	0%		10%	
307	Animal Management Systems	0%		15%	
308	Improved Animal Products (Before Harvest)	0%		10%	
311	Animal Diseases	0%		15%	
	Total	0%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	16.0	0.0
Actual Paid Professional	0.0	0.0	10.1	0.0
Actual Volunteer	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	1343492	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	3730294	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 animal and global food security goals include both basic and applied research. Laboratories, 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 takes place as do national and international studies. Effective research requires a mixture of laboratories, animal enclosures, and on-farm research sites to maximize knowledge. Emerging threats now require more advanced facilities such as a biosecurity lab, particularly needed in the study infectious animal diseases. Final preparation for BL3 laboratory research is well underway. 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 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; and business groups such as 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

2012	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: 2012

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	0	69	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 nutrition utilization for the purpose of increased growth and quality of products commensurate with consumer demand, as well as nutrition utilization, performance, and efficiency to the point that savings will off-set increases in costs of animal feedstocks
3	Show incremental gains annually in dietary research to increase utilization of food stocks (e.g. via better understanding of protozoal ecology), increase bioavailability of nutrients including trace minerals, and protect animal and human health
4	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
5	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
6	Improve management for multiple animal farm types, including organics, that will produce higher yields for and lower costs to the producer and consumer
7	Advance preharvest research over five years to the extent that new technologies are being adopted and showing profitability in area such as improved muscle growth, quality of meat, tenderness, lower fat in dairy products, etc.
8	Animal disease researchers will continue to serve on first responder teams when stakeholders have an immediate disease problem
9	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
10	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 nutrition utilization for the purpose of increased growth and quality of products commensurate with consumer demand, as well as nutrition utilization, performance, and efficiency to the point that savings will off-set increases in costs of animal feedstocks

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Complex, multi-ingredient diets for dairy cows are the norm because it is thought that multiple ingredients are necessary to ensure that all required nutrients were provided.

What has been done
OARDC scientists compared three different diets: (1) a typical Midwestern diet for dairy cows based on corn silage, alfalfa silage, corn grain and soybean meal; (2) extensive use of a simple milled corn gluten feed byproduct that contained only corn silage, the corn byproduct and supplemental minerals; (3) same as the second diet but included supplemental rumen protected methionine and lysine. The hypothesis was that milk yield, milk composition, and feed efficiency would be similar between the control diet and the byproduct diet that included supplemental amino acids but milk protein would be lower in the byproduct diet without amino acids.

Results

Results from an OARDC study using a corn milling product challenges the premise that multiple ingredients dairy cattle diets are necessary. A very simple diet with only three ingredients performed almost as well as a much more complex diet. The simple diet is cheaper and will reduce inventory needs on a dairy farm, both of which should improve profitability. Enhanced performance was observed by adding two important amino acids but the response was much less than expected. This experiment may lead to a change in the approach taken to formulate diets. Many farms with limited land base can grow adequate corn silage but must purchase other feedstuffs. This simple, three ingredient diet approach would be quite beneficial to such producers. The simple diet would usually be much less expensive and should improve dairy farm profitability.

4. Associated Knowledge Areas

KA Code	Knowledge Area
302	Nutrient Utilization in Animals
305	Animal Physiological Processes
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)

Outcome #3

1. Outcome Measures

Show incremental gains annually in dietary research to increase utilization of food stocks (e.g. via better understanding of protozoal ecology), increase bioavailability of nutrients including trace minerals, and protect animal and human health

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Ruminant animals, such as cows and sheep, depend on the bacteria residing in their rumen to extract nutrients from feed. As such, any attempt to improve ruminant nutrition, feed efficiency, or to develop new feeds or feed additives must involve analysis of ruminal bacteria.

What has been done
An OARDC project has developed the Rumen Array analyzer to enable both comprehensive and cost-effective analysis of rumen bacteria. The Rumen Array can be used to analyze up to six rumen samples simultaneously for 1,600 different bacteria present in the rumen. The analysis afforded by the Rumen Array is relatively inexpensive and less time-consuming. Such unprecedented, comprehensive analysis of multiple samples provides a new platform to enable more effective and rational studies of ruminant nutrition and development of new feeds and feed additives.

Results
The Rumen Array is a microarray with 1,660 specific probes that enable detection and semi-quantification of individual species. The microarray is designed to include one universal probe that detects total bacteria and archaea and also incorporates several control probes to ensure proper normalization and validation of microarray analysis. Collectively, the Rumen Array enables simultaneous detection and quantification of most bacteria in the rumen. This comprehensiveness exceeds any currently available techniques or methods. The Rumen Array is designed on phylogenetic marker sequences collected worldwide, enabling the analysis of ruminal microbiome of ruminant animals in any country. The Rumen Array enables simultaneous detection and analysis of most bacteria in the forestomach of ruminant animals: dairy cows, beef cows, buffalo, sheep, goats, and wild ruminant animals.

4. Associated Knowledge Areas

KA Code	Knowledge Area
302	Nutrient Utilization in Animals
305	Animal Physiological Processes
307	Animal Management Systems

Outcome #4

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 #5

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 #6

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Ohio aquaculture has an estimated impact of $50 million annually. Aquaculture sales in Ohio have tripled from $1.8 million to $6.6 million in recent years. Nationally, Ohio ranks first in sales of yellow perch for food and is the number one bluegill producing state. Ohio also ranks fourth in sales of baitfish and largemouth bass sold for sport, and fifth in number of baitfish farms. Yellow perch remains the primary food fish for human consumption. To be economically viable and to provide for production efficiency, improved lines of yellow perch must be developed.

What has been done
Genetically improved yellow perch were evaluated on three sites in two states using both separate rearing and communal rearing methods. Results showed the OSU improved fish strain exhibited 42.1 ? 59.4% higher production, and 25.5% - 32.0% higher growth rates, and even have 12.3% - 27.8% higher survival than local strains. CFAES - South Centers now has capacity to create genetic relatedness charts and genetic pedigrees of selected broodfish. Family identification technology using DNA for selective breeding has been established. These are now available to stakeholders.

Results
Multiple improved lines of yellow perch have been developed, and over one million genetically improved fish have been distributed to Ohio fish farms by South Centers research and extension team. An additional third generation of improved fish was produced in 2012 through the crossing and mating of more than 100 families. Evaluation of 1-stage and 2-stage selection was completed, and the results have been published in the Journal of Animal Science. Three male populations with a female genotype have been developed, which will produce fast-growing all-female populations for the aquaculture industry.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
303	Genetic Improvement of Animals
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)

Outcome #7

1. Outcome Measures

Advance preharvest research over five years to the extent that new technologies are being adopted and showing profitability in area such as improved muscle growth, quality of meat, tenderness, lower fat in dairy products, etc.

Not Reporting on this Outcome Measure

Outcome #8

1. Outcome Measures

Animal disease researchers will continue to serve on first responder teams when stakeholders have an immediate disease problem

Not Reporting on this Outcome Measure

Outcome #9

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 #10

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

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

As noted above a number of factors continue to impact this planned program. The impact is typically situational as to the degree that any particular external factor affects outcome. As noted in other planned programs the greatest challenge is for OSU Extension and OARDC to find adequate resources to respond to growing demand. Often if there is an immediate need for OSU personnel to intercede to assist a stakeholder with a pending pest or pathogen, there is no time to structure a research grant for cost recovery or surplus funds to support additional extension personnel needed to meet these growing challenges.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

No formal evaluation results to report from OARDC. Publications, research grants garnered, n of stakeholders served, and anecdotal data provide a positive assessment of this planned program.

Key Items of Evaluation

No key items to report

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%		15%	
402	Engineering Systems and Equipment	0%		20%	
403	Waste Disposal, Recycling, and Reuse	0%		25%	
404	Instrumentation and Control Systems	0%		15%	
405	Drainage and Irrigation Systems and Facilities	0%		20%	
723	Hazards to Human Health and Safety	0%		5%	
	Total	0%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	4.0	0.0
Actual Paid Professional	0.0	0.0	1.5	0.0
Actual Volunteer	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	173223	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	322583	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. 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

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; and 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

2012	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: 2012

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	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	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 systems to that will permit small farmers to take advantage of alternatives to traditional commodity crops at a rate commensurate with demand
4	Improve mechanical devices and instrumentation needed by stakeholders
5	Develop improved systems to aid in meeting new or yet to emerge or novel needs
6	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
7	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
8	Aid rural stakeholders with onsite waste disposal systems to the extent that all rural Ohio onsite waste management systems could meet state standards
9	Reduce through research, development, and outreach the negative impact of farm-, recreation-, or industry-related accidents within agriculture and natural resources.

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 systems to that will permit small farmers to take advantage of alternatives to traditional commodity crops at a rate commensurate with demand

   Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

   Improve mechanical devices and instrumentation needed by stakeholders

   Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

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

2. **Associated Institution Types**

   - 1862 Extension
   - 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The opportunity to sell corn stover is present with bioenergy conversion plants being built across the Midwest. Farmers are aware that soil organic matter remains the foundation upon which sustainable, and profitable agricultural systems are built. Farmers, extension educators and professional services personnel working in this area, as well as industry need a simple and easy-to-use tool, in order to understand how management influences soil organic matter.

What has been done
CFAES research and extension personnel at OSU South Centers gathered both user needs data and calculator options and parameters to better understand how to create a useful calculator.

Results
South Centers developed the Soil Organic Matter (SOM) calculator tool based on the impacts of stover removal, crop rotation, drainage, manure and organic amendments, fertilizers, conservation tillage practices, and cover crops. The outputs of the calculator consist of total, active, and passive soil organic matter, total nitrogen, CO2-C sequestration, and overall soil health. The tool also helps to calculate the revenue from residue sales.

4. Associated Knowledge Areas

KA Code	Knowledge Area
402	Engineering Systems and Equipment
404	Instrumentation and Control Systems

Outcome #6

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 #7

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Wastewater from food processing plants is often pretreated at considerable expense before it is sent to municipal wastewater treatment plants. An alternative is needed.

What has been done
OARDC agriculture engineers have been working for several years with a turkey processing plant on an alternative to pretreating wastewater and sending it to a municipal source. After extensive modeling a solution way found.

Results
Research on treatment of turkey slaughterhouse wastewater has resulted in the construction and operation of a full-scale treatment system. The 4-acre sand and gravel bioreactor is treating the wastewater from the processing of 7000 birds per day. The bioreactor cost is estimated to be $2.8 million over 20 years saving the owner about $10 million from the proposed alternative of pretreatment before discharge to a municipal treatment plant. The new bioreactor plant went online in August 2012 and is achieving 99% BOD removal and 53% - 85% ammonia removal.

4. Associated Knowledge Areas

KA Code	Knowledge Area
401	Structures, Facilities, and General Purpose Farm Supplies
402	Engineering Systems and Equipment
403	Waste Disposal, Recycling, and Reuse

404	Instrumentation and Control Systems
723	Hazards to Human Health and Safety

Outcome #8

1. **Outcome Measures**

Aid rural stakeholders with onsite waste disposal systems to the extent that all rural Ohio onsite waste management systems could meet state standards

Not Reporting on this Outcome Measure

Outcome #9

1. **Outcome Measures**

Reduce through research, development, and outreach the negative impact of farm-, recreation-, or industry-related accidents within agriculture and natural resources.

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

As noted above a number of factors continue to impact this planned program. The impact is typically situational as to the degree that any particular external factor affects outcome. As noted in other planned programs the greatest challenge is for OSU Extension and OARDC to find adequate resources to respond to growing demand. Perhaps the greatest factor affecting productivity to OARDC engineering efforts are our lack of formal laboratories on the Wooster campus. As noted in previous ROAs, the building housing these laboratories was destroy by a tornado and the replacement, with construction to be underway in early 2013, will not be completed and fully operational until 2014-15.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

No formal evaluation results to report from OARDC. Publications, research grants

garnered, n of stakeholders served, and anecdotal data provide a positive assessment of this planned program. CFAES' food, agricultural and biological engineering program is consistently ranked one of the top programs in the nation.

Key Items of Evaluation

No specific data to report.

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%		10%	
602	Business Management, Finance, and Taxation	0%		10%	
603	Market Economics	0%		10%	
604	Marketing and Distribution Practices	0%		5%	
605	Natural Resource and Environmental Economics	0%		10%	
606	International Trade and Development	0%		10%	
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%		10%	
611	Foreign Policy and Programs	0%		10%	
	Total	0%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	5.5	0.0
Actual Paid Professional	0.0	0.0	4.4	0.0
Actual Volunteer	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	615935	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	531672	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

Food, Agricultural and Economics Development Planned Program includes both basic and applied research. Both laboratories and multiple field sites are available throughout state to permit data gathering and to continue long - term experiments. Extensive in-state research takes place as do national and international studies. Close working relationships with multiple industries and organizations provide real - world settings and data, greatly enhancing the program's capacity and outputs/impacts. All functional laboratories and sites are improved over time as program need and resource availability 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 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; and 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

2012	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:	2012
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	0	34	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Report 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 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	Advanced knowledge of how to market and manage quality attributes of commodities leading to demonstrated value added/ profits for producers, processors, and distributors, and reported satisfaction/needs attainment among consumers.
3	Business management knowledge 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.
4	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.
5	Relational contracting theory and practice information that will contribute to reduction of risks, improving profits, and adding stability to the system that meet stated stakeholder needs.
6	Stakeholders will have the necessary models that will improve on the forecasting of risk, demand, and prices in various commodity sectors leading to enhanced decision making, increased profits, and reductions in uncertainty.
7	Resultant management models that explain potential impacts of new/emerging trends e.g. trade agreements, bio-terrorism threats, and renewable fuels requirements, on specific agriculture sectors to the extent that negative impacts can be mitigated in a timely manner.
8	Market economies and efficiencies studies relating to factors such as pricing, finance, supply and demand, etc. ensuring that stakeholders are informed and their identified needs, e.g. lower operating costs, become more attainable.
9	Research finding on valuing environmental resources, e.g. wetlands, river restoration, and how it applies to stakeholder needs for demonstrated gains in profits, resources sustained, and/or actions mitigated.
10	Biocomplexity analysis to understand human-nature interactions at the landscape level that informs human enterprises, leading to demonstrated profitability, environmental protection, and/or improvements in quality of stakeholders' lives.
11	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.
12	Market and non-market valuation of environmental resources, e.g. steelhead trout fishing, open space, that have often lacked economic justification that meets client needs, and informs individual, group, and government decision making.
13	Advance knowledge of vertical markets in developing counties that when applied leads to documented increased trade with the US.
14	Exchange rate, trade policy, and similar uncertainties research findings that lead to documented mitigation for stakeholders of certain negative effects of international trade.
15	New policy analysis research that informs policy development and fosters demonstrated gains for stakeholders in areas such as conservation programs, farmland protection, Farm Credit System resources, etc.

Outcome #1

1. **Outcome Measures**

   New knowledge of production variations in 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**

   Advanced knowledge of how to market and manage quality attributes of commodities leading to demonstrated value added/ profits for producers, processors, and distributors, and reported satisfaction/needs attainment among consumers.

   Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

   Business management knowledge 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 Extension
   - 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

An issue of disagreement during the 2012 Farm Bill debate was whether the farm safety net should focus on revenue or price. It is common to think of revenue per acre as price times yield, however, this perspective is not appropriate if the objective is to manage risk. Risk management approaches seek to manage the negative impacts of changes. The risk of revenue

loss depends not only on the risk of an decline in price or yield, but also on the correlation between the changes in price and the changes in yield.

What has been done
Until the ACRE program was enacted in the 2008 Farm Bill, farm programs focused on price. An OARDC economist compared price and revenue programs and the parameters specified in the Senate Farm Bill to focus on the key role played by the correlation between changes in price and changes in yield.

Results
Converting from a price based farm safety net to a revenue based farm safety net will likely increase the effective risk management provided by the farm safety net and will result in more support being provided to Southern crops. These implications reflect that revenue risk is not just about price and yield, but also about the correlation between price and yield.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation
603	Market Economics
609	Economic Theory and Methods
610	Domestic Policy Analysis

Outcome #4

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 #5

1. Outcome Measures

Relational contracting theory and practice information that will contribute to reduction of risks, improving profits, and adding stability to the system that meet stated stakeholder needs.

Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

Stakeholders will have the necessary models that will improve on the forecasting of risk, demand, and prices in various commodity sectors leading to enhanced decision making, increased profits, and reductions in uncertainty.

Not Reporting on this Outcome Measure

Outcome #7

1. **Outcome Measures**

Resultant management models that explain potential impacts of new/emerging trends e.g. trade agreements, bio-terrorism threats, and renewable fuels requirements, on specific agriculture sectors to the extent that negative impacts can be mitigated in a timely manner.

Not Reporting on this Outcome Measure

Outcome #8

1. **Outcome Measures**

Market economies and efficiencies studies relating to factors such as pricing, finance, supply and demand, etc. ensuring that stakeholders are informed and their identified needs, e.g. lower operating costs, become more attainable.

2. **Associated Institution Types**

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Livestock Gross Margin Insurance for Dairy Cattle (LGM-Dairy) is an insurance tool that enables dairy producers to protect income-over-feed-cost margins. LGM-Dairy is priced based on information from Chicago Mercantile Exchange (CME) futures and options prices for Class III milk, corn and soybean meal. The LGM-Dairy rating methodology assumes that the volatility

implied from CME futures and options data do not change across strike prices. However, evidence suggests that the volatility surface is not flat. Storable commodities such as corn or soybean meal often have higher implied volatilities at higher strike prices. At issue, are changes warranted?

What has been done
OARDC economists used high-frequency data for Class III milk, corn, and soybean meal futures, and options to document the extent the existence and magnitude of volatilities in milk and feed prices in 2011. Using Monte Carlo experiments they examined the effect of accounting for extremes on LGM-Dairy premiums. Their question was should the LGM-Dairy rating method be amended?

Results
The research team found no effect of any significant financial importance. Further experiments revealed that the basket option nature of LGM-Dairy suffices to neutralize the premium-enhancing effect of excess skewness. This project demonstrated that volatility in corn and soybean meal implied volatilities do not seem to change LGM-Dairy premiums sufficiently to warrant amending the LGM-Dairy rating method.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation
603	Market Economics
609	Economic Theory and Methods
610	Domestic Policy Analysis

Outcome #9

1. Outcome Measures

Research finding on valuing environmental resources, 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 #10

1. Outcome Measures

Biocomplexity analysis to understand human-nature interactions at the landscape level that informs human enterprises, leading to demonstrated profitability, environmental protection, and/or improvements in quality of stakeholders' lives.

Not Reporting on this Outcome Measure

Outcome #11

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

Outcome #12

1. **Outcome Measures**

Market and non-market valuation of environmental resources, e.g. steelhead trout fishing, open space, that have often lacked economic justification that meets client needs, and informs individual, group, and government decision making.

Not Reporting on this Outcome Measure

Outcome #13

1. **Outcome Measures**

Advance knowledge of vertical markets in developing counties that when applied leads to documented increased trade with the US.

Not Reporting on this Outcome Measure

Outcome #14

1. **Outcome Measures**

Exchange rate, trade policy, and similar uncertainties research findings that lead to documented mitigation for stakeholders of certain negative effects of international trade.

Not Reporting on this Outcome Measure

Outcome #15

1. **Outcome Measures**

New policy analysis research that informs policy development and fosters demonstrated gains for stakeholders in areas such as conservation programs, farmland protection, Farm Credit System resources, 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

As noted above a number of factors continue to impact this planned program. The impact is typically situational as to the degree that any particular external factor affects outcome. As noted in other planned programs the greatest challenge is for OSU Extension and OARDC to find adequate resources to respond to growing demand. Given the emphasis on re-growing the economy, CFAES economists are overwhelmed with demand for their services; e.g. analyze economic situations, make forecasts, assist with new programs such as those OSU Extension provides to families and rural communities seeking economic programs.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

No formal evaluation results to report from OARDC. Publications, research grants garnered, n of stakeholders served, and anecdotal data provide a positive assessment of this planned program. CFAES' agricultural.environmental, and development economic program is consistently ranked one of the top programs in the nation.

Key Items of Evaluation

Of the 66 Ohio State programs that appeared in the recent National Research Council "Data-Based Assessment of Research-Doctorate Programs in the United States" CFAES' Department of Agricultural, Environmental, and Development Economics (AEDE) ranked as the top program in the U.S. in Agricultural and Resource Economics using the regression based ranking calculation. AEDE is the only Ohio State program to earn a top ranking in either of the two reported ranking methods.

AEDE scored particularly well, when compared to other departments around the country, in the percentage of minority faculty (ranked 1st), the average number of PhD students graduated per year (2nd), the average GRE score (3rd), the percentage of first year students with external funding (6th), the percentage of PhD students completing within 6 years (7th), and the average number of publications per faculty member (7th).

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
721	Insects and Other Pests Affecting Humans	0%		20%	
722	Zoonotic Diseases and Parasites Affecting Humans	0%		60%	
723	Hazards to Human Health and Safety	0%		20%	
	Total	0%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	1.0	0.0
Actual Paid Professional	0.0	0.0	0.4	0.0
Actual Volunteer	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	49515	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	107300	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. 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 biosecurity 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; political entities; extension personnel; students from pre-school to post doctorate studies; news organizations; and 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

2012	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:	2012
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	0	25	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	2. Create a growing base of knowledge that supports improving human health as it relates to food, environment, and lifestyle
7	3. Create a growing base of knowledge that supports improving human health as it relates to food, environment, and lifestyle.

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.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Worldwide, mosquito-borne diseases cause more human suffering than any other organism. Over one million people worldwide die from mosquito-borne diseases each year. Interrupting the mosquito life cycle is being explored on multiple fronts as one approach to reducing the human health impacts.

What has been done
One approach employs molecular mechanisms that regulate insect overwintering (diapause), an RNA-interference technique. An OARDC scientist and colleagues have developed a novel technique for delivering double-stranded RNA into mosquito larvae by exploiting the larva's dehydration tolerance. Larvae were dehydrated in a NaCl solution and then rehydrated in water containing double-stranded RNA. Using larvae of Culex pipiens, they demonstrated the principle by knocking down expression of the gene encoding heat shock protein 90. The knockdown persisted through the pupal stage and into adulthood, with a knockdown of rate 77% that was still evident on the third day of adult life.

Results
These scientists have successfully targeted major genes that regulate fat accumulation and utilization, as well as genes and transcription factors in the insulin signaling pathway, a pathway used to regulate the mosquito diapause response. Mosquitoes that have been treated with various RNA constructs fail to survive the winter. This relatively simple procedure will prove useful for knocking down expression of other genes in larvae of this mosquito and in others.

4. Associated Knowledge Areas

KA Code	Knowledge Area
721	Insects and Other Pests Affecting Humans
722	Zoonotic Diseases and Parasites Affecting Humans
723	Hazards to Human Health and Safety

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.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
There is an urgent need for new antibiotics because resistance to currently available drugs is growing.

What has been done
N-terminal acetylation was discovered in paenibacillin, a novel lantibiotic recently reported as a product of Paenibacillus polymyxa OSY-DF. This N-terminal modification is unprecedented among bacteria-derived antimicrobial peptides. Lantibiotics are produced by a large number of Gram-positive bacteria such as Streptococcus and Streptomyces to attack other Gram-positive

bacteria. Additionally, the primary structure of paenibacillin has been finally determined unequivocally by the extensive NMR analysis taken together with previous MS/MS results. These analyses revealed the structure of paenibacillin as one of the most post-translationally modified lantibiotics.

Results
Researchers at OSU have identified a novel antimicrobial agent, paenibacillin. The newly identified compound has potential for use against drug resistant pathogens. The compound was isolated from Paenibacillus polymyxa and identified as a member of the lantibiotic class. Lantiotics have been known and used for many years in food production; their instability at higher physiological pH has historically made them unsuitable for medical use. The newly discovered compound contains a more highly modified peptide than other lantibiotics and has shown increased thermal and alkaline stability and excellent water solubility that may make it suitable for medical therapeutic use. Paenibacillin has been shown to have considerable antimicrobial potency against numerous gram-positive and gram-negative bacteria, including food-borne and antibiotic-resistant organisms.

4. Associated Knowledge Areas

KA Code	Knowledge Area
723	Hazards to Human Health and Safety

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

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual

2012 0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
LDL cholesterol interacts with free radicals to become oxidized and at that point is more likely to promote inflammation and cause tissue damage. LDL cholesterol, or "bad" cholesterol, becomes even more dangerous when it is oxidized. Oxidized LDL can produce inflammation in arteries that supply blood to the organs and other tissues, thus promoting atherosclerosis and increasing the risk of having a heart attack or stroke.

What has been done
An OARDC study in the OSU College of Education and Human Ecology found that apples lowered blood levels of oxidized LDL cholesterol. When LDL cholesterol interacts with free radicals to become oxidized, the cholesterol is more likely to promote inflammation and can cause tissue damage and it takes on a form that hardens arteries. The researchers achieved a strong effect against LDL being oxidized with just one apple a day for four weeks. The difference was similar to that found between people with normal coronary arteries versus those with coronary artery disease.

Results
OARDC scientist found that in a study of healthy, middle-aged adults, consumption of one apple a day for four weeks lowered by 40 percent blood levels of a substance linked to hardening of the arteries. Taking capsules containing polyphenols, a type of antioxidant found in apples, had a similar, but not as large, effect. Eating an apple a day might in fact help keep the cardiologist away.

4. Associated Knowledge Areas

KA Code	Knowledge Area
723	Hazards to Human Health and Safety

Outcome #6

1. Outcome Measures

2. Create a growing base of knowledge that supports improving human health as it relates to food, environment, and lifestyle

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Turmeric, commonly used in Southeast Asian and Middle Eastern cooking, is a deep orange-yellow powder containing curcumin and is made from the roots of the Curcuma longa tropical plant. Curcumin has been thought to have health benefits ranging from fighting cancer to slowing progression of Alzheimer's disease and is available commercially as a food supplement.

What has been done
An OARDC scientist in the College of Education and Human Ecology sought to study dimensions of curcumin absorption and possible health benefits. The body poorly absorbs the supplement curcumin, thus most extracts need to be taken in high doses, some in excess of 1,000 mg, thus defeating the purpose of taking a supplement. Instead, the OARDC study used an extract containing 80 mg of curcumin mixed with small amounts of natural fat compounds intended to help boost absorbability of the spice extract. Unlike previous trials, which focused mainly on people with existing health problems, healthy individuals ages 40-60 were recruited for this study. Blood samples were taken before and after the study period.

Results
A low dose of a curcumin extract from the spice turmeric can have a variety of positive health effects on healthy middle-aged individuals. The curcumin supplement was relatively well absorbed because a low dose produced many good effects on blood and saliva measures. These effects included a reduction in triglyceride levels, which are linked to heart disease. Curcumin also increased plasma levels of nitric oxide, a molecule that can work against high blood pressure. Researchers also observed lower plasma concentrations of sICAM, a molecule linked to atherosclerosis, the process of artery hardening.

4. Associated Knowledge Areas

KA Code	Knowledge Area
723	Hazards to Human Health and Safety

Outcome #7

1. Outcome Measures

3. Create a growing base of knowledge that supports improving human health as it relates to food, environment, and lifestyle.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
People in the United States are consuming up to 24% of their calories from snacks, a significant increase over the last few decades. The increase in food consumption frequency without compensatory energy reduction at each eating occasion may be contributing to the incidence of obesity and Type 2 diabetes. Moreover, current snack food choices tend to lack in nutrition.

What has been done
OARDC scientists proposed that soy incorporation into snack foods could provide nutritional benefits. A human clinical study was conducted involving 51 healthy participants to assess if the addition of 27.2% soy ingredients to a soft pretzel snack food can significantly decrease the glycemic index without affecting consumer acceptability or satiety. In order for a soy product to claim official heart healthy benefits, it must provide 6.25 grams and also be low in fat, saturated fat and cholesterol

Results
The addition of soy to a soft pretzel snack food can significantly decrease the glycemic index without affecting consumer acceptability or satiety. These results show that soy can be used to supplement snack foods in high enough quantities to achieve lower post-meal glycemia while maintaining favorable sensory characteristics. Incorporation of alternate, nutrient dense, sensory acceptable snack foods containing soy in a daily diet may reduce blood sugar levels and curb type 2 diabetes associated with the obesity epidemic. In addition, including soy at >20% levels improved textural properties of microwaved dough products, resulting in a softer and less chewy texture. Microwavable baked goods are used frequently by the food industry but suffer from poor texture upon microwave re-heating. This work has led to a patent and a start-up company.

4. Associated Knowledge Areas

KA Code	Knowledge Area
723	Hazards to Human Health and Safety

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

Human health programs are found in multiple departments and colleges at OSU and many directly or indirectly receive financial support, collaborators, and infrastructure support from CFAES. As noted above, a number of factors continue to impact this planned program. The impact is typically situational as to the degree that any particular external factor affects outcome. As noted in other planned programs the greatest challenge is for OSU Extension and OARDC to find adequate resources to respond to growing demand. Likewise given OSU history as a major medical university, having adequate personnel and other resources within CFAES to collaborate widely across the university and take full advantage of the multiple opportunities stresses this program.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Given the breathe of this program across so many departments and colleges within OSU, of which OARDC and OSU Extension participate, we have no specific formal evaluation data for the program as a whole. Publications, research grants garnered, n of stakeholders served, and anecdotal data provide a positive assessment of this planned program. Perhaps our long history of research and extension outputs and impacts in food safety, food and animal health, and in programs such as obesity, provide the a better picture of our long term success, and our contributions to improving human health and wellness.

Key Items of Evaluation

No key item to report.

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%		20%	
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	0%		15%	
805	Community Institutions, Health, and Social Services	0%		10%	
901	Program and Project Design, and Statistics	0%		10%	
902	Administration of Projects and Programs	0%		5%	
903	Communication, Education, and Information Delivery	0%		20%	
	Total	0%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	2.5	0.0
Actual Paid Professional	0.0	0.0	2.2	0.0
Actual Volunteer	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	294709	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	229697	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 this Human and Community Resource Development Planned Program is primarily applied research. 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; and 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

2012	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:	2012
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	0	16	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of gradaute 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 the agricultural workforce leading to improved quality and quantity of jobs in rural areas yielding demonstrated economic growth.
2	Advance human capital and sociological studies that will inform strategies for strengthening individual and family well-being, and community stability, e.g. grandmother daycare in single head households.
3	Develop a more complete understanding of the relationship between learning style and cognitive abilities of Ohio agricultural students to inform teaching ?learning leading to gain score increases within and a better-educated workforce.
4	Conduct statewide survey research to better understand public attitudes, perceptions, opinions, and behaviors related to select topics in agriculture, annually documenting how those data impact decision-making, e.g. public policy, industrial decisions.
5	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.
6	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.
7	Develop a conceptual framework within five years that will inform programming for developing statewide leadership characteristics, skills, and attitudes in a core of present and future leaders in order to advance a more socially responsible industry.
8	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.
9	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.
10	Investigate project formulation and administration to the extent that the findings help the institution to document gains in creativity, productivity, partnerships, collaboration, and proficiency within five years.
11	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 the agricultural workforce leading to improved quality and quantity of jobs in rural areas yielding demonstrated economic growth.

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

Advance human capital and sociological studies that will inform strategies for strengthening individual and family well-being, and community stability, e.g. grandmother daycare in single head households.

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

Develop a more complete understanding of the relationship between learning style and cognitive abilities of Ohio agricultural students to inform teaching ?learning leading to gain score increases within and a better-educated workforce.

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

Conduct statewide survey research to better understand public attitudes, perceptions, opinions, and behaviors related to select topics in agriculture, annually documenting how those data impact decision-making, e.g. public policy, industrial decisions.

Not Reporting on this Outcome Measure

Outcome #5

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 #6

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 #7

1. **Outcome Measures**

Develop a conceptual framework within five years that will inform programming for developing statewide leadership characteristics, skills, and attitudes in a core of present and future leaders in order to advance a more socially responsible industry.

Not Reporting on this Outcome Measure

Outcome #8

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.

Not Reporting on this Outcome Measure

Outcome #9

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 #10

1. **Outcome Measures**

Investigate project formulation and administration to the extent that the findings help the institution to document gains in creativity, productivity, partnerships, collaboration, and proficiency within five years.

Not Reporting on this Outcome Measure

Outcome #11

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

As noted above, a number of factors continue to impact this planned program. The impact is typically situational as to the degree that any particular external factor affects the societal outcome. As noted in other planned programs, the greatest challenge is for OSU Extension and OARDC to find adequate resources to respond to growing demand.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

OARDC has no evaluation data to report for this planned program.

Key Items of Evaluation

No key item to report.

V(A). Planned Program (Summary)

Program # 14

1. Name of the Planned Program

Business Retention and Expansion Initiative (Extension)

☐ Reporting on this Program

Reason for not reporting

This program (and all reported summaries, descriptions, situations, priorities, factors, results, outputs, outcomes and goals) has been rolled into the "Advancing Employment and Income Opportunities" program.
"Business Retention and Expansion" is one of several 'signature programs' offered by Ohio State University Extension. Signature programs are updated or replaced with other signature programs periodically, as client need dictates. Due to their transient nature, we have decided to report all signature programs under one of 4 permanent 'impact areas': (1) Advancing Employment and Income Opportunities, (2) Enhancing Agriculture and the Environment, (3) Preparing Youth for Success, and (4) Strengthening Families and Communities.
"Business Retention and Expansion" will now be reported under "Advancing Employment and Income Opportunities".

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	4.0	0.0	0.0	0.0
Actual Paid Professional	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
Actual Volunteer	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

V(D). Planned Program (Activity)

1. Brief description of the Activity

BR&E Program Outputs include: BR&E training, on-site workshops and one-on-one consultation, volunteer organizational efforts, continuous update of BR&E hard copy and web-based materials such as questionnaires, reports, and presentations in cooperation with development officials, elected officials, businesses, and community stakeholders including Extension professionals.

2. Brief description of the target audience

Local development officials, community volunteers, Extension professionals (direct); community stakeholders (indirect)

3. How was eXtension used?

{No Data Entered}

V(E). Planned Program (Outputs)

1. Standard output measures

2012	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: 2012

Actual: {No Data Entered}

Patents listed

{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	3	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Formal training workshops

Year	Actual
2012	0

Output #2

Output Measure

- one-on-one consultations

Year	Actual
2012	0

Output #3

Output Measure

- formal community presentation of findings

Year	Actual
2012	0

Output #4

Output Measure

- web-based questionnaires

Year	Actual
2012	0

Output #5

Output Measure

- hard-copy questionnaires

Year	Actual
2012	0

Output #6

Output Measure

- Number of program planning and implementation volunteers

Year	Actual
2012	0

Output #7

Output Measure

- Number of program planning and implementation volunteer hours donated

Year	Actual
2012	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Local leaders and community residents will be more familiar with different ways of analyzing data and more capable of interpreting data needed to make important community decisions.
2	Local leaders and community residents will use BR&E data and other secondary data available to make better-informed community decisions.
3	Jobs will be created and retained as a result of ongoing, meaningful dialogue among community leaders, residents, and businesses.

Outcome #1

1. Outcome Measures

Local leaders and community residents will be more familiar with different ways of analyzing data and more capable of interpreting data needed to make important community decisions.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #2

1. Outcome Measures

Local leaders and community residents will use BR&E data and other secondary data available to make better-informed community decisions.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #3

1. Outcome Measures

Jobs will be created and retained as a result of ongoing, meaningful dialogue among community leaders, residents, and businesses.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual

2012 0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 15

1. Name of the Planned Program

Dining with Diabetes (Extension)

☐ Reporting on this Program

Reason for not reporting

This program (and all reported summaries, descriptions, situations, priorities, factors, results, outputs, outcomes and goals) has been rolled into the "Strengthening Families and Communities" program.
"Dining with Diabetes" is one of several 'signature programs' offered by Ohio State University Extension. Signature programs are updated or replaced with other signature programs periodically, as client need dictates. Due to their transient nature, we have decided to report all signature programs under one of 4 permanent 'impact areas': (1) Advancing Employment and Income Opportunities, (2) Enhancing Agriculture and the Environment, (3) Preparing Youth for Success, and (4) Strengthening Families and Communities.
"Dining with Diabetes" will now be reported under "Strengthening Families and Communities".

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	15.0	0.0	0.0	0.0
Actual Paid Professional	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
Actual Volunteer	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

V(D). Planned Program (Activity)

1. Brief description of the Activity

Series of classes offered in participating counties

Newsletter

Training for program team provided by statewide Dining with Diabetes (DWD) Team and invited speakers

Curriculum review and development by DWD Team

Collaborations with agencies to offer programming include: Registered Dietitians, Certified Diabetes Educators, Health Professionals and support at the State level from the Ohio Department of Health

Media releases to promote programming

Partnerships with new organizations with funding sources to support county programming

2. Brief description of the target audience

The Dining with Diabetes Program targets individuals with diabetes and their caregivers/family support members.

3. How was eXtension used?

{No Data Entered}

V(E). Planned Program (Outputs)

1. Standard output measures

2012	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: 2012

Actual: {No Data Entered}

Patents listed

{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of classes

Year	Actual
2012	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of participants whose knowledge of diabetes management has increased.
2	Number of participants who are able to count carbohydrates.
3	Number of participants who are eating smaller portion sizes.
4	Number of participants who have lowered blood sugar levels.

Outcome #1

1. Outcome Measures

Number of participants whose knowledge of diabetes management has increased.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #2

1. Outcome Measures

Number of participants who are able to count carbohydrates.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #3

1. Outcome Measures

Number of participants who are eating smaller portion sizes.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual

2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #4

1. Outcome Measures

Number of participants who have lowered blood sugar levels.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 16

1. Name of the Planned Program

Increasing Profitable Crop Yields Above Trendline-2014 (Extension)

☐ Reporting on this Program

Reason for not reporting

This program (and all reported summaries, descriptions, situations, priorities, factors, results, outputs, outcomes and goals) has been rolled into the "Enhancing Agriculture and the Environment" program.
"Increasing Profitable Crop Yields Above Trendline-2014 (Extension)" is one of several 'signature programs' offered by Ohio State University Extension. Signature programs are updated or replaced with other signature programs periodically, as client need dictates. Due to their transient nature, we have decided to report all signature programs under one of 4 permanent 'impact areas': (1) Advancing Employment and Income Opportunities, (2) Enhancing Agriculture and the Environment, (3) Preparing Youth for Success, and (4) Strengthening Families and Communities.
"Increasing Profitable Crop Yields Above Trendline-2014 (Extension)" will now be reported under "Enhancing Agriculture and the Environment".

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%		10%	
133	Pollution Prevention and Mitigation	5%		5%	
205	Plant Management Systems	20%		20%	
211	Insects, Mites, and Other Arthropods Affecting Plants	15%		15%	
212	Pathogens and Nematodes Affecting Plants	13%		13%	
213	Weeds Affecting Plants	20%		20%	
402	Engineering Systems and Equipment	7%		7%	
601	Economics of Agricultural Production and Farm Management	10%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	10.0	0.0	0.0	0.0

Actual Paid Professional	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
Actual Volunteer	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

V(D). Planned Program (Activity)

1. Brief description of the Activity

The program includes specific areas of plant production including pest (weed, insect & disease) management, soil fertility, tillage/soil erosion, soil water/drainage, precision application of inputs and plant genetic evaluation.

Increasing field crop yields through technology adoption.

Producing high-value crops on small tracts of land.

Growing alternative crops for bioenergy.

Crop Observation and Recommendation Network Newsletter

Crop Production Conference

Crop Profit

Multiple Regional/Local Agronomy Meeting/Workshops

Website

Local/On-Farm Research

Field Days

Bulletins/Fact Sheets/Publications

Work with Media and OSU Communications Technology

Building relationships with commodity organizations and agencies

Build relationships across other teams in OSU Extension.

Computer training on technologies for agronomic applications

Precision ag data management analysis and decision workshops

Develop educational programs and tools to improve the efficiency of nitrogen utilization to improve farm economics and reduce environmental impact.

Develop a user friendly manure nutrient credit spreadsheet for livestock and crop producers

2. Brief description of the target audience

Grain Producers and cash forages of both commercial size and part-time

Agriculture Industry- Fertilizer chemical retailers, Input company representatives, crop advisors

Certified Crop Advisors

Non-agronomic specialized educators

Agency Soil and Water Conservation Districts, Natural Resources Conservation Service, Ohio Department of Agriculture and Environmental Protection Agency

3. How was eXtension used?

{No Data Entered}

V(E). Planned Program (Outputs)

1. Standard output measures

2012	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: 2012

Actual: {No Data Entered}

Patents listed

{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	12	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Crop Observation and Recommendation Network Newsletter distribution

Year	Actual
2012	0

Output #2

Output Measure

- Number of participants reached with agronomic information provided in Regional/Local Agronomy Meetings

Year	Actual
2012	0

Output #3

Output Measure

- Website which reaches an estimated 60,000 hits per year

Year	Actual
2012	0

Output #4

Output Measure

- Local/On-Farm Research project sites.

Year	Actual
2012	0

Output #5

Output Measure

- Number of participants in annual Field Days

Year	Actual

2012	0

Output #6

Output Measure

- Weed Control Guide for Ohio and Indiana distribution

Year	Actual
2012	0

Output #7

Output Measure

- Field Crop Insects of Ohio distribution available via web only updated annually

Year	Actual
2012	0

Output #8

Output Measure

- Corn, Soybean, Wheat and Alfalfa Field Guides distributed

Year	Actual
2012	0

Output #9

Output Measure

- Resource Guides on Pest-Insect, Disease and profitable production.

Year	Actual
2012	0

Output #10

Output Measure

- Ohio Agronomy Guide distribution

Year	Actual
2012	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of meeting participants will indicate they will implement new management practices based on information received at the meetings.
2	Number of crop production acres that will impliment BMP's for nutrient management.
3	Number of crop production acres that implement weed resistance management strategies.
4	Number of Ohio crop acres where appropriate utilization of IPM practices occurs
5	Number of individuals taught about disease identification, control and scouting or key weed control concepts.
6	Number of farmers reporting positive changes in management and or profitability of their farm from use of the disease identification, control and scouting or key weed control concepts.
7	Number of farmers reporting positive changes in management and or profitability of their farm from use of information from farm financial analysis.
8	Reported economic impact of cost savings, increased yield or other increased profitability from use of CORN newsletter reported as total dollars.

Outcome #1

1. Outcome Measures

Number of meeting participants will indicate they will implement new management practices based on information received at the meetings.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
133	Pollution Prevention and Mitigation
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
402	Engineering Systems and Equipment
601	Economics of Agricultural Production and Farm Management

Outcome #2

1. Outcome Measures

Number of crop production acres that will impliment BMP's for nutrient management.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
133	Pollution Prevention and Mitigation
205	Plant Management Systems

Outcome #3

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

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
213	Weeds Affecting Plants

Outcome #4

1. Outcome Measures

Number of Ohio crop acres where appropriate utilization of IPM practices occurs

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants

Outcome #5

1. Outcome Measures

Number of individuals taught about disease identification, control and scouting or key weed control concepts.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants

Outcome #6

1. Outcome Measures

Number of farmers reporting positive changes in management and or profitability of their farm from use of the disease identification, control and 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
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
601	Economics of Agricultural Production and Farm Management

Outcome #7

1. Outcome Measures

Number of farmers reporting positive changes in management and or profitability of their farm from use of information from farm financial analysis.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
402	Engineering Systems and Equipment
601	Economics of Agricultural Production and Farm Management

Outcome #8

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
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
133	Pollution Prevention and Mitigation
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
402	Engineering Systems and Equipment
601	Economics of Agricultural Production and Farm Management

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 17

1. Name of the Planned Program

New Start for Financial Success (Extension)

☐ Reporting on this Program

Reason for not reporting

This program (and all reported summaries, descriptions, situations, priorities, factors, results, outputs, outcomes and goals) has been rolled into the "Strengthening Families and Communities" program.
"New Start for Financial Success (Extension)" is one of several 'signature programs' offered by Ohio State University Extension. Signature programs are updated or replaced with other signature programs periodically, as client need dictates. Due to their transient nature, we have decided to report all signature programs under one of 4 permanent 'impact areas': (1) Advancing Employment and Income Opportunities, (2) Enhancing Agriculture and the Environment, (3) Preparing Youth for Success, and (4) Strengthening Families and Communities.
"New Start for Financial Success (Extension)" will now be reported under "Strengthening Families and Communities".

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	3.5	0.0	0.0	0.0
Actual Paid Professional	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
Actual Volunteer	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

V(D). Planned Program (Activity)

1. Brief description of the Activity

Two-hour course approved by the Department of Justice.
The subjects covered are budget development, money management, wise credit use and consumer information.
Competitors have arisen in most communities where the New Start course has been offered. Attorney's prefer to send clients to the same provider for both credit counseling and personal finance education. Unfortunately, OSU Extension educators are not certified to be credit counselors, so that now the referrals are going to other agencies who can offer both to bankruptcy filers. Most educators will not be offering the class in 2012 and beyond because of the funding and referral issues.

2. Brief description of the target audience

Bankruptcy filers

3. How was eXtension used?

{No Data Entered}

V(E). Planned Program (Outputs)

1. Standard output measures

2012	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: 2012
Actual: {No Data Entered}

Patents listed
{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of educational sessions

Year	Actual
2012	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of participants indicating they will use a budget at home.
2	Number of participants indicating they were more likely to set aside money for occasional expenses.
3	Number of participants indicating they were more likely to set aside money for unplanned expenses.
4	Number of participants indicating they were more likely to save money toward a goal.
5	Number of participants indicating they were more likely to keep debt below 20% of take-home pay.
6	Number of participants indicating they were more likely to adjust spending to match income.
7	Number of participants indicating they were more likely to know where their money goes.

Outcome #1

1. Outcome Measures

Number of participants indicating they will use a budget at home.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #2

1. Outcome Measures

Number of participants indicating they were more likely to set aside money for occasional expenses.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #3

1. Outcome Measures

Number of participants indicating they were more likely to set aside money for unplanned expenses.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual

2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #4

1. Outcome Measures

Number of participants indicating they were more likely to save money toward a goal.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #5

1. Outcome Measures

Number of participants indicating they were more likely to keep debt below 20% of take-home pay.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #6

1. Outcome Measures

Number of participants indicating they were more likely to adjust spending to match income.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #7

1. Outcome Measures

Number of participants indicating they were more likely to know where their money goes.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 18

1. Name of the Planned Program

Real Money, Real World (Extension)

☐ Reporting on this Program

Reason for not reporting

This program (and all reported summaries, descriptions, situations, priorities, factors, results, outputs, outcomes and goals) has been rolled into the "Preparing Youth for Success" program.
"Real Money, Real World (Extension)" is one of several 'signature programs' offered by Ohio State University Extension. Signature programs are updated or replaced with other signature programs periodically, as client need dictates. Due to their transient nature, we have decided to report all signature programs under one of 4 permanent 'impact areas': (1) Advancing Employment and Income Opportunities, (2) Enhancing Agriculture and the Environment, (3) Preparing Youth for Success, and (4) Strengthening Families and Communities.
"Real Money, Real World (Extension)" will now be reported under "Preparing Youth for Success".

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	3.0	0.0	0.0	0.0
Actual Paid Professional	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
Actual Volunteer	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

V(D). Planned Program (Activity)

1. Brief description of the Activity

Real Money, Real World consists of a six-lesson curriculum to help young people become aware of the money-management skills they'll need for the rest of their lives. Designed to be a partnership of local Extension educators, schools, and community volunteers, the program focuses on basic finance principles, including how education and occupation affect income; how expenses and paycheck deductions add up; and how to be smart in using checking accounts, savings, and credit.

2. Brief description of the target audience

Ohio Youth Grades 5 to 9.

3. How was eXtension used?

{No Data Entered}

V(E). Planned Program (Outputs)

1. Standard output measures

2012	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: 2012

Actual: {No Data Entered}

Patents listed

{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Total number of volunteers participating in the planning and implementation of this program (e.g., committee members, teachers/trainers, unpaid staff, etc.)

Year	Actual
2012	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of participants who increased awareness about what it costs to maintain a household.
2	Number of participants who increased awareness about how every spending decision affects other spending opportunities.
3	Number of participants who increased awareness about how the type of job they have affects how much money they will make.
4	Number of participants who increased feeling of importance about getting more education or training after high school.
5	Number of participants who increased feeling of importance about waiting to have children until financially ready.
6	Number of participants who increased feeling of importance about having a plan for spending that includes both needs and wants.
7	Number of participants who indicated their likeliness to make changes relative to getting more education or training after high school.
8	Number of participants who indicated their likeliness to make changes relative to learning how to make wise financial decisions.

Outcome #1

1. Outcome Measures

Number of participants who increased awareness about what it costs to maintain a household.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #2

1. Outcome Measures

Number of participants who increased awareness about how every spending decision affects other spending opportunities.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #3

1. Outcome Measures

Number of participants who increased awareness about how the type of job they have affects how much money they will make.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual

2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #4

1. Outcome Measures

Number of participants who increased feeling of importance about getting more education or training after high school.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #5

1. Outcome Measures

Number of participants who increased feeling of importance about waiting to have children until financially ready.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #6

1. Outcome Measures

Number of participants who increased feeling of importance about having a plan for spending that includes both needs and wants.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #7

1. Outcome Measures

Number of participants who indicated their likeliness to make changes relative to getting more education or training after high school.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #8

1. Outcome Measures

Number of participants who indicated their likeliness to make changes relative to learning how to make wise financial decisions.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual

2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

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

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 19

1. Name of the Planned Program

Why Trees Matter: Next STEP (Extension)

☐ Reporting on this Program

Reason for not reporting

This program (and all reported summaries, descriptions, situations, priorities, factors, results, outputs, outcomes and goals) has been rolled into the "Enhancing Agriculture and the Environment" program.
"Why Trees Matter: Next STEP (Extension)" is one of several 'signature programs' offered by Ohio State University Extension. Signature programs are updated or replaced with other signature programs periodically, as client need dictates. Due to their transient nature, we have decided to report all signature programs under one of 4 permanent 'impact areas': (1) Advancing Employment and Income Opportunities, (2) Enhancing Agriculture and the Environment, (3) Preparing Youth for Success, and (4) Strengthening Families and Communities.
"Why Trees Matter: Next STEP (Extension)" will now be reported under "Enhancing Agriculture and the Environment".

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	10.0	0.0	0.0	0.0
Actual Paid Professional	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
Actual Volunteer	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

V(D). Planned Program (Activity)

1. Brief description of the Activity

The Ohio Street Tree Evaluation Program (OSTEP), with 130 statewide research sites, aims to secure long-term data on how specific tree types look, last, and serve the environment.

The Community Tree Research Evaluation and Extension (TREE) Plot in the Ohio Agricultural Research and Development Center's Secrest Arboretum supports replicated plantings of key street-tree types, demonstration plots of trees' environmental benefits, and evaluation plots of new varieties.

The "Ohio Trees" Master Gardener Specialization Program trains volunteers for community street-tree projects.

2. Brief description of the target audience

Ohio citizens

Community Leaders/Officials

Master Volunteers

3. How was eXtension used?

{No Data Entered}

V(E). Planned Program (Outputs)

1. Standard output measures

2012	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: 2012

Actual: {No Data Entered}

Patents listed

{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	2	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of programs presented.

Year	Actual
2012	0

Output #2

Output Measure

- Number of volunteers participating in WTM educational programs.

Year	Actual
2012	0

Output #3

Output Measure

- Number of volunteer hours committed to WTM programs.

Year	Actual
2012	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of participants that appreciate the value of community forests.
2	Number of participants that have improved knowledge of tree identification.
3	Dollar value of energy savings to Ohioans documented from WTM studies in local communities.
4	Dollar value of storm water remediation savings documented from WTM studies in local communities.
5	Dollar value of air quality benefits documented from WTM studies in local communities.

Outcome #1

1. Outcome Measures

Number of participants that appreciate the value of community forests.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #2

1. Outcome Measures

Number of participants that have improved knowledge of tree identification.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #3

1. Outcome Measures

Dollar value of energy savings to Ohioans documented from WTM studies in local communities.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual

2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #4

1. Outcome Measures

Dollar value of storm water remediation savings documented from WTM studies in local communities.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #5

1. Outcome Measures

Dollar value of air quality benefits documented from WTM studies in local communities.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

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

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 20

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	45%		0%	
608	Community Resource Planning and Development	45%		0%	
801	Individual and Family Resource Management	10%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	15.0	0.0	0.0	0.0
Actual Paid Professional	8.0	0.0	0.0	0.0
Actual Volunteer	10.0	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**
463427	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
463427	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

2. Brief description of the target audience

- Community Leaders
- Economic development professionals
- Citizens (families and individuals)

3. How was eXtension used?

Answered appropriate questions through eXtension related to Business Retention & Expansion programming / content. Participants referred to eXtension as an additional source of information, especially the Financial Security for All Community of Practice / area.

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	28623	164200	3637	100050

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

Patent Applications Submitted

Year:	2012
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	8	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of volunteers who have participated

Year	Actual
2012	3468

Output #2

Output Measure

- # of volunteer hours

Year	Actual
2012	44877

Output #3

Output Measure

- number of formal BR&E training workshops

Year	Actual
2012	10

Output #4

Output Measure

- number of one-on-one BR&E consultations

Year	Actual
2012	150

Output #5

Output Measure

- number of formal BR&E presentations of findings to the community

Year	Actual
2012	5

Output #6

Output Measure

- number of web-based BR&E questionnaires collected

Year	Actual
2012	5

Output #7

Output Measure

- number of hard-copy BR&E questionnaires collected

Year	Actual
2012	35

Output #8

Output Measure

- number of program planning and implementation volunteers (BR&E)

Year	Actual
2012	27

Output #9

Output Measure

- number of program planning and implementation volunteer hours donated (BR&E)

Year	Actual
2012	189

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	# of participants who increased their financial literacy
2	# of participants who have developed an integrated plan for achieving financial security
3	# of participants who understand their roles in the development of a community economy;
4	# of participants using information to make community decisions
5	# of community plans developed and adopted
6	# of participants who reduced total debt
7	# of jobs created and retained
8	number of local leaders and 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)
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
10	number of jobs created (BR&E)
11	number of jobs retained (BR&E)

Outcome #1

1. Outcome Measures

of participants who increased their financial literacy

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	68

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The economic well-being and quality of life of families and communities is put at risk by many conditions. Extension programming seeks to overcome the following conditions: the loss of good-paying jobs with benefits, declining health along with inadequate health insurance coverage.

What has been done
Educators assisted families in improving both present and future economic well-being by helping them assess their financial circumstances, increase their financial management skills, and develop their decision-making abilities. The basic financial management skills courses involved determining and prioritizing goals, organizing financial records, tracking spending, establishing a spending plan, decreasing spending, improving bill paying and reducing debt, and beginning or increasing savings.

Results
Participating in Extension programs helped Ohioans make progress in their financial management skills and behavior.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #2

1. Outcome Measures

of participants who have developed an integrated plan for achieving financial security

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	102

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Financial security is the ability to meet future needs while keeping pace with day-to-day obligations. Preparing for retirement and potential long-term care costs takes planning, saving, and debt control. This programming immediately impacts individuals and families. Programming effects also ripple into larger societal issues, including welfare, health care costs, and senior care.

What has been done
The goals of the 'Financial Security' initiative are to help individuals accumulate adequate savings to meet long-term financial goals and obligations and to make adequate preparation for asset distribution. Workshops were conducted and individuals were assisted with developing plans for achieving financial security.

Results
102 individuals developed personal integrated plans for achieving financial security.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #3

1. Outcome Measures

# of participants who understand their roles in the development of a community economy;

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	23

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Increased economic growth is of critical importance, yet local communities lack an understanding of issues related to their economy. Interested community leaders, residents, and representatives of business and institutions can affect economic conditions when they are meaningfully engaged in local and/or regional economic development efforts.

What has been done
Workshops have been conducted to explain how community residents can play a role in understanding and developing their local and regional economy.

Results
More than 90% of program participants have actively engaged in conducting local applied research to better understand their economy and to inform strategies for its improvement.

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 #4

1. Outcome Measures

# of participants using information to make community decisions

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	12

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Increased economic growth is of critical importance, yet local communities lack an understanding of issues related to their economy and as a result, are unable to identify, implement, and evaluate strategies designed to improve it. Interested community leaders, residents, and representatives of business and institutions can affect economic conditions when they are meaningfully engaged in local and/or regional efforts designed to better understand the economy.

What has been done
Workshops and one-on-one meetings have been conducted to help community leaders understand how local applied research can be used in decision-making.

Results
Local leaders have infused local data into policy decisions.

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 #5

1. Outcome Measures

# of community plans developed and adopted

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	13

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Increased economic growth is of critical importance, yet local communities lack an understanding of issues related to their economy and as a result, are unable to identify, implement, and evaluate strategies designed to improve it. Interested community leaders, residents, and representatives of business and institutions can affect economic conditions when they are meaningfully engaged in local and/or regional efforts designed to better understand the economy and chart a course for sustainable growth.

What has been done
Community workshops have been conducted to demonstrate how to actively plan for economic success.

Results
Community and organizational leaders have realized formal plans to guide policy and action aimed at improving socioeconomic conditions.

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 participants who reduced total debt

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	580

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Ohio State University Extension is taking an active role in a nationwide partnership with the 'America Saves' program to "Build Wealth, Not Debt" that will financially impact individual Ohioans.

What has been done
Ohio Extension educators are forming broad-based community coalitions involving education, financial institutions, non-profit, government and private sectors to: (1) Motivate people to take financial action. (2)Promote increased saving through social marketing and (3)Provide access to products and education.

Results
580 individuals indicated they had reduced their total debt load.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #7

1. Outcome Measures

# of jobs created and retained

Not Reporting on this Outcome Measure

Outcome #8

1. Outcome Measures

number of local leaders and 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)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	75

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Local leaders and community residents desire to have a strong local economy. In order to learn about the community economics, 'Business Retention and Expansion' surveys are created to specifically engage local businesses to ascertain their strengths and weaknesses.

What has been done
'Business Retention and Expansion' surveys have been conducted throughout the state in numerous communities.

Results
Information from the surveys are incorporated into strategic opportunities to assist businesses with optimizing their potential.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	125

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Local leaders need to know their local business districts and what potential negative and positive issues are affecting them.

What has been done
'Business Retention and Expansion' surveys have been conducted throughout the state to meet the local communities' needs.

Results
Completed surveys help the local community leaders understand the needs of businesses and inform future decision making.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

Outcome #10

1. Outcome Measures

number of jobs created (BR&E)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	755

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Increased economic growth is of critical importance, yet local communities lack an understanding of issues related to their economy and as a result, are unable to identify, implement, and evaluate strategies designed to improve it. Interested community leaders, residents, and representatives of business and institutions can affect economic conditions when they are meaningfully engaged in local and/or regional efforts designed to better understand specific business concerns that, if addressed, can help businesses create new employment opportunities.

What has been done
Community leaders, residents, and businesses were engaged in formal dialogue and 'Business Retention & Expansion' survey methods to better understand how to create and retain employment opportunities and better understand local business concerns.

Results
Program participants learned ways to create and expand employment and income in their community, reporting the creation of 755 new jobs.

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
608	Community Resource Planning and Development

Outcome #11

1. Outcome Measures

number of jobs retained (BR&E)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	2000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Increased economic growth is of critical importance, yet local communities lack an understanding of issues related to their economy and as a result, are unable to identify, implement, and evaluate strategies designed to improve it. Interested community leaders, residents, and representatives of business and institutions can affect economic conditions when they are meaningfully engaged in local and/or regional efforts designed to better understand specific business concerns that, if addressed, can help businesses retain existing employment opportunities.

What has been done
Community leaders, residents, and businesses were engaged in formal dialogue and 'Business Retention & Expansion' survey methods to better understand how to create and retain employment opportunities and better understand local business concerns.

Results
Program participants learned ways to create and expand employment and income in their community, reporting the retention of approximately 2000 existing jobs.

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
608	Community Resource Planning and Development

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

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The following evaluation studies will be implemented to assess programming efforts for "Advancing Employment and Income Opportunities":

- Retrospective (post program)
- Before-After (before and after program)
- Case studies
- Comparison between locales where the program operates and sites without program intervention (use of a control group)

Under the larger planned program of "Advancing Employment and Income Opportunities", OSU Extension offers a specific signature program, "Business Retention and Expansion." The following are results documented from "Business Retention and Expansion" programming efforts. Local leaders gained a greater appreciation of their community economics and what it takes to add jobs to the local economy. These results were documented with the use of both retrospective and before-after evaluations. These evaluations showed that 'Business Retention and Expansion' participants learned additional ways to evaluate and interpret data that will inform their decision making. Documented job creation / retention shows that decision making skills learned in 'Business Retention and Expansion' programming has helped positively inform the communities where programming occurred.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 21

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
112	Watershed Protection and Management	5%		0%	
123	Management and Sustainability of Forest Resources	5%		0%	
133	Pollution Prevention and Mitigation	5%		0%	
205	Plant Management Systems	15%		0%	
216	Integrated Pest Management Systems	10%		0%	
307	Animal Management Systems	5%		0%	
308	Improved Animal Products (Before Harvest)	5%		0%	
315	Animal Welfare/Well-Being and Protection	10%		0%	
402	Engineering Systems and Equipment	5%		0%	
601	Economics of Agricultural Production and Farm Management	15%		0%	
602	Business Management, Finance, and Taxation	10%		0%	
603	Market Economics	5%		0%	
721	Insects and Other Pests Affecting Humans	5%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	40.0	0.0	0.0	0.0
Actual Paid Professional	35.0	0.0	0.0	0.0
Actual Volunteer	16.0	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**
2027494	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
2027494	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

• Develop and deliver curriculum about "The Ohio New and Small Farm College", an eight-week introductory course covering topics including production practices and requirements, marketing alternatives, the economics of land-use choices, the assessment of personal and natural resources, the identification of sources and assistance, and individual potential productivity/profitability.
• Develop and conduct Small Farm Conference(s) and trade show(s) each year in at least one location in Ohio to potentially include 30-40 different seminars taught by Extension professionals and industry leaders focusing in the areas of: aquaculture, farm management, forages and pasture, livestock (exotic and traditional), natural resources, horticulture (fruits/vegetables), and organic production.
• Develop curriculum and teach tax education workshops for tax practitioners in partnership with the IRS and the Ohio Department of Taxation offers students Continuing Education credits.
• 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.
• Offer Pesticide Applicator Training - Private and Commercial
• Offer Transitioning Your Farm Business to the Next Generation workshops and Women in Agriculture seminars.
• Offer beginner and advanced trainings and workshops for Ohio Volunteer Master Gardneners and Ohio Volunteer Certified Naturalists.
• Conduct workshops, provide publications, and serve as a resource on bed bugs to business owners, community leaders and citizens of Ohio.

Under the 'Increasing Profitable Crop Yields' OSU Extension signature program:

• Increasing field crop yields through technology adoption;
• Producing high-value crops on small tracts of land;
• Growing alternative crops for bioenergy;
• Publication of the Crop Observation and Recommendation Network Newsletter;
• Crop Production Conference;
• Multiple Regional/Local Agronomy Meeting/Workshops;
• Website development and maintenance;
• Local/On-Farm Research;
• Field Days;

- Precision ag data management analysis and decision workshops;
- Develop educational programs and tools to improve the efficiency of nitrogen utilization to improve farm economics and reduce environmental impact.
- Develop a user friendly manure nutrient credit spreadsheet

2. Brief description of the target audience

The target audience for efforts under the "Enhancing Agriculture and the Environment" programs include:

- Ohio farm families
- Commercial green-industry companies
- Consumer horticulture advocates
- Commodity/farm advocacy groups
- Federal / state agricultural & environmental agencies
- State-wide consumer groups
- Volunteer groups
- Community leaders
- Business leaders
- Elected and appointed officials
- Non-government organizations
- New and small farmers
- Tax practitioners

The OSU Extension signature program, "Increasing Profitable Crop Yields" also targets the following audiences:

- Grain producers
- Fertilizer chemical retailers
- Input company representatives
- Crop advisory, agency soil and water conservation districts
- Natural Resources Conservation Service
- Ohio Department of Agriculture
- Environmental Protection Agency

The OSU Extension "Ohio Volunteer Master Gardener Program" targets the following audiences:

- Ohio citizens
- Community leaders and officials
- Master gardeners

The "Ohio Certified Volunteer Naturalist" program targets the following individuals:

- Ohio citizens
- Community leaders and officials
- Certified naturalists.

OSU Extension programming on the topic of bed bugs targets the following audiences:

- Business owners
- Community leaders
- Citizens of Ohio

3. How was eXtension used?

eXtension's "Ask an Expert" was used primarily to answer consumer horticulture questions, although a myriad of other agriculture-related questions have been answered via eXtension as well. We began the

development of an Animal Welfare Community of Practice and participated in the Forest Products Community of Practice.

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	119159	547942	5446	688

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

Patent Applications Submitted

Year: 2012

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	39	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
2012	5259

Output #2

Output Measure

- number of multi-state partnerships

Year	Actual
2012	269

Output #3

Output Measure

- Number of people completing the Transitioning Your Farm/Agricultural Business to the Next Generation Workshops

Year	Actual
2012	180

Output #4

Output Measure

- number of people attending 'Bed Bugs' educational talks and meetings

Year	Actual
2012	2600

Output #5

Output Measure

- number of people attending the 'New and Small Farm College'

Year	Actual
2012	65

Output #6

Output Measure

- number of people attending the 'Small Farm Conference and Trade Show'

Year	Actual
2012	158

Output #7

Output Measure

- number of producers completing direct and indirect education on 'Weed Control in Agronomic Crops'

Year	Actual
2012	5000

Output #8

Output Measure

- number of producers completing educational activities targeting proper nutrient utilization, crop response, and water quality concerns

Year	Actual
2012	5567

Output #9

Output Measure

- 'Crop Observation and Recommendation Network Newsletter' distribution (Increasing Crop Yields Above Trendline)

Year	Actual
2012	129150

Output #10

Output Measure

- number of participants attending regional / local agronomy meetings (Increasing Profitable Crop Yields Above Trendline)

Year	Actual
2012	3500

Output #11

Output Measure

- number of hits to website (Increasing Profitable Crop Yields Above Trendline)

Year	Actual
2012	360000

Output #12

Output Measure

- number of local / on-farm research project sites (Increasing Profitable Crop Yields Above Trendline)

Year	Actual
2012	27

Output #13

Output Measure

- number of participants in annual field days (Increasing Profitable Crop Yields Above Trendline)

Year	Actual
2012	655

Output #14

Output Measure

- number of 'Weed Control Guide' for Ohio and Indiana distributed (Increasing Profitable Crop Yields Above Trendline)

Year	Actual
2012	1758

Output #15

Output Measure

- number of 'Field Crop Insects of Ohio' media distributed (Increasing Profitable Crop Yields Above Trendline)

Year	Actual
2012	8

Output #16

Output Measure

- number of 'Corn, Soybean, Wheat, and Alfalfa Guides' distributed (Increasing Profitable Crop Yields Above Trendline)

Year	Actual
2012	621

Output #17

Output Measure

- number of 'Ohio Agronomy Guide' media distributed (Increasing Profitable Crop Yields Above Trendline)

Year	Actual
2012	168

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of producers that demonstrate an increase in biosecurity knowledge and skills.
2	Number of food animal producers that increase their knowledge of the how to mitigate animal biosecurity hazards and risks on their farm operations and agribusinesses.
3	Increased knowledge of current practices and emerging technology.
4	Number of youth food animal exhibitors at county fair youth livestock shows that implement animal ID or quality assurance programs.
5	Number of producers (or units represented) adopting energy efficient practices (energy conservation plans, more efficient equipment, etc.)
6	Increase profitability for the food animal sector of the Ohio agricultural industry.
7	Number of Schedule "F" tax forms filed by tax practitioners that participated in OSU Income Tax Schools.
8	Number of farms using transitioning planning.
9	number of meeting participants indicating they will implement new management practices (Increasing Profitable Crop Yields Above Trendline)
10	Number of crop production acres that will implement best management practices for nutrient management (Increasing Profitable Crop Yields Above Trendline)
11	number of crop production acres that implement weed resistant management strategies (Increasing Profitable Crop Yields Above Trendline)
12	number of crop production acres where appropriate utilization of integrated pest management practices occur (Increasing Crop Yields Above Trendline)
13	number of individuals taught about disease identification, control, and scouting or key weed control concepts
14	number of farmers reporting positive changes in management and / or profitability of their farm from use of the disease identification, control and scouting or key weed control concepts (Increasing Crop Yield Above Trendline)
15	number of farmers reporting positive changes in management and / or profitability of their farm as a result of use of information from farm financial analysis (Increasing Crop Yields Above Trendline)
16	reported economic impact of cost savings, increased yield or other increased profitability from use of CORN newsletter reported as total dollars (Increaing Crop Yields Above Trendline)

Outcome #1

1. Outcome Measures

Number of producers that demonstrate an increase in biosecurity knowledge and skills.

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Number of food animal producers that increase their knowledge of the how to mitigate animal biosecurity hazards and risks on their farm operations and agribusinesses.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	639

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Improper handling and transport of pigs is one of the largest profit reducing issues facing the pork industry today and is a farm-to-market and a farm-to-farm biosecurity issue. Disease and the containment of disease directly affect agricultural production and public health.

What has been done
Livestock Mortality Composting training sessions were conducted at multiple locations across the state; Transport Quality Assurance Certification Classes were held across the state; and a Swine Health Symposium was conducted.

Results
Livestock Mortality Composting training was conducted at multiple locations across the state, resulting in certification of 326 people. 10 Transport Quality Assurance Certification Classes were held; 183 people were certified in Transport Quality Assurance; and a Swine Health Symposium was conducted with 130 in attendance.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)
315	Animal Welfare/Well-Being and Protection
402	Engineering Systems and Equipment

Outcome #3

1. Outcome Measures

Increased knowledge of current practices and emerging technology.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Ohio's agriculture industry is valued at more than $200 million dollars, but increasing input costs can have a negative effect on agriculture. Learning about new and emerging technologies and practices in agriculture allow Ohio farmers and agricultural business owners the opportunity to implement them into their business and ultimately save money.

What has been done
The 2-day Conservation Tillage Conference (CTC) attracted 1000 farmers, consultants, agricultural dealers, and agency personnel from over 28 states.

Results
CTC is thoroughly evaluated annually for the impact on Ohio agronomic production & economic outcome. By attending the 2012 CTC: *Participants reported an economic impact of $12/acre on an average of 1,100 acres per farmer. *Crop consultants & agricultural dealers reported an economic impact of $15/acre on an average of 30,000 acres/consultant. *An average of 80% of "Corn University", 78% of "Soybean School", & 92% of "Cover Crop" session participants learned at least 1 new idea that will increase farm profitability. *65% of attendees expected to increase soybean yields by 1-2 bushels/acre/year, 15% expect a 3-5 bushel/acre/year increase, and 10% expected a 5+ bushel / acre / year increase in soybean yields. *34% of attendees expected to

increase their corn yields by 3 bushels/acre/year, 29% 1-2 bushels,& 17% 4 bushels/acre/year.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
133	Pollution Prevention and Mitigation
205	Plant Management Systems
216	Integrated Pest Management Systems
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)
315	Animal Welfare/Well-Being and Protection
402	Engineering Systems and Equipment
601	Economics of Agricultural Production and Farm Management

Outcome #4

1. Outcome Measures

Number of youth food animal exhibitors at county fair youth livestock shows that implement animal ID or quality assurance programs.

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Number of producers (or units represented) adopting energy efficient practices (energy conservation plans, more efficient equipment, etc.)

Not Reporting on this Outcome Measure

Outcome #6

1. Outcome Measures

Increase profitability for the food animal sector of the Ohio agricultural industry.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	32

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Detailed financial and production data is essential for dairy farmers to understand their cost of production, profitability, and competitive advantage.

What has been done
Detailed, on-farm financial records analysis and dairy/crop enterprise evaluations were completed for 32 farms.

Results
Farmers were able to compare average on-farm data with the top 20% of their peers in the cohort group. For example, average cost per cwt $21.69; top 20% for profitability had a lower cost of $18.98 cwt. Net farm income per cow was $317 on average, however the top 20% of farms averaged $1290 per cow.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
133	Pollution Prevention and Mitigation
205	Plant Management Systems
216	Integrated Pest Management Systems
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)
315	Animal Welfare/Well-Being and Protection
402	Engineering Systems and Equipment
601	Economics of Agricultural Production and Farm Management

Outcome #7

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

Year	Actual
2012	1046

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The OSU Income Tax School program has been providing education for Income Tax Preparers for 49 years.

What has been done
Taught prepatory classes to Registered Tax Return Preparers (RTRP); conducted eight 2-day OSU Income Tax Schools which provide Continuing Education to Enrolled Agents, Registered Tax Return Preparers, Attorneys, and Certified Financial Professionals; conducted an Agricultural Issues Workshop for Tax Professionals.

Results
1046 people attended Tax Schools, classes, and workshops in 2012. Attendees reported a 1.90 gain with respect to their perceived preparedness to take the RTRP exam (1.95 (s.d. = 0.76) to 3.85 (s.d. =0.67) on 5 point scale. 100% (n=141) of the attendees indicated the Ag Issues workshop improved their knowledge of agricultural tax issues.

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
603	Market Economics

Outcome #8

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

Year	Actual
2012	180

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
As farm and agricultural enterprise/business owners age, they need to develop a transfer plan and to increase family communication.

What has been done
Six "Transferring the Farm to the Next Generation" workshops were held throughout 2012 with a total of 180 participants. A six-month survey was conducted to discover whether or not the tools they learned during the workshop had been implemented.

Results
Families are beginning the process of transferring the farm to the next generation. 180 participants in the "Transferring the Farm to the Next Generation" workshops where they gained skills to develop a farm transfer plan and to increase family communication. The 6-month survey indicated the participants made great strides in putting into action the tools they learned during the workshops. 85.1% have had discussions with their family about business transition, 84.8% have improved their communication, and 76.6% have started an estate plan. In addition, 54.2% of the participants held an intergenerational family meeting, 35.4% reported meeting with their attorney, and 33.3% met with their accountant to develop a succession plan.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation
603	Market Economics

Outcome #9

1. Outcome Measures

number of meeting participants indicating they will implement new management practices (Increasing Profitable Crop Yields Above Trendline)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	17725

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Adaption of management techniques that will increase farm profitability is the ultimate outcome.

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 practice adoption.

Results
End of program surveys using paper instruments and audience response technology show 83% of producers and professional agronomists learned at least one new idea that will increase farm profitability.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation
205	Plant Management Systems
216	Integrated Pest Management Systems
721	Insects and Other Pests Affecting Humans

Outcome #10

1. Outcome Measures

Number of crop production acres that will implement best management practices for nutrient management (Increasing Profitable Crop Yields Above Trendline)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	750000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Excess or lost soil-applied plant nutrients can cause water quality impairment when they enter Ohio's streams, rivers and lakes. Municipal and recreational uses of Ohio's water can be affected by declining water quality.

What has been done
OSU Extension teaches landowners and farmers production practices to mitigate the potential losses of plant nutrients to Ohio's waters. Education occurs at workshops, summer field days, conferences, and one-on-one consultation.

Results
39% of workshop participants report they will continue their current farming practices because they match university recommendations, 39% will change 1 or more current farming practices, 27% will adopt a new idea/practice learned at the workshop, 15% will recommend changes of 1 or more farm practices to clientele/customers, 18% will recommend adopting a new idea/practice to clientele/customers

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation
205	Plant Management Systems

Outcome #11

1. Outcome Measures

number of crop production acres that implement weed resistant management strategies (Increasing Profitable Crop Yields Above Trendline)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	3200000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Weed resistance causes yield loss and loss of herbicide products, which require a shift in weed control systems. Implementation of multiple modes of herbicide action, tillage, seed bank reduction and other integrated weed management practices can reduce weed impacts and cost of controlling weeds to farmers, and consequently to consumers.

What has been done
Through research and educational programs, a discussion of re-introducing primarily glyphosate-based pre-emergent herbicides into soybean production systems has encouraged different modes of actions. Discussion about weed size has focused on application timing to target smaller weeds with adequate rates to achieve control.

Results
Greater than 80% of Ohio's licensed private pesticide applicators have increased the efficiency of their applications by better timing, pest identification and correct product choice to manage resistant weed populations.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
216	Integrated Pest Management Systems

Outcome #12

1. Outcome Measures

number of crop production acres where appropriate utilization of integrated pest management practices occur (Increasing Crop Yields Above Trendline)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	280000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Utilizing integrated pest management (IPM) practices has the intent of appropriate use of pesticides to protect cropland yields from insects, diseases, and weeds. This has environmental and economic benefits.

What has been done
The CORN newsletter is distributed to over 3500 subscribers weekly via e-mail. 63% of the articles in 2012 delivered IPM information and strategies to protect crop yields from damage and economic losses.

Results
In 2012, there was a 21% increase in the CORN newsletter subscriptions over 2011 subscription rates.

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems

Outcome #13

1. Outcome Measures

number of individuals taught about disease identification, control, and scouting or key weed control concepts

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	534

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Practical agronomic skills of pest identification, risk assessment knowledge, and control strategies are essential for servicing Ohio's cropland needs. This knowledge is of immediate benefit to farmers and Certified Crop Advisors (CCA), and of secondary benefit to farm product consumers (i.e., general public).

What has been done
Over 900 individuals attended the 2012 Conservation Tillage Conference which is a 2+ day educational event, with over 60 specialized speakers. Certified Crop Advisers (CCA) attend the conference to learn and earn continuing education credits for certification renewal.

Results
Conservation Tillage Conference attendees report their primary reason for attending is corn/soybean production knowledge (31%), or to earn CCA continuing education credits (31%). Overall, 88% of participants learned at least one thing that will improve their farm or business.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation
205	Plant Management Systems
216	Integrated Pest Management Systems

Outcome #14

1. Outcome Measures

number of farmers reporting positive changes in management and / or profitability of their farm from use of the disease identification, control and scouting or key weed control concepts (Increasing Crop Yield Above Trendline)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	534

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Farming and management practices change with developing production needs and environmental concerns. Farmers implement learned management strategies for profit and the protection of the natural resources of soil, water and air, which benefit everyone.

What has been done
Over 900 farmers, agronomists, and crop consultants attend the 2012 Conservation Tillage Conference. CTC is a 2+ day educational event, which provides participants with instruction on a broad selection of agronomic topics.

Results
2012 CTC participants reported:
*Crop consultants and Ag dealers reported an economic impact of $15/acre on an average of 30,000 acres per consultant by attending CTC.
*Farmers reported an economic impact of $12/acre on an average of 1,100 acres per farmer by attending CTC.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation
205	Plant Management Systems
216	Integrated Pest Management Systems
402	Engineering Systems and Equipment

601 Economics of Agricultural Production and Farm Management

Outcome #15

1. Outcome Measures

number of farmers reporting positive changes in management and / or profitability of their farm as a result of use of information from farm financial analysis (Increasing Crop Yields Above Trendline)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	100

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Dairy, livestock and grain farms support the local economy including schools, families, public services, and businesses.

What has been done
Hands-on computerized farm record keeping workshops taught over 50 farmers how to transition from a paper/pencil/ledger system to a computerized accounting system.

Whole farm financial analysis was conducted on 50 Ohio dairy farmers to measure 16 financial standards.

Results
94% of the participants provided survey results. As a result of the OSU Extension workshop to prepare a farm tax return or farm financial analysis:
71% plan to begin using farm financial analysis software
23% indicated they will continue using a computerized farm record keeping system

Following the workshops, 50 Ohio dairy farms benchmarked their farm financial performance against farm financial standards establish by the National Farm Financial Standards Council.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation

Outcome #16

1. Outcome Measures

reported economic impact of cost savings, increased yield or other increased profitability from use of CORN newsletter reported as total dollars (Increaing Crop Yields Above Trendline)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	2500

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Farmers, agronomists, and crop consultants seek access to timely and accurate information about crop land production. Information sought includes cost saving practices that increase yield while also increasing profitability.

What has been done
The CORN newsletter was delivered in 41 issues throughout 2012, mostly a weekly publication during the preseason, growing season, and postseason to nearly 3,500 subscribers.

Results
Ohio farmers reading the CORN newsletter have reported not treating fungicides and/or insecticides on over 53,000 acres after reading the research based recommendations from OSU State Specialists.

The calculated value to Ohio farmers, dealers, and CORN Newsletter readers, was over $21 Million dollars in a year. This value includes input savings and crop yield increases for corn and soybeans.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation
216	Integrated Pest Management Systems

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Competing Public priorities

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The Conservation Tillage Conference (CTC), being a large (900+ annual attendance) and well established meeting, was evaluated using over 800 audience response clickers.

After attending CTC, the following expectations about soybean **yields per acre per year** were shared:

- 65% of participants indicated they expected to increase their soybean yields by 1-2 bushels
- 15% expected 3-5 bushel increase
- 10% expected 5+ bushel increase
- 10% indicated no expected increase in soybean yields/acre/year.

After attending CTC, the following expectations about corn **yields per acre per year** were shared:

- 34% expected a 3 bushel increase
- 29% expected 1-2 bushel increase
- 17% expected a 4 bushel increase
- 11% expected a 5+ bushel increase
- 9 % expected no increase

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 22

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
806	Youth Development	100%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	55.0	0.0	0.0	0.0
Actual Paid Professional	81.8	0.0	0.0	0.0
Actual Volunteer	100.0	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
4735646	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
4735646	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

2. Brief description of the target audience

- Youth: infants through 18 years of age
- Parents of youth
- Volunteers working with youth audiences
- Teachers / educators working with youth audiences
- Youth (with a special focus on new and underserved audiences)
- Families
- Volunteers
- Youth Development Professional Staff
- Community Leaders involved in subject specific areas
- Youth (8 - 18 years), parents of youth, and volunteers working with youth; all associated with animal projects
- General public who have an interest in animals

3. How was eXtension used?

Limited use; there has been a Moodle course on the topic of Volunteer Education added by a small group of Ohio 4-H Educators, with some use by others; the major content of eXtension content matter is content-related, not organizational-related, which results in limited use by 4-H Professionals

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	265990	28030	291160	0

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

Patent Applications Submitted

Year:	2012
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	46	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
2012	74668

Output #2

Output Measure

- Number of youth enrolled/engaged in after school 4-H programs

Year	Actual
2012	2777

Output #3

Output Measure

- Number of youth enrolled/ engaged in military 4-H clubs

Year	Actual
2012	469

Output #4

Output Measure

- Number of youth participating in Special Interest and short term programs

Year	Actual
2012	81801

Output #5

Output Measure

- Number of youth participating in School Enrichment programs

Year	Actual
2012	61949

Output #6

Output Measure

- Number of youth participating in 4-H overnight camping programs

Year	Actual
2012	11272

Output #7

Output Measure

- Number of youth participating in 4-H day camping programs

Year	Actual
2012	3457

Output #8

Output Measure

- Number of adult volunteers

Year	Actual
2012	21837

Output #9

Output Measure

- Number of teen volunteers

Year	Actual
2012	7137

Output #10

Output Measure

- number of volunteers participating in the planning and implementation of this program (committee members, teachers / trainers, unpaid staff, etc.) (RMRW)

Year	Actual
2012	1641

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Increase understanding of decision making processes
2	Increase knowledge in educational topic being presented
3	Demonstrate decision making and problem solving skills
4	Practice improved basic life skills
5	Youth who have participated in 4-H programs possess transferrable workforce skills
6	number of youth who have indicated the intention to practice learned basic life skills
7	number of participants who increased awareness about what it costs to maintain a household (RMRW)
8	number of participants who increased awareness about how every spending decision affects other spending opportunities (RMRW)
9	number of participants who increased awareness about how the type of job they have affects how much money they will make (RMRW)
10	number of participants who increased feeling of importance about getting more education or training after high school (RMRW)
11	number of participants who increased feeling of importance about waiting to have children until financially ready (RMRW)
12	number of participants who increased feeling of importance about having a plan for spending that includes both wants and needs (RMRW)
13	number of participants who indicated their likeliness to make changes relative to getting more education or training after high school (RMRW)
14	number of participants who indicated their likeliness to make changes relative to learning how to make wise financial decisions (RMRW)

Outcome #1

1. Outcome Measures

Increase understanding of decision making processes

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	48100

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
The typical club member attends an average of 11 club meetings per year. In 2012, there were a reported 3695 clubs and 315 4-H affiliates, with a combined membership of 74,677 individuals. 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%)

Results
The following percentages (n = 48100) of 4-H members who answered "YES" when asked if they learned any decision making skills through their 4-H club experience indicates a high level of knowledge, attitude, and intended behavior changes. 90% indicated they would think about what might happen because of the decision; 90% generated ideas for possible solutions before making a decision; 89% indicated they would determine the best alternative and actually make the decision; 88% indicated they would implement that decision; 86% indicated they would gather background information that will help to make a decision; 85% said they would evaluate the outcome of the decision; 79% said they would make decisions without delaying too much (be timely).

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #2

1. Outcome Measures

Increase knowledge in educational topic being presented

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	60300

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Youth need to increase their knowledge of presented educational topics to become more productive citizens as adults.

What has been done
Youth participating in a variety of activities (including clubs, after-school programs, military clubs, special interest and short term programs, school enrichment programs, overnight camping, and day camping programs) were surveyed on their knowledge gains regardnig the educational topic presented at the event they attended.

Results
4-H members were asked to rate on a four point scale (where 1=NONE and 4=A LOT) the amount of project knowledge/ skills gained through 4- H events; the items with the highest ratings were "Exhibiting the product(s) of a 4-H project" and "Working on a 4-H project". The next highest rated items were: "4-H project books and written 4-H materials" and then "One-on-one visits with an adult 4-H volunteer". The lowest rated item was "Attending 4-H workshops/ clinics". However, all but the last 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

Demonstrate 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
2012	48100

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
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 in 4-H. One hundred ninety-one (191) volunteers and 336 youth collected and returned usable questionnaires.

Results
Over 90% of the 527 respondents stated that half or more of their members demonstrated decision making skills. 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 taught. The highest rated skill was "Generate ideas for possible solutions before making a decision" (96%) and the lowest was, "Implement the decision" (91%).

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #4

1. Outcome Measures

Practice improved basic life skills

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Youth who have participated in 4-H programs possess transferrable workforce skills

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	32100

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.

What has been done
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 in 4-H. One hundred ninety-one (191) volunteers and 336 youth returned usable questionnaires. These results will be reported for the respondents and extrapolated to the 2012 Ohio 4-H community club members.

Results
When asked in a survey, 92-99% of 4-H Club advisors reported that half or more of their members demonstrated transferable workforce skills. The highest ranked skill was, "Display positive attitudes" (99%); the lowest ranked skill was, "Demonstrate self motivation" (92%). Other skills members achieved and demonstrated were: "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 learned with others"

(98%); and "Are respectful" (98%)

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #6

1. Outcome Measures

number of youth who have indicated the intention to practice learned basic life skills

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	63700

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.

What has been done
To assess the impact of Ohio 4-H community clubs, a survey was completed in the fall of 2010. We are assuming similar impacts for the 2012 year. Another survey will be implemented this fall (with an intended survey cycle of every three years). 18 counties were randomly selected, and from each county, five 4-H clubs were randomly selected. All 4-H volunteers and members in these clubs received either a printed or web-based questionnaire. 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.

Results
4-H members were asked if they learned any Basic Life Skills through their 4-H club experience. The percentage who responded "YES" is indicated for each life skill below: 96% indicated they understand it is important to follow through on commitments they have made; 96% indicated that they feel they have control over their own personal goals/future; 95% indicated they intended to or believe they can work / play with people who are different from them; 94% said they would use their time wisely; 94% indicated they would take care of their personal belongings; 94% said they

will listen carefully to what others say; 93% said they will treat people who are different from them with respect; 93% said they have friendships with people who are different from them; 93% indicated that they realize that people lead in different ways; 89% said they will do what is right for themselves when with a group; 87% made a presentation.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #7

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
2012	11425

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
This program will be of use to parents and their children. Parents will benefit as their children will become more likely to understand the money issues parents face in real life.

What has been done
Students participated in a 'Real Money Real World' simulation and made decisions on what to purchase based on a salary received, thus simulating the real world.

Results
11425 school-age participants have a better understanding of the costs involved in running a household with children including taxes, retirement savings and medical insurance. In addition, they are more prepared to make better decisions regarding important purchases when getting out on their own.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #8

1. Outcome Measures

number of participants who increased awareness about how every spending decision affects other spending opportunities (RMRW)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	11516

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Parents, family members, friends--Learning to make choices when spending money affects all areas of life. If money is foolishly spent on impulse purchases, parents can reinforce the ideas that when you spend your money quickly, there isn't anything left for the necessary expenditures.

What has been done
Students participated in Real Money Real World simulation and made decisions on what to purchase based on a salary received, thus simulating the real world. In the simulation, if / when they ran out of money, they had to rethink choices or get another income.

Results
Students determined they needed to make a plan and spend towards the most important things first such as housing, utilities and transportation and leave the extras until the end. This helps them better understand needs vs wants.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #9

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)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	20342

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Teachers, employers, parents - if students are interested in making a good salary they will be more likely to stay in school, do well academically and get a better education thus leading to a better job in the future.

What has been done
Students participated in a 'Real Money Real World' simulation and made decisions on what to purchase based on a salary received, thus simulating the real world. Those who 'received' a less than desirable job, had to make many concessions to stay on track and not overspend.

Results
Students commented that there is a direct correlation between education and job thus resulting in better career and salary choices. Many comments included concepts like "stay in school", or getting good grades so one can go to college for a better job in the future.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #10

1. Outcome Measures

number of participants who increased feeling of importance about getting more education or training after high school (RMRW)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	9673

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Teachers, parents, employers -- if students stay in school and continue training after high school, the chances of better employment increase.

What has been done
Students participated in a 'Real Money Real World' simulation and made decisions on what to purchase based on a salary received, simulating the real world. If students did not have adequate training or education after high school, they were able to see first hand how this affected how much they could purchase on a limited salary.

Results
Students commented on the importance of getting good grades in school so they could get into a good college to study for a more lucrative career.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #11

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

Year	Actual
2012	10018

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Parents - this program also tends to discourage teenage pregnancy after students realize how much child care and other child related expenses are.

What has been done
Students were forced to purchase child care if they had children because the other parent was either going back to school or looking for employment. They couldn't depend on assistance from relatives.

Results
Students were most surprised by child care. They had no concept of costs involved or the extras it takes in raising a child. Students comments included concepts such as, "wait to have children until you have a job and can afford them."

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #12

1. Outcome Measures

number of participants who increased feeling of importance about having a plan for spending that includes both wants and needs (RMRW)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	10004

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Parents and teachers care about this outcome measure. Students are still egotistically minded at this age and this program helps them to think more of others and begin to develop some adult habits of selflessness.

What has been done
Students participated in a 'Real Money Real World' simulation and made decisions on what to purchase based on a salary received, simulating the real world. If students overspent on non-essentials, they were made to go back and re-do their plan to take care of needs before wants. In addition, sometimes their salaries didn't even cover all basic needs, so they had to have another job to get by.

Results
Students become less selfish and begin thinking of others especially taking care of a family and what their parents must go through when they buy things for family. Students say they will be less likely to ask their parents for so much "stuff" in the future.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #13

1. **Outcome Measures**

number of participants who indicated their likeliness to make changes relative to getting more education or training after high school (RMRW)

2. **Associated Institution Types**

- 1862 Extension

3a. **Outcome Type:**

Change in Action Outcome Measure

3b. **Quantitative Outcome**

Year	Actual
2012	9279

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

Issue (Who cares and Why)
Parents don't want to have to support their children forever and the 'Real Money Real World' experience helps students to see the value of education. Teachers benefit as students strive to do better in all classes for a better overall GPA.

What has been done
Students chose occupations out of a hat, some with post-secondary education requirements and some not. Those with more training and schooling had better salaries.

Results
Students were able to compare their salaries with those of their friends and could see the direct correlation on what kind of a job made better money.

4. **Associated Knowledge Areas**

KA Code	Knowledge Area
806	Youth Development

Outcome #14

1. **Outcome Measures**

number of participants who indicated their likeliness to make changes relative to learning how to make wise financial decisions (RMRW)

2. **Associated Institution Types**

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	10293

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Parents can talk and talk about making wise financial decisions but when their children are able to see for themselves the impact that decision making has, it is more likely these habits will continue and develop into adulthood.

What has been done
With the variety of choices students have in this simulation, they must make wise financial choices to come out with a checkbook in the black. Students were given a variety of spending choices, some positive and some negative, during the course of the 'Real Money Real World' simulation. The simulation helped students to see the impacts of their financial decisions, thus informing future behavior.

Results
As a result of the 'Real Money Real World' activities, students are more likely to think before making purchases and are less likely to ask parents for unnecessary expenditures.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Other (Personnel and management)

Brief Explanation

The two personnel and management situations which affected the reporting of 2011 Ohio 4-H statistics continued for 2012 data:

1. A new data person was hired to implement and manage the Ohio 4-H statistical reporting system

2. Implementing ACCESS 4-H as the Ohio 4-H enrollment computer program for 2012, a series of management and technical issues continued to be encountered by the ACCESS 4-H Team and our new data person.

We feel the data reported for all categories is conservative, but was data collected for 2012. Also, a new personnel and management situation has emerged: there were fifteen new 4-H Educators hired in Ohio during 2012, so many are inexperienced with the data collection and reporting processes. At the same time, there are less Extension Educators in other program areas, which demands more 4-H Educators resources in efforts other than reporting and data manipulation.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

A survey was completed in the fall of 2010 to assess the impact of Ohio 4-H community clubs. The 2010 survey results were extrapolated to 2012 programming efforts and assessments. A new survey will be conducted using ACCESS 4-H contact in the fall of 2013.

Eighteen counties were randomly selected, and from each county, five 4-H clubs were randomly selected. All 4-H volunteers and members in these clubs received either a printed or web-based questionnaire. 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 in 4-H. Usable questionnaires were returned from 191 volunteers and 336 youth. These results are reported for the respondents and extrapolated to Ohio 4-H community club members.

Of the Volunteers who responded:

- 19% were male and 81% were female;
- The average tenure as a 4-H Advisor is 11 years;
- A given 4-H club member averaged 11 club meetings per year.
- 90% or more of clubs met monthly March through July, 70%-89% met in February and August, 40%-50% met January, September and October, while less than 30% met November and December;
- Educational delivery methods employed by clubs included: work nights (31%), workshops / clinics (59%), Skillathon kits (54%), required demonstrations by members (81%), outside speakers (59)%, subject matter volunteer presenters (45%), field trips / tours (56%); and community service (91%).

Of the 4-H Members who responded:

- The average age of youth respondent =13.5 years old;
- The average years in a 4-H club = 4.9 years;
- 62% of the youth respondents held one of the seven possible 4-H club offices;
- 34% of respondents were male and 66% female.
- Almost 47% of the projects taken by respondents were in the Animal Sciences. A little over 30% of the projects taken were in Clothing and Textiles, Creative and Leisure Arts or Food and Nutrition. Almost 7% were in STEM and over 5% Natural Resources.

A new OSUE signature program, "Assuring Quality Care for Animals" was introduced in 2012. This program expands on the curriculum of the current "Youth Food Animal Quality Assurance" program to address food safety, animal handling, and animal

welfare. Animals are involved in 35% of Ohio 4-H projects, so teaching quality care is very important for the 4-H program. The new signature program has already demonstrated changes in participant behavior -- there has been a measurable change in the number of reduced drug residue violations. In the years prior to implementing the program curriculum in Ohio, there were approximately 15 - 20 violations per year in champion and reserve animals (all of which are tested as mandated by law in the state of Ohio). Violations were reduced to a single digit since the inception of this new signature program, and this is attributed to the educational gains as a result of participating in "Assuring Quality Care for Animals."

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 23

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
607	Consumer Economics	5%		0%	
703	Nutrition Education and Behavior	30%		0%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	5%		0%	
723	Hazards to Human Health and Safety	5%		0%	
724	Healthy Lifestyle	25%		0%	
801	Individual and Family Resource Management	20%		0%	
802	Human Development and Family Well-Being	10%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	20.0	0.0	0.0	0.0
Actual Paid Professional	23.1	0.0	0.0	0.0
Actual Volunteer	10.0	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**
1338146	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1338146	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 the intended audiences educated. School programming is age-appropriate, whereas programs at Senior Centers are targeted to individuals living alone or with one other person in terms of food preparation. The end result is a program that has the potential to encompass all residents. 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 may not have 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 used as a source for participant hand-out materials and a reference source that participants are encouraged to consult. As part of the 'Dining With Diabetes' signature program, participants were encouraged to use eXtension as an additional resource, particularly the Families, Food & Fitness Community of Practice. As part of the 'New Start for Financial Success' program, prticipants were encouraged to use eXtension as a source of free, additional on-line learning content, particularly the Personal Finance area.

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	77129	160000	25778	42500

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

Patent Applications Submitted

Year:	2012
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	2	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Educational sessions held with two or more participants

Year	Actual
2012	4771

Output #2

Output Measure

- number of volunteer hours given

Year	Actual
2012	2084

Output #3

Output Measure

- number of Dining with Diabetes classes taught

Year	Actual
2012	130

Output #4

Output Measure

- number of volunteers participating in the planning and implementation of this event (DWD)

Year	Actual
2012	85

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	# of participants who actually adopt one or more recommended practices as a result of this education program/session(s)
4	number of participants whose knowledge of diabetes management has increased (DWD)
5	number of participants who are able to count carbohydrates (DWD)
6	number of participants who are eating smaller portion sizes (DWD)
7	number of participants who have lowered blood sugar levels (DWD)

Outcome #1

1. Outcome Measures

of participants who increased knowledge on topic presented as a result of the education program/session(s)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	12041

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Individuals and families face a wide range of challenges in their daily lives. As determined through the use of statewide clientele surveys and focus groups, three key issues for residents of Ohio and the nation are economic stability, healthy lifestyles, and educational success. The nature of these complex key issues requires programming that is holistic and increasingly multidisciplinary. Improved knowledge is a key factor in bringing about behavior change.

What has been done
Ohio's team of FCS professionals delivered high quality, research-based educational programs focused on building Healthy People, Healthy Finances, and Healthy Relationships throughout the state. Using the full range of program delivery modalities (e.g., face-to-face, one-on-one, webinar, social media campaigns, websites, media, demonstrations, workshops, etc.), we taught people the knowledge and skills they need to keep healthy through good nutrition and food safety, to use their money wisely, and to balance the demands of life and work.

Results
The following results are from OSU Extension's "Successful Co-Parenting After Divorce" program (court-mandated attendance in many counties before the magistrate will grant a divorce/separation when minor children are involved). All results pertain to the number of respondents that indicated "Agreed" or "Strongly Agreed" on a 5 point scale. 91.7% of participants stated that they learned new information from this program. 94.7% intend to use the information they learned. 88.4% feel more prepared to co-parent as a result of attending, and 92.1% felt the program was helpful. Statistical analysis of the 11 learning outcomes provided very strong evidence that participants gained new knowledge and awareness in all topic areas. Participants reported knowing more about the topics as a result of attending the presentation than they did beforehand.

4. Associated Knowledge Areas

KA Code	Knowledge Area
607	Consumer Economics
703	Nutrition Education and Behavior
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
723	Hazards to Human Health and Safety
724	Healthy Lifestyle
801	Individual and Family Resource Management
802	Human Development and Family Well-Being

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)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	10208

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Individuals and families face a wide range of challenges in their daily lives. As determined through the use of statewide clientele surveys and focus groups, three key issues for residents of Ohio and the nation are economic stability, healthy lifestyles, and educational success. The nature of these complex key issues requires programming that is holistic and increasingly multidisciplinary. Intentions are the strongest predictors of behavior change, planning to adopt is a measure of intention.

What has been done
OSU Extension Family & Consumer Sciences provided a wide range of programs aimed at supporting and improving life across the full-range of Ohio's rural and urban communities. We helped Ohioans address issues from building stronger families, improving nutrition and food safety, enhancing health and wellness, and managing family budgets and financial resources.

Results

The following are results from one county's "Matter of Balance" fall prevention for the elderly program: 100% were 'somewhat' to 'very sure' that they could find a way to get up after falling; 100% were 'somewhat' to 'very sure' that they can find a way to reduce falls; 100% were 'somewhat' to 'very sure' that they can protect themselves if they fall;
100% were 'somewhat' to 'very sure' that they can increase physical strength; 100% 'somewhat' to 'very sure' that they can become more steady on their feet. The following results are from a parent education program (Early Childhood Step) conducted with Head Start Parents: All (100%) of the parenting session participants agreed that they plan to use the information presented. One particpant wrote, "I learned how to better communicate on my child's level, understanding that we're the same and have the same needs."

4. Associated Knowledge Areas

KA Code	Knowledge Area
607	Consumer Economics
703	Nutrition Education and Behavior
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
723	Hazards to Human Health and Safety
724	Healthy Lifestyle
801	Individual and Family Resource Management
802	Human Development and Family Well-Being

Outcome #3

1. Outcome Measures

# of participants who actually adopt one or more recommended practices as a result of this education program/session(s)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	4974

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Participants will apply practical information to their daily lives in order to make informed choices about family financial management, healthy lifestyles, nutrition, and family relationships resulting in reduced health care expenditures, financial security at all life stages, improved quality of life, and more resilient families and communities. Adopting new behavior(s) is one of the ultimate goals of Extension programming to achieve positive impacts in individuals, communities, and society.

What has been done

OSU Extension Family & Consumer Sciences (FCS) taught people how to apply research in their daily lives so they could make informed choices about everything from finances to healthy living to food safety. Our faculty and staff delivered relevant and engaging programs focused on meeting the local needs of the clientele in the communities we serve. Our program participants have internalized educational objectives and implemented new/improved practices in their daily lives.

Results

One example from a financial management program - A couple who participated in one county's Master Money Mentor (MMM) Program (FCS Extension professionals train community volunteers to serve as financial coaches) reported that as a result of MMM participation: "We're much more mindful of our spending than we ever have been. We went back to keeping all receipts and using a check register instead of relying only on online banking. It helps us prioritize better and not rely on credit as much as we did. So far we've reduced our debt by about $800, but we're on our way. We've even started to save regularly again, at least $100 per month." The MMM Volunteer who worked with this couple also shared: "At our first meeting they were considering selling their house. At our last meeting both were talking about saving, investing and retirement planning. I fully expect them to get their debts settled very quickly now!"

4. Associated Knowledge Areas

KA Code	Knowledge Area
607	Consumer Economics
703	Nutrition Education and Behavior
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
723	Hazards to Human Health and Safety
724	Healthy Lifestyle
801	Individual and Family Resource Management
802	Human Development and Family Well-Being

Outcome #4

1. Outcome Measures

number of participants whose knowledge of diabetes management has increased (DWD)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	3663

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Nearly 1 in 10 Ohioans has been diagnosed with diabetes which, if not managed properly, can increase the risk for serious health problems, from heart disease to eye and foot complications. Diabetes costs Ohio $5.9 billion annually in medical expenses, lost work, and early death.

What has been done
OSU Extension Family & Consumer Sciences county educators deliver the Dining with Diabetes signature program to teach clientele ways to manage diabetes through menu-planning, carbohydrate-counting, portion control, label-reading, and healthy recipe taste-testing.

Results
64% of 'Dining with Diabetes' participants indicated their knowledge of diabetes management increased.

4. Associated Knowledge Areas

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

Outcome #5

1. Outcome Measures

number of participants who are able to count carbohydrates (DWD)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	2164

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Foods that contain carbohydrates raise blood glucose levels. Because diabetes negatively impacts the body's ability to produce and/or use insulin, those with diabetes must be aware of the amount of carbohydrates in the foods they choose to consume.

What has been done
Dining with Diabetes participants are taught how to count carbohydrates as a meal planning technique so they can better manage their blood glucose levels and keep them in their target range.

Results
38% of 'Dining with Diabetes' participants knew the correct answers to at least 4 of the 5 carbohydrate serving questions at the end of the 3-lesson course series.

4. Associated Knowledge Areas

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

Outcome #6

1. Outcome Measures

number of participants who are eating smaller portion sizes (DWD)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	2840

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Diabetics who are overweight or obese have increased risks for a negative sequelae of co-morbid conditions and resultant complications. Eating smaller portion sizes is effective at not only helping to reduce excess adipose tissue, but also helps to better control blood glucose levels. Americans have greatly distorted perceptions of what a serving size is, and amounts that are needed to meet recommended daily intakes.

What has been done
'Dining with Diabetes' participants are taught portion sizes and strategies to better control portion size.

Results
49% of 'Dining with Diabetes' participants indicated that after 3 classes they are eating smaller portions.

4. Associated Knowledge Areas

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

Outcome #7

1. Outcome Measures

number of participants who have lowered blood sugar levels (DWD)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1871

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
High blood glucose causes nerve damage, kidney and eye problems, heart disease and stroke.

What has been done
'Dining with Diabetes' participants are taught ways to manage diabetes through menu-planning, carbohydrate-counting, portion control, label-reading, healthy recipe taste-testing, and increased physical activity.

Results
33% of 'Dining with Diabetes' participants indicated that after 3 classes they had lowered their blood glucose levels.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
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

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The following are planned evaluation methods for programming in 'Strengthening Families and Communities' :

- After only
- Retrospective
- Before-After
- During
- Case studies

Of those attending Extension educational sessions aimed at strengthening families and communities: 64% reported gaining knowledge; 54% reported intentions to adopt one or more recommended practices; and 26% reported they actually adopted one or more

recommended practices.

Within the larger planned program of 'Strengthening Families and Communities,' there are several other Extension programs that have evaluation results of note.

The OSU Extension program, 'Dining with Diabetes' recorded the following evaluation results for 2012 programming efforts. 38% of participants knew the correct answers to at least 4 of the 5 carbohydrate serving questions at the end of the 3-lesson course series. 64% indicated improved knowledge of diabetes managment. 49% reported eating smaller portions, and 33% reported lowering their blood glucose levels.

The OSU Extension program, 'Real Money, Real World' recorded the following evaluation results for 2012 programming efforts. Data showed that the program made a dramatic difference in raising youths' awareness about the costs to maintain a household, as well as an awareness of the interrelationships of education, job, and money. Youth indicated having an increased understanding of the importance of financial issues and a better understanding of what is involved in earning, spending, and managing money. Results also showed the curriculum was successful in providing motivation for intent to change behaviors.

Key Items of Evaluation

Of those attending Extension educational sessions aimed at strengthening families and communities: 64% reported gaining knowledge; 54% reported intentions to adopt one or more recommended practices; and 26% reported they actually adopted one or more recommended practices.

For those specifically attending 'Dining with Diabetes' programming: 64% of participants indicated improved knowledge of diabetes managment. 49% reported eating smaller portions and 33% reported lowering their blood glucose levels.

For those that specifically attended 'Real Money Real World' programming: participants in the program have increased their awareness in all aspects of financial decision making when making life long decisions such as home ownership, children and spending for essential and non-essential items. Students are determined to delay having children until they are more financially ready. Participants see the direct correlation between doing well in school, going to college or post secondary and getting a better job leading them to determine to stay in school longer.