2011 Ohio State University Combined Research and Extension Annual Report of Accomplishments and Results

Status: Accepted

Date Accepted: 06/25/2012

I. Report Overview

1. Executive Summary

If one had to select a 2011 report year byline to describe Ohio Agricultural Research and Development Center (OARDC) and Ohio State University Extension's (OSUE) strategic focus on fulfilling the land-grant mission and helping to meet the needs of the citizens of Ohio, and beyond, 'cultivating for the future would be fitting. Whether supporting Ohio's billion dollar soybean industry with releases of new cultivars or cultivating relations with our over 200 business and industry partners, OSUE and OARDC are engaged, and are delivering impacts that make a difference.

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), have advanced mission-oriented research and extension programming throughout 2011. 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. OSU Extension brings the knowledge of the university directly to its Ohio stakeholders and beyond. The organization advances the land-grant mission of The Ohio State University by interpreting knowledge and research developed by OSUE and OARDC faculty and staff, by other OSU faculty, and from other land-grant universities - so Ohioans can use the scientifically based information to better their lives, businesses, and communities. Development of human capital is central to fulfilling that mission.

OSU, as 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, is highly dependent on OARDC and OSUE for the central role they have in fulfilling the academic mission of this Center. Research and extension programs throughout the year have been highly focused on leveraging our inputs into AGBIOSCIENCE for economic development and job growth. Agbioscience continues as this institution's program moniker and 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. 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 plus billion agricultural industry.
Throughout 2011 OARDC and OSUE have continued to manage within a tight economy, 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 to expand the economy while ensuring the wise use of our social, environmental, and human capital.

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/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 - development - marketing nexus where we research new value-added products and services to expand

beyond the traditional food and fiber markets. We maintain a business team, ATECH, which is charged with finding new markets for our research output with the aim of value-added products. 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. In 2011, CFAES hired an Industrial Liaison Officer (ILO) to work collaboratively with other recently hired OSU ILOs for the purpose of further enhancing university - business/industry research collaborations.

Perhaps more so than ever OSUE and OARDC facilities and programs are critical as Ohio and the nation continue to face a severe economic downturn, pressures to become more energy independent, have need for more sustainable systems, and seek approaches to lessen our impact on our environment. All are important and imperative. 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 do address these issues, and strengthen the land-grant's role relative to these issues, OARDC and OSUE have positioned 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 in new and innovative ways to generate technology-based economic development, supported by strong human capital enhancement programs. For example, CFAES and the College of Arts and Sciences are partnering to create the Center for Applied Plant Sciences (CAPS). The development of new bioproducts and enhanced crop performance are among its priorities. The new Center facilitates the translation, or connection, between basic research and applications in areas such as photosynthesis and carbon fixation, biomass and bioproducts, crop production enhancement, and plant-microbe interactions. CAPS supports the work of interdisciplinary scientific teams with members from across the university.

In 2011, OARDC used the one-year anniversary of the Wooster tornado to bring stakeholders and elected leaders from throughout the state, as well as university leaders, faculty members, and staff to the Wooster campus to celebrate all that had been accomplished in the one year since the tornado. In addition to this recognition, OARDC used the occasion to engage all that were present, and advance the message statewide, that the greater OARDC research partnership was moving forward, and seeking new opportunities and new partners. Visitors to the celebration had the opportunity to attend the dedication of and tour the newly completed BL3 biosecurity lab. In addition to providing an opportunity to view this state-of-the-art facility, the event also served as a channel to better help stakeholders understand this facilityas a major advancement in OARDC's research capacity, as well helping them to understand the extraordinary health and safety aspects of such a facility. Throughout the year, OARDC and OSUE have used opportunities such as this event to garner stakeholder participation, feedback, and support.

OSU Extension and OARDC continue to focus on three signature areas in agbioscience, as defined in the College of Food, Agricultural and Environmental Sciences (CFAES) Strategic Plan (2008). These are (1) Food Security, Production and Human Health; (2) Advanced Bioenergy and Biobased Products; and (3) Environmental Quality and Sustainability. Embedded within these three signatures areas is critical support for addressing the five NIFA priority areas. Last year OARDC and OSUE provided major input into APLU/ESCOP Science Roadmap for Food and Agriculture and have continued throughout 2011 to build a strong alignment of our programs with the Roadmap. 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 GATE TO PLATE and CELL TO SELL. Exemplary, and in recognition of such collaboration, TEAM Northeast Ohio presented its Economic Development Plus Award in the Public/Private Partnership category to the city of Wooster (OH), the Wayne Economic Development Council, OARDC, and the BioHio Research Park for its work in making the Quasar Energy Group expansion project a reality. TEAM Northeast Ohio advances northeast Ohio's economy by attracting businesses worldwide to the 16-county

Cleveland Plus region. Since 2007 alone, the organization has attracted 34 new company expansions or relocations, 3,200 new jobs and $100 million in annual payroll to northeast Ohio, leading to a total annual regional payroll benefit of $260 million. The work of OARDC and OSUE has been instrumental in achieving these signature-area related successes.

CFAES grows it signature areas in other ways as well. In 2011, the U.S. Department of Agriculture, through NIFA, awarded Agricultural Technical Institute (ATI), CFAES' two-year technical school that adjoins the OARDC's Wooster campus, a two-year grant for $281,509 as part of the New Era Rural Technology Competitive Grants Program. The program's goal is to help technical schools and community colleges prepare the educated workforce needed for the expanding bioenergy industry. The grant brings together three partners: ATI, CFAES's Ohio Bioproducts Innovation Center (OBIC), and the Ohio Soybean Council Foundation. OBIC will manage the grant, while the Ohio Soybean Council Foundation will help promote the academic program that will be developed by ATI with USDA funds. ATI students are now working at the aforementioned Quasar Energy Group in the BioHio Research Park on OARDC's Wooster campus. Many of these ATI graduates continue their education by transferring to CFAES's Bachelor of Science program.

OARDC and OSUE work closely on all 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. This close collaboration 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 cropping issue 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 guest lecture about this research in CFAES academic courses, as well as help advise graduate students studying cropping issues.

Our efforts to extend knowledge are not limited to the more expected research and Extension settings. You may find one of our entomology faculty members, a member of a newly created (2011) CFAES Department of Entomology, arriving at a CFAES student learning/living center on the Columbus campus bearing his traveling "curiosity case" of pests for a show and tell. As students enjoy pizza, "Dr. Tick" blends humor and knowledge, keeping the tone light and informative as the scientist teacher enlightens those gathered for the next hour and a half. Myths about these usually unwelcome bugs are dispelled as research and expertise lead to practical tips and scientific understanding. 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, such as food safety. In 2011, an OARDC scientist and colleagues garnered two food safety grants totaling $2.3 million from the U.S. Department of Agriculture. The first grant, "Reducing the Transmission of AMR (antimicrobial-resistant) Organisms by Wildlife within the Food Supply -- A Research, Control and Outreach Strategy", is to determine the extent to which wildlife contribute to antimicrobial-resistant bacteria colonization in livestock, and how much that can spread to humans. Veterinary preventive medicine in the OSU College of Veterinary Medicine, and health sciences in the OSU College of Public Health as well as researchers from Colorado State University, the University of Guelph, the University of British Columbia, the U.S. Environmental Protection Agency, the Public Health Agency of Canada, and the National Wildlife Research Center in Fort Collins, Colorado are also involved. The other grant, part of a $5.4 million University of Maryland study on "Developing Scientifically Based Consensus Food Safety Metrics for Leafy Greens and Tomatoes" is from the USDA's Specialty Crop Research Initiative. These collaborations illustrate the highly integrative, multi - institution, multi/inter/trans - disciplinary work that is required to address complex research questions. OARDC and OSUE faculty and staff are encouraged and supported in their efforts to seek out such collaborative ventures.

These collaborative ventures are providing leadership and outputs/impacts that are relevant to multiple

sectors of our society and contribute to food, economic, environmental, and national security. In 2011 OARDC managed a $120 plus million portfolio of ongoing research projects. Programs such as biobased product research, spearheaded by the Ohio Byproducts 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 ongoing 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 Russian 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. All OARDC research findings are conveyed to stakeholders via strong outreach, engagement, and Extension programs led by OSUE. These Extension efforts are critical to moving from idea inception to product and service development, and commercialization thereof.

OARDC and OSUE programs are far ranging, very different, 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 Russian 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 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 for 2010, those lines of research have resulted in a significant portion of OSU Wooster campus' energy needs being met from biogas generated onsite. The business research partner, located in the BioHio Research Park on the OARDC Wooster campus, will now help fuel OARDC vehicles with biogas generated at the Park from food processing waste streams. 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 2011 the BioHio Research Park became fully institutionalized with formal agreements signed with OSU, a full Board of Directors appointed and in place, with a search under way for the Executive Director of the BioHio Research Park. Tenants continue to move into a newly remodeled building, and are partnering with our faculty and staff to advance new products and services. The 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.

To that end, in 2011,the Wayne Economic Development Council was awarded $275,000 in funding from TEAM Northeast Ohio and the Jobs Ohio Regional Office to carry out an agbioscience initiative over the next year that will help to accelerate the region's growth strategy. This initiative will build upon the $8.2 billion agbioscience industry in Northeast Ohio by accelerating the efforts of the Agbio Leadership Council of Northeast Ohio to establish a regional agbioscience industry cluster. Specific areas include Advanced Bioenergy and Biobased Products; Environmental Quality and Sustainability; and Food Security, Production, and Human Health. Strategies include hiring a portfolio manager to increase deal flow and business growth in the agricultural bioscience industry cluster. Funding also supports efforts to identify attraction targets in the agbioscience industry that are strong candidates for expansion / relocation to Northeast Ohio due to regional assets such as the BioHio Research Park.

Our faculty and staff are key to the research and Extension successes in this 2011 report. Many are

recognized for their stellar accomplishments. For example, Yebo Li, an OARDC biosystems engineer and OSUE specialist, has received Ohio State University's 2011 Early Career Innovator of the Year Award for his work on the development and commercialization of bio-based energy and industrial products. This award recognizes researchers who are working actively to promote commercialization of university intellectual property through invention disclosures filed, patents applied for / received, technologies licensed, or spin-off companies formed. Li's lab focuses on the creation of novel sources of bio-energy, biofuels, and bio-products from waste. One of those patented technologies is a bio-polyol made from crude glycerin (a byproduct of biodiesel production) and crop residue. This bio-polyol can be turned into "green" polyurethane foam for use in products such as automotive seats, headrests and bumpers, as well as sealants, thermal insulation systems for refrigerators, insulation boards, and packaging materials. Li's technology has been licensed to an Ohio start-up company, for commercial production. Li also works with the previously referenced Quasar Energy Group in the development of an innovative, patent-pending technology for an integrated anaerobic digestion system, or iADS, that can cost-effectively produce clean energy from both solid and liquid organic wastes through anaerobic digestion. He also collaborates with West Virginia laboratory in the optimization of an open-pond system for growing algae for a variety of biofuel and bio-product applications.

Both internal and external assessments, and continued support by federal, state, local government, stakeholders, and by private business and industry attests 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 the state in 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: (1) OARDC sponsored research grew by more than a 100% since 2004, and (2) Achieving a 64% growth rate in funding in the applied and commercially-oriented non-federal research funding category between 2004 and 2008. 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 research supports approximately 200 graduate students 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 50-plus 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 seminars, project reports, and symposia. OARDC research faculty members also participated in the national 2011 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.

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

private 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 2011, 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 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. It is these programs that will substantially contribute to reducing global hunger. For the most part 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 in 2011 in collaboration with both internal and external partners.

A primary goal of this institution is to advance research and 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 OSUE 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.

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 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, OSUE 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.

OSU Extension 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 2011 we have opened a major initiative in Tanzania and lead OSU in building a strong relationship with Iceland. Ohio Agricultural Research and Development Center and Ohio State University Extension have worked throughout this reporting year to accomplish the land-grant mission of The Ohio State University 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 and in kind 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: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	210.0	0.0	82.7	0.0
Actual	181.0	0.0	90.9	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

Merit and peer review have been a central component of OARDC and OSU Extension from inception. 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.

OARDC, OSU Extension, and the College of Food Agricultural, and Environmental Sciences are well into their strategic plan that was adopted tin 2008. The merit review process is critical to the full implementation of that strategic plan. Advisory committees and multiple internal and external stakeholder groups are now providing feedback that aids in plan implementation. Throughout 2011, these groups have been used for input on multiple matters including tornado mitigation, new dimensions for agbioscience

initiatives, annual reports and new hires. 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 are asked to provide feedback on both content and how the story is told. This input comes from multiple levels such as partner business groups, advisory committees, elected officials, and commodity groups.

All of OARDC and OSU Extension's published matter, ranging from traditional print to social media outlets, are compiled, prepared, and reviewed by teams with both technical expertise and communication expertise. Most of these will also have administrative review. Thus when stakeholders/partners are asked to review a draft document or just to make input on something that is to be formulated, they are provided with the best background available. Each of the OSU Extension program areas conducts long range strategic planning annually to prioritize programming.

OARDC utilized it's advisory committee, various other committees that focus on specific areas, and an extensive amount of one on one researcher to stakeholder interaction to identify needs, establish priorities, and engage in research and development programs that for the most part actually partner with a stakeholder group throughout the program. Given that all of OARDC and OSU Extension efforts are targeted to benefit some targeted group or groups, these individuals typically are engaged at the beginning of the process thus providing formative reviews. This holds true even in highly theoretical research in that multi- and interdisciplinary partners are needed 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 provide insight from research trends while county Extension personnel provide insight from local communities. Systematic prioritization processes, such as Delphi, are used. Program area personnel work together to identify key issues that cut across disciplines. Special task forces or teams then collaborate to identify priority program efforts to address these issues. Funding is then allocated to support program priorities. Programmatic resources such as personnel or materials reflect the program priorities. In addition, these priorities direct from what sources grant funds are sought. There is 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 OSU Extension works 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 insure resources are targeted to garner the greatest impacts where they are most needed.

OARDC centers and programs and their stakeholders participate in multiple sessions ranging from planning and setting research agendas, to formative and summative evaluation of research projects. The OARDC 2011 internal competitive grants program (SEEDS) 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 are used to help define research programs so that 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 who can help move the research through the full value chain and deliver needed goods and services to society. The goal is to advance the gate to plate or cell to sell approach in a timely manner.

All OARDC and OSU Extension 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 from needs to formative to summative have long have been part of the business culture of OSU Extension 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 loop from those stakeholders will be complete.

As OSU Extension 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. To that end the organization is committed to both informal and formal reviews at all levels of the organization.

III. Stakeholder Input

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

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

Brief explanation.

Stakeholder input is central to our organization's well being and has long been part of our corporate culture. OARDC and OSU Extension, as well as our College of Food, Agricultural and Environmental Sciences (CFAES) as a whole, have continued to have wide support and active participation from among our stakeholders in 2011. Each year, our networks continue to go. New stakeholders and partners are constantly being sought out and are seeking us out, especially as we enter new areas such as biobased product research and renewable energy from waste streams and other sustainable biomass sources. As individuals and groups see meaningful engagement opportunities where they can influence outcomes that will directly impact them, they are becoming more and more engaged. Our faculty and staff understand that each contact with a stakeholder is an opportunity for input as well as on opportunity for us to better understand needs and to communicate our messages. The key is meaningful engagement. Over time, both formally and informally, we use all of the methods noted above. OSU Extension and OARDC are constantly engaged at some level with stakeholders. One technique was to ask some of the newly appointed

government employees, some who 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.

While the 2010 tornado on the Wooster, Ohio campus was devastating, it continues to provide a reason for many people to visit that campus to take a closer look at the benefits of OARDC $120 plus million research portfolio and associated extension programs. The outpouring of volunteer support and broad financial support from citizens group and school children statewide, especially towards resorting the Secrest Arboretum, is a surrogate measure of our institution's stakeholder support. Out of these visits and contributions many have found a reasons stay engaged.

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 agbiosciences; and - encouraging researchers to commercialize their research through licensing and spin-off opportunities and ongoing collaborations.

OSU Extension is part of this research - for - impact process, working closely with research colleagues and listening to and helping business and industry partners better understand how to more effectively utilize and grow their human capital. During 2011, electronic messaging, social media, and blogging, as well as interactive group meeting/messaging systems have continue to expand rapidly. OARDC, OSU Extension, and most academic departments/schools within the College of Food, Agricultural and Environmental Sciences 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. More of these people 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 in that time and money are not available for the traditional face-to-face meetings of past years. It is the reduction in travel time commitment 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 engagements with a private business or industry on a project by project bases, or with a commodity or civic group. Stakeholders report that they appreciate this opportunity to make input. In addition to the series of OARDC and OSU Extension Battelle studies from 2004 through 2009 that drew extensively on stakeholders, each program area within OSU Extension conducted stakeholder based strategic plans to identify statewide priority programs. Those studies, in 2011 are still providing avenues for input. 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 will develop curriculum and evaluation strategies for statewide programs. In many cases, these teams have identified 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 OSU Extension and OARDC, maintain a strong commitment to making input into our programs, i.e. identifying needs, and participating in both formative and summative assessments. Throughout 2011, OSU Extension 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 2011 showed that growth, not only in numbers, but also in type of groups ranging from traditional agricultural production, to environmental, to food networks, to mothers of infants. Each of these is special, often having unique needs. While many seek us out, OARDC and OSU Extension make targeted efforts to find and link with representatives of all stakeholders. OARDC and OSU Extension have 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 as to others who need to be included. This rolling process continues to serve the organization well. This year informal needs assessments and targeted surveys, as well as an annual statewide telephone survey, have provided meaningful feedback. One on one sessions at our Farm Science Review, the state fair, local fairs, special events, and active participation by faculty and staff in community group processes and business/professional meetings have provided an opportunity to better link with constituents, 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 insure 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 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 insure 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 dat)

Brief explanation.

The methods noted above in 2(B)1 have all been are 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 that generate more qualitative data than quantitative. That data though, 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. OSU Extension and OARDC, per se, 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, as well as special interest groups also add to the list of stakeholders from whom we seek input in the initial planning and execution phases of our programs, 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 OSU Extension 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 once engaged our stakeholders find reason to stay 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 2011, both OARDC and OSU Extension 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 in that 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 OARDC personnel were active in the development of, as reported in 2010. That input is still relevant and useful. We recognize that state, federal, and extramural supporters must see constituency benefits in order to justify funding decisions. As we join with 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, all be it that need often is greater than our capacity to respond.

It is the field level interactions among stakeholders, researchers, and extension specialists that 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. Issues and needs 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, that provide our scientists with the study questions. Once answered, the response is framed for the clients, and in cooperation with these clients, as well as with other interested parties. The response includes intervention to effect change, deliver new goods, services, concepts to the suppliers, 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 in that

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

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

Brief Explanation of what you learned from your Stakeholders

OSU Extension and OARDC have had specific input strategies from stakeholders on the following topics that informed decisions made in 2011: relations with elected officials; personnel hires; Ohio Third Frontier funding; continued remediation of the Wooster campus tornado damage, new facilities planned for and built, e.g. new agricultural biosecurity laboratory on the Wooster campus, and formation of an extensive OSU team to assist our clientele in understanding and working with the new oil shale initiatives in Ohio. Input has also been provided on: retrofitting of existing facilities such as greenhouses; strategic planning; organizational changes; program expansion and program reduction including development of new centers and closing of some facilities; content and format of publications such as our annual reports; research grants and awards; program content and delivery strategies within OSU Extension; and membership, structure, and the role of advisory committees.

As we grow in our partnerships not only are we learning from stakeholders, the stakeholders have vested interest, and in many cases authority, to help set agendas, e.g. our BioHio initiatives. The primary information learned in these interactions over the years is that: - the stakeholder perspective is not always as we might assume, thus it is imperative that we communicate broadly and on a regular bases; - our science and services are highly valued, are making real impacts that have positive social, economic, ecological, and ethical impacts, both quantitatively and qualitatively, for individuals, families, groups, communities, and 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'; - OARDC and OSU Extension do not have the resources and personnel to meet all the demand, or take advantage of all the windows of opportunity, that present themselves; and - the breath of demand is so wide and the quantity so great, and the shift so dramatic, that the organization must be engaged in constant planning to garner and optimize resources, invest them in very targeted programs, and generate impacts in a timely manner, all the while clearly articulating to the full array of stakeholders what we have capacity and resources to do and not do. The institution - stakeholder interaction is providing OARDC and OSU Extension with better insights into stakeholder needs, willingness to participate and at what levels, and a willingness to pay. Stakeholders are better understanding institutional capacity to respond to needs,

funding models, institutional support (political, monetary, and client participation) needed, and the mission of the institution in the 21st century. 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
10696493	0	7486859	0

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	9744705	0	7233861	0
Actual Matching	9744705	0	10799591	0
Actual All Other	0	0	0	0
Total Actual Expended	19489410	0	18033452	0

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous				
Carryover	2681101	0	0	0

V. Planned Program Table of Content

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Climate Change

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
132	Weather and Climate	50%		25%	
133	Pollution Prevention and Mitigation	40%		65%	
605	Natural Resource and Environmental Economics	10%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	2.0	0.0	1.3	0.0
Actual Paid Professional	5.0	0.0	1.0	0.0
Actual Volunteer	144.0	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
269190	0	82453	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
269190	0	87518	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 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 needs warrant. 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 stakeholders, and with external stakeholders.

2. Brief description of the target audience

In the Climate Change Planned Program, targeted audiences include, but are not limited to: business and industry 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; other stakeholders; 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. 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

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	9166	23000	0	0

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	3	5	5

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of Graduate Students Completed

Year	Actual
2011	3

Output #2

Output Measure

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

Year	Actual
2011	3500

Output #3

Output Measure

- Number of workshops offered to producers and agri-business leaders

Year	Actual
2011	10

Output #4

Output Measure

- number of webinars / online educational or research sessions

Year	Actual
2011	10

Output #5

Output Measure

- number of volunteers that completed an invasive species training

Year	Actual
2011	1050

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	Create eco-engineering solutions within our program to reduce atmospheric pollution that can contribute to global climate change.
7	Capitalize on natural systems solutions within our program to reduce atmospheric pollution that can contribute to global climate change.
8	number of producers using no-till techniques
9	number of individuals demonstrating increased knowledge about toxic algae blooms

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
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The 9 million dairy cows in the U.S. provide healthy, nutritious food. But manure from livestock operations is the major source of anthropogenic atmospheric ammonia. Atmospheric ammonia is related to health issues and has numerous negative effects on the environment. A cow's unique four-chambered stomach allows for the digestion of high-fiber feedstock. That stomach though also produces methane gas, roughly 23 times more potent than carbon dioxide as a greenhouse gas. These emissions are the single largest component of the animal industry's carbon footprint.

What has been done
OSU/OARDC scientists have quantified how common diet modifications - including high digestibility rumen-undegradable protein (RUP) supplementation - affect milk production, N excretion, and ammonia production from manure of dairy cows. This integrated approach allows formulation of environmentally friendly and economically viable diets. Complementary extension programs have been developed to encourage adoption.

Results
Mathematical equations developed at OARDC can be incorporated into diet formulation software so that environmental impact (i.e., ammonia emissions) can be one of the response criteria. The

overall impact is that diets can be formulated to generate substantially less ammonia, as much as 25% reduction from worse case to best case, with no effect on milk production. Differences in diet costs from worse case (highest ammonia emissions) to best case are trivial which means that profitability would not be detrimentally affected if cows were fed for reduced manure ammonia. The dairy industry already has made great strides in reducing greenhouse gas emissions. Implementing strategies for greater reductions not only is good for the environment, but also can increase feed efficiency and herd productivity.

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.

Not Reporting on this Outcome Measure

Outcome #6

1. Outcome Measures

Create eco-engineering solutions within our program 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
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Animal feeding operations (AFO) emit gases and particulate matter (PM). The gases and PM emissions can negatively impact the environment and human and animal health locally, regionally, and globally. Some gases are odorous; some, including ammonia (NH3) and hydrogen sulfide (H2S), can be hazardous; others like carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O) are greenhouse gases. Some gases react with other chemicals in the atmosphere to produce fine particulates that contribute to respiratory distress, haze, and impaired visibility.

What has been done
OARDC and OSU Extension personnel conducted field-testing of full-scale wet scrubbers in 2011. Results show that the scrubber for a poultry composting facility study site has an efficiency of about 80% when the scrubbing liquid is recycled continuously for 1-2 week and the ammonium sulfate concentration increases to about 12% w/v. A scrubber in the swine pit facility has an efficiency range of 80 to 95% when the scrubbing liquid is recycled for about one month, i.e. the ammonium sulfate concentration is 12%.

Results
The study developed an optimized spray wet scrubber for recovery of ammonia emissions from animal manure storage facilities and production of nitrogen fertilizer. The wet scrubbers remove NH3 (80% efficiency) and enable producers to mitigate significant environmental impacts of ammonia emissions from AFOs while producing nitrogen fertilizer for crop production. Simulated recycling studies results show that scrubbers can be operated to concentrate scrubbing liquid of up to 30% ammonium sulfate, a fertilizer grade. The fertilizer generated by the process will enhance farm income or reduce the needs for purchasing expensive commercial nitrogen fertilizer. A companion extension publication, 'Wet Scrubbers for Mechanically Ventilated Animal Facilities', can be found at <http://www.extension.org/sites/default/files/Wetscrubbers%20FINAL.pdf>.

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

Capitalize on natural systems solutions within our program 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
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Wetlands have been long viewed as important in agriculture for sound ecosystem management, water retention, sinks for excess fertilizers, and water filtration. Long-term monitoring is now assessing the role of wetlands as carbon sinks.

What has been done
This OARDC study analyzed the variation of total soil carbon with depth in two temperate (Ohio) and three tropical (humid and dry) wetlands in Costa Rica and compares their total soil C pool to determine C accumulation in wetland soils.

Results
The two wetlands in Ohio have about ten times the mean total carbon concentration, as did adjacent upland soils. The temperate wetlands had significantly greater C pools than did the wetlands located in tropical climates in the top 24 cm of soil. Carbon profiles showed a rapid decrease of concentrations with soil depth in the tropical sites, whereas in the temperate wetlands they tended to increase with depth, up to a maximum at 18 - 24 cm, after which they started decreasing. Wetlands sequester large carbon pools and play important roles in global carbon cycles as natural carbon sinks. As agriculture lands play an ever-increasing role in carbon sequestration, wetland programs on agriculture lands will grow in importance.
To this end, OSU Extension advances wetlands creation and management programs throughout the state.

4. Associated Knowledge Areas

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

Outcome #8

1. Outcome Measures

number of producers using no-till techniques

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	5000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Change the awareness regarding no-till impact in regard to: 1. Soil quality, climate and carbon: Rethinking tillage in the 21st century. 2. Tillage and planting impact on carbon sequestration and soil quality. 3. No-till, strip-till and soil compaction. 4. Crop production as affected by tillage system, crop rotation, and soil type. 5. Crop rotation and diversity effects on soil quality. 6. Soil ecology and nutrient recycling in corn and soybeans with cover crops.

What has been done
Multiple meetings on no-till were conducted throughout 2011 and several break-out sessions were offered during the 2011 Conservation Tillage Conference that was attended by 900+ producers.

Results
Increased awareness on soil quality motivations; greater adaptation of sustainable practices to improve soil quality; increased farm income and diversity.

4. Associated Knowledge Areas

KA Code	Knowledge Area
132	Weather and Climate
605	Natural Resource and Environmental Economics

Outcome #9

1. Outcome Measures

number of individuals demonstrating increased knowledge about toxic algae blooms

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	3802

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Municipal water systems, farmers in the watershed, tourism industry, local businesses, waterfront homeowners can benefit from these trainings as they concern health issues and economic impacts.

What has been done
20 meetings/workshops held across the state on toxic algae blooms for local residents, farmers, business owners, government officials. Participated in the Governor's 3-agency task force on 'Nutrients in Water' and provided technical reports, fact sheets and follow-up consultations.

Results
70% of the farmers in the watershed around Grand Lake St. Mary's have submitted nutrient management plans with the Soil & Water Conservation District within this watershed. 1901 people received one-to-one consultation or assistance. 3802 individuals expressed changes in knowledge, skills or abilities. 20,000 acres were applied best management practices.

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
- Populations changes (immigration, new cultural groupings, etc.)
- Other (Social Acceptance of the issue; retirement of key state specialists and county educators due to retirement incentives and / or attrition.)

Brief Explanation

The above checked items are the primary external factors that affect this program. The political controversies around the program remain one of the greater barriers. Likewise, the economic input required to mitigate climate change is enormous, far exceding resources available. As funding becomes available to expand research and extension personnel numbers in this area, increased outcomes will be reported.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

OSU is not formally reporting evaluation data for 2011. Our Plan of Work for 2013 - 17 outlines the areas we propose to report in for that period.

Key Items of Evaluation

OSU is not formally reporting evaluation data for 2011. Our Plan of Work for 2013 - 17 outlines the areas we propose to report in for that period.

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Sustainable Energy

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	0%		90%	
608	Community Resource Planning and Development	100%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	5.5	0.0	2.0	0.0
Actual Paid Professional	1.0	0.0	3.6	0.0
Actual Volunteer	3.0	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
53838	0	291204	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
53838	0	234850	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 insure the research has the greatest chance of effecting change within society.

Throughout 2011, the Ohio Bioproducts Innovation Center (OBIC) has provided substantial leadership in this area by bringing together faculty and staff from OARDC and OSU Extension, from other OSU colleges, and from other Ohio universities, with business and industry partners. Additionally the BiOhio Research Park, discussed elsewhere in this report, has been instumental in advancing this program.

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 middle 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

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	460	1000	25	50

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	2	24	26

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of graduate students completed.

Year	Actual
2011	8

Output #2

Output Measure

- Educational Workshops and Seminars

Year	Actual
2011	8

Output #3

Output Measure

- Research based assessments of energy project sites

Year	Actual
2011	2

Output #4

Output Measure

- Community energy project assistance & planning

Year	Actual
2011	2

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.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Multiple bio-products are being developed to replace or supplement petroleum based products. Many of those products are from biomass grown or wild harvested specifically for making that product. Agricultural crops containing lignocellulos require advanced technology to be viable raw material for bio-products/energy. OARDC scientists are responding to the need for processes that utilize agricultural waste streams, or could use targeted agricultural crops, to generate a new value added bio-product.

What has been done
OSU/OARDC scientists working with a business partner and OSU Extension have successfully processed a waste stream (crude glycerin) from the biodiesel process and lignocellulosic biomass to produce a biopololy. Likewise they scaled up a liquefaction system to a 500-gallon/batch system for biopoloys. A continuous production system has also been developed. Characterization of the biopolyols in terms of hydroxyl number, acid number, viscosity, and composition were conducted. The produced biopolyols was also refined to meet the industry standards.

Results
The environmentally friendly liquefaction process produced biopolyols and polyurethane foams from the waste stream (crude glycerin) of the biodiesel process and lignocellulosic biomass. Compared to the petroleum and vegetable oil based polyurethane production technology, this technology is more cost effective. The technology was awarded a patent in 2011 and licensed to Polygreen Technology LLC for commercial production. This technology will increase the profit of biodiesel plant via increasing the value of its byproduct in that for every 10 gallons of biodiesel produced, one gallon of crude glycerin byproduct is generated. While the initial product to be generated is foam from specific source materials, the potential input streams of raw materials are numerous, and the product potential from this invention is immense.

4. Associated Knowledge Areas

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

Outcome #2

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Many industries are demanding more bio-based products to replace petroleum -based products. This demand will continue to grow as petroleum supplies are depleted and costs continue to rise. Additionally transportation costs for crude oil continues to grow. Bio-based products are critical to growing energy independence. Collaboration among land grant programs and business and industry are required to meet the demand.

What has been done
OSU/OARDC scientists and OSU Extension specialists are collaborating an Ohio company use plant-derived fibers to create a new generation of composite materials that consumers may soon find in their vehicles, houses, and many other products -- generating new jobs in Ohio. Agricultural-based fibers and bio-based materials are blended with plastic resins to create a very unique composite with very high-performance properties that compare with glass-reinforced materials.

Results
OARDC has engineered composites from jute, soy hulls, corn and wheat straw, and other plant-based sources instead of materials such as fiberglass. These natural fiber-reinforced composites are targeted for use in transportation, construction, packaging, and industrial products. Made from

two or more materials, composites are popular in many industrial and consumer products that need to be lightweight yet strong. These composites are a combination of plant fibers and plastic resins -- a formula that also brings together Ohio?s two largest industries, agriculture and polymers.

4. Associated Knowledge Areas

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

Outcome #3

1. Outcome Measures

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

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
In 2011 the ethanol industry faced continuing changes in terms of government subsidies, increasing worldwide demand for grain, pricing issues, and need to be competitive in a market with high volatility in crude oil pricing and lack of stability in global economics and global security. The future of the U.S. ethanol industry depends on its ability to increase yields, be competitive

with fossil fuels, and fill a growing need for energy independence. OARDC scientist, supported by parallel OSU Extension programming and human capital development, has maintained a program that assesses the needs of and informs this industry.

What has been done
Two main lines of OARDC research have had significant impact in the ethanol and associated industries. The first, reported in a prior year Report of Activities, has demonstrated how to increase the animal food value of dried distillers grains (DDG), a byproduct of ethanol production. The second addresses OARDC agricultural systems engineering to increase the efficiency of ethanol production by upwards of 3%. The technology is being installed in ethanol plants.

Results
OARDC scientists, collaborating with a Cleveland-based company and OSU Extension, have developed a technology called hydrodynamic controlled-flow cavitation that enables ethanol plants to produce more fuel from the same amount of corn. The impact can be significant in that the 3-percent yield boost can substantially increase revenue. And if the entire U.S. ethanol industry (11.2 billion gallons projected production in 2012) were to use cavitation, the revenue increase could be dramatic. This new technology, combined with OARDC impacts from DDG research, and combined with the multiple other ethanol related research impacts from agricultural experiment stations nationwide, are supporting industry goals. Likewise national goals related to energy independence and agriculture goals of expanded value added markets are being met.

4. Associated Knowledge Areas

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

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 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
There exists a need for technologies that increase the types of waste that can be converted into biogas for energy and fuel uses.

What has been done
OSU/OARDC scientists have developed a novel "integrated biogas conversion system " that adds a solid-state or "dry" bio-digester to an existing current liquid bio-digester. This allows for the production of additional biogas from a number of organic materials with high solids content, such as yard trimmings, crop residue, corn silage, and lignocellulosic food waste, all not suitable to existing anaerobic digestion systems alone. OSU Extension has addressed the education and human capital development aspects of this effort.

Results
That patent pending technology is now being integrated into a new Zanesville, Ohio bio-digester facility that will annually process approximately 30,000 tons of agricultural and food waste and can produce up to 7,800 megawatt-hours of electricity. The new technology has the potential to increase the amount of feedstock available for anaerobic digestion within a specific area, thus reducing transportation costs. It can also boost the amount of biogas generated at a bio-digester. The company installing the facility is located in the BiOhio Research Park on the OARDC Wooster Ohio campus where the pilot research was conducted.

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 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Nearly 90 million dry tons of livestock manure is available for methane biogas production in the USA per year. Anaerobic digestion of the livestock manure alone can produce 17 to 35 billion m3 of methane per year. However, 40-50% of the manure passes through digesters undigested due to recalcitrance of fibrous materials to microbial degradation. If the efficiency of anaerobic digestion can be increased by merely 10%, an additional 3.5-7.0 billion m3/year of methane can be produced from the 90 million dry tons of livestock manure available for biogas production.

What has been done
An OARDC study developed a temperature-phased anaerobic digestion (TPAD) process that can enhance biogas production from livestock manure. After the first TPAD operational experiments were completed in 2010, scientists conducted two additional studies to examine the effect of organic late rate (OLR), temperature, hydraulic retention time (HRT) on the biogas production, biogas composition, solid destruction, and residual volatile fatty acids present in the effluent.

Results
The TPAD process was designed to enhance degradation of fibrous materials in manure, biogas production, process stability, and pathogen inactivation. The TPAD process can increase biogas production by more than 10%. Therefore, this increase can potentially translate to at 3.5-billion m3 methane/year in the US livestock industry. OSU Extension is addressing the adoption and diffusion potential of this new technology.

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
2011	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
608	Community Resource Planning and Development

Outcome #9

1. Outcome Measures

Implement change in energy usage by workshop participants

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual

2011	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
511	New and Improved Non-Food Products and Processes
608	Community Resource Planning and Development

Outcome #10

1. Outcome Measures

Complete installation of alternative energy activity

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	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
511	New and Improved Non-Food Products and Processes

Outcome #11

1. Outcome Measures

Complete plan for community or business energy activity

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	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
608	Community Resource Planning and Development

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

The factors checked above are primary in affecting outcomes. Additionally as subsidies change for ethanol, and the cost of crude oil changes, new businesses may be reluctant to enter the market, making it more difficult for new faculty generated sustainable energy / bioproducts to be commercialized. As in all programs, as land grants have the opportunity to rebuild their faculty ranks, outcomes and impacts will increase.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

OSU is not formally reporting evaluation data for 2011. Our Plan of Work for 2013 - 17 outlines the areas we propose to report in for that period.

Key Items of Evaluation

OSU is not formally reporting evaluation data for 2011. Our Plan of Work for 2013 - 17 outlines the areas we propose to report in for that period.

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Childhood Obesity

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%		80%	
703	Nutrition Education and Behavior	60%		10%	
724	Healthy Lifestyle	30%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	20.0	0.0	0.6	0.0
Actual Paid Professional	11.0	0.0	1.1	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
592220	0	105338	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
592220	0	45820	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 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 advance programs that ensures 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 not limited to: specific individuals, families, and groups who have an expressed a need 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?

OARDC: eXtension was not used in this program

OSU Extension: Program participants referred to eXtension as a source of additional information and support.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	18685	37370	18090	49136

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	2	3	5

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of graduate students competed

Year	Actual
2011	1

Output #2

Output Measure

- number of educational sessions held

Year	Actual
2011	838

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 implement a regular physical activity routine. (OSUE)
7	Number of participants who plan to increase their level of daily physical activity. (OSUE)
8	Number of participants who plan to increase their consumption of fruits and vegetables. (OSUE)
9	Number of participants who plan to increase the number of family meals they eat together. (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.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Obesity is often linked with levels good cholesterol, blood sugar, insulin sensitivity, and inflammation, especially in obese postmenopausal women who have Type 2 diabetes, according to new research. Such condition is a growing health and economic concern nationally.

What has been done
OSU/OARDC scientists and OSU Extension specialists began exploring novel dietary approaches to this problem using doses of safflower oil. Safflower oil contains linoleic acid, which is polyunsaturated fatty acid (PUFA). Research dating back to the 1960s has suggested that dietary oils from plant sources can help prevent heart disease. PUFA impact was compared to conjugated linoleic acids (CLA) found mainly in meat and dairy products. Women in the study did not replace what was in their diet with safflower oil. They added it to what they were already doing. A daily dose of safflower oil in the diet is about one and two-thirds teaspoons.

Results
The researchers first discovered that safflower oil reduced abdominal fat and increased muscle tissue in this group of women after 16 weeks of daily supplementation. Safflower oil also lowered

fasting blood sugar levels by between 11 and 19 points. On average among all of the women tested, the study found: (1) An increase in insulin sensitivity of about 2.7 percent; (2) A significant .64 percent decrease in a blood protein that is a marker of long-term presence of excess glucose in the blood; and (3) A roughly 17.5% decrease in a protein in the blood that rises in the presence of inflammation. Existing research suggests that high levels of this protein increase the risk for a heart attack. The researchers concluded: ?What is needed in our diet is PUFAs to help with cardiovascular disease, the No. 1 killer of men and women in this country.?

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 #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.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Approximately 9% of US population has diabetes. Slowed starch digestion by use of tannins in the diet can modulate glucose "spiking" and depletion that occurs after ingestion of a carbohydrate-rich meal.

What has been done
Calorimetry was utilized to evaluate effectiveness of tannins inhibition of amylase and glucoamylase, starch degrading enzymes. Apple, grape, and berry juices are all high in tannins. Pomegranates contain an array of tannins, particularly hydrolyzable tannins. Berries, such as cranberries, strawberries and blueberries, contain both hydrolyzable and condensed tannins. The binding of the tannins to starch hydrolysis enzymes was evaluated using differential scanning

calorimeter (DSC) analysis and results correlated with changes in enzyme activity measured by starch hydrolysis assay.

Results
This research confirms that amylase activity can be inhibited by tannin derivatives naturally occurring in plant-based foods. Enzyme tests showed that pomegranate and cranberry had a similar inhibition effect on alpha-amylase (approximately 40%), and grape had a lower inhibition effect (approximately 20%). Such inhibition of starch hydrolysis with plant-based tannins is potentially a healthy way of controlling blood sugar through consumption of fruits. Fruits rich in tannins may provide nutraceutical treatment for type II diabetes and obesity. The findings of this research can be used for nutraceutical treatment for type II diabetes that affects 26 million children and adults in US.

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 #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

2011 19079

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 contribute to the obesity issue.

What has been done
A wide variety of 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 impact of this program is for individuals to change their eating habits and become more physically active.

Results
Participants increased their awareness, knowledge, skills, and improved their attitudes 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 implement a regular physical activity routine. (OSUE)

Not Reporting on this Outcome Measure

Outcome #7

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
2011	10122

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 contribute to the obesity issue.

What has been done
A wide variety of 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 impact of this program is for individuals to change their eating habits and become more physically active.

Results
Participants increased their awareness, knowledge, skills, and improved their attitudes 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 #8

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
2011	8686

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 contribute to the obesity issue.

What has been done
A wide variety of 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 impact of this program is for individuals to change their eating habits and become more physically active.

Results
Participants increased their awareness, knowledge, skills, and improved their attitudes 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 #9

1. Outcome Measures

Number of participants who plan to increase the number of family meals they eat together. (OSUE)

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 (Support in schools for programs)

Brief Explanation

Childhood obesity is one of the most complex social and health issues in land grant research and extension portfolios. While our program has the capacity to address some factors relating to childhood and adult obesity, a highly organized unified effort at the national level that is well supported politically, socially, and economically, will be required to make a substantial impact. Many of the barriers noted above influnce the implementation of such effort.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

OARDC: not formally reporting evaluation data for 2011. Our Plan of Work for 2013 - 17 outlines the areas we propose to report in for that period.

OSU Extension: Participants gained knowledge in variety of foods and their benefits, the need for balance of all the food groups, what were appropriate portions and the amount of physical activity needed daily. These skills will assist them in obtaining a balanced diet and engaging in daily physical activity to achieve and maintain a healthy weight. This information was gathered via after-only (post-program), retrospective (post-program), before-after program, and case study evaluation methods.

Key Items of Evaluation

OARDC: not formally reporting evaluation data for 2011. Our Plan of Work for 2013 - 17 outlines the areas we propose to report in for that period.

OSU Extension: In FY11, 97% of participants reported having learned "some" or "a lot" of new information, while 89% reported planning to make "some" or "a lot" of changes after coming to our programs.

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Food Safety

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%		10%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	10%		90%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	15.0	0.0	2.1	0.0
Actual Paid Professional	5.0	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
269191	0	139789	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
269191	0	195359	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 include 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 need warrants. Parallel 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); and general consumers (via formal or informal education).

3. How was eXtension used?

eXtension was not used in this program.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	10209	22245	7377	0

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

Patent Applications Submitted

Year: 2011

Actual: 7

Patents listed
ANTIOBIOTIC ANTIMICROBIAL AGENTS AND METHODS OF THEIR USE (patents for this were issued in seven countries)

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	11	34	39

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of Graduate Students Completed

Year	Actual
2011	9

Output #2

Output Measure

- Number of educational sessions held

Year	Actual
2011	379

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Contribute to the advancement of knowledge about food packaging technologies, e.g. ultrasonic sealing, controlled environment packaging, to the extent that, annually, the risk of contamination due to packaging is reduced measurably.
2	Expand the knowledge base for contamination detection within packaged foods by developing or refining technologies such as magnetic resonance or infrared spectroscopy that will, within ten years, eliminate the problem.
3	Reduce food borne pathogens in the food supply chain.
4	Number of participants who learned new information from this program. (OSUE)
5	Number of participants who plan to adopt one or more recommended practices. (OSUE)
6	Number of participants who adopt one or more recommended practices. (OSUE)
7	Contribute to the knowledge of food safety practices and creation of new technologies in the area fresh foods.

Outcome #1

1. **Outcome Measures**

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

   Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

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

   Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

   Reduce food borne pathogens in the food supply chain.

   Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

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

   Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

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

   Not Reporting on this Outcome Measure

Outcome #6

1. Outcome Measures

Number of participants who 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
2011	6773

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 including ServSafe, home food preservation courses, 4-H projects, EFNEP & FNP. Extension staff and volunteers complete a Safe Food Handling class.

Results
There were 10,209 participants in all types of food safety education programs in 2011. 66% of those reported on end-of-program evaluations that they 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

Outcome #7

1. Outcome Measures

Contribute to the knowledge of food safety practices and creation of new technologies in the area fresh foods.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Fruits and vegetables are a major vehicle for transmission of foodborne enteric viruses since they are easily contaminated at pre- and post-harvest stages and they undergo little or no processing. However, commonly used sanitizers are relatively ineffective for removing human norovirus surrogates from fresh produce.

What has been done
OARDC scientists evaluated the effectiveness of surfactants on a human norovirus surrogate, murine norovirus 1 (MNV-1), from fresh produce. A panel of surfactants, including sodium dodecyl sulfate (SDS), Nonidet P-40 (NP-40), Triton X-100, and polysorbates, significantly enhanced the sanitization of viruses from fresh fruits and vegetables. While tap water alone and chlorine solution only reduced less than 1.2 logs of virus in all fresh produce, a surfactant solution was able to achieve 3 logs of virus reduction in strawberry, and approximately 2 logs of virus reduction in lettuce, cabbage, and raspberry. OARDC and OSU Extension continue a joint program to address fresh food safety.

Results
Almost 3 logs of virus reduction were observed in all the tested fresh produce after sanitization with a combination of 50 ppm of each surfactant and 200 ppm of chlorine solution. Taken together, these results demonstrate that the combination of a surfactant with a commonly used sanitizer enhanced the efficiency in removing viruses from fresh produce by approximately 100 times. Since SDS is an FDA approved food additive and polysorbates are FDA recognized GRAS (Generally Recognized As Safe) products, implementation of this novel sanitization strategy is a feasible approach to efficiently reduce the virus.

4. Associated Knowledge Areas

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

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

Food safety science is very robust yet the above mentioned external factors as well as the lack of research personnel and reserach dollars continue to hamper this program nationwide.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

OARDC is not formally reporting evaluation data for 2011. Our Plan of Work for 2013 - 17 outlines the areas we propose to report in for that period.

OSU Extension: 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

OARDC is not formally reporting evaluation data for 2011. Our Plan of Work for 2013 - 17 outlines the areas we propose to report in for that period.

OSU Extension: 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") ($p<0.001$).

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Global Food Security and Hunger

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	20%		19%	
502	New and Improved Food Products	15%		15%	
503	Quality Maintenance in Storing and Marketing Food Products	5%		10%	
607	Consumer Economics	10%		1%	
701	Nutrient Composition of Food	5%		10%	
702	Requirements and Function of Nutrients and Other Food Components	5%		15%	
703	Nutrition Education and Behavior	15%		5%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	10%		10%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	15%		15%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	2.0	0.0	8.9	0.0
Actual Paid Professional	21.0	0.0	9.8	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**
1130601	0	866243	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1130601	0	1076437	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 not only local food security but the far broader goal of global food security and hunger with programs on topics including but not limited to improved food processing methods education for small-scale food processors and farm markets; improved food handling methods education for small-scale food processors and farm markets; improved food storage safety education for farm markets as well as underserved and/or disadvantaged communities and/or individuals; nutrition education programs for underserved and/or disadvantaged communities and/or individuals; Expanded Food & Nutrition Education Program for underserved and/or disadvantaged communities and/or individuals; growing your own food/backyard gardening education to individuals that had expressed interest including, but not limited to underserved and/or disadvantaged communities and/or individuals; Ohio Plant Diagnostic Network to identify invasive plant species quickly and the recommended methods of control in order to protect the current (and future) crop; MarketMaker interactive mapping connecting farm markets and consumers locally and as an agritourism tool; protecting the food supply through on-farm producer-based group educational programs on controlling how food gets contaminated on the farm and how pathogens survive in the farm environment, on plants and within animals and the research-based, safe recommendations for the control of this issue.

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 i.e. producer-related organizations, food producers/growers, food processors, underserved and/or disadvantaged communities and/or individuals, consumers, farm markets, communities looking to increase tourism - specifically agri-tourism through farm markets (MarketMaker) or by setting up a community-sponsored farm market.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	8679	10000	8137	9000

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	5	33	38

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of graduate student completed

Year	Actual
2011	9

Output #2

Output Measure

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

Year	Actual
2011	16816

Output #3

Output Measure

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

Year	Actual

2011 27

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 within five years 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	The primary outcome measure of the EFNEP program is the number of adults & youth that changed behaviors necessary to achieve nutritionally sound diets.

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 within five years 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
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Timely information on performance of new and existing varieties of food crop production is critical to growers. OARDC and OSU Extension provide this through their annual field trials of multiple crops. Of the greater economic importance to the industry are field trail data from corn, soybean, and wheat. These grains make up a significant portion of exported foods, and contribute significantly to reducing world hunger.

What has been done
In 2011, 251 corn hybrids (32 commercial brands) were evaluated at ten sites across the state. Hybrid entries in the regional tests were planted in either an early or a full season maturity trial.  Two hundred and ten soybean varieties were evaluated in 2011 for yield, lodging, seed size, oil and protein content at six locations throughout Ohio. The Ohio Wheat Performance Trials were planted in the fall of 2010 in five major Ohio wheat growing regions. Tested were 89 soft wheat cultivars and breeding lines.

Results

For corn hybrids, the difference in yield was between the highest and lowest was 52 bu/A and 63 bu/A, respectively for the early and late maturing hybrid trials. A projected one-bushel increase in yield at current prices across Ohio's 3.22 million corn acres represents a gain of more than $19 million. The soybean studies were for productivity as well as phytophthora root rot resistance. Assuming a 5% yield increase, then the economic impact would be $125 million over 1.84 million soybean hectares in Ohio. Wheat trial selection is likely produce at least 5 bu/ac increase for the State of Ohio. This is an extra yield of 2.9 million bushels with a value of $17.4 million. In addition the growers will save money by planting resistant varieties that need less fungicides and the milling and baking industries see increased profits by purchasing grain with better quality. Overall, the food available to the world, as a result of field trials conducted nationally by land grant programs, is ever-increasing.

4. Associated Knowledge Areas

KA Code	Knowledge Area
502	New and Improved Food Products
503	Quality Maintenance in Storing and Marketing Food Products
703	Nutrition Education and Behavior

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
2011	1475

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Increasingly, across Ohio and the US, there is a growing demand by consumers for locally grown and fresh food products. Making the connection between consumers, local agricultural producers, wholesale markets, and restaurants find local foods from local agricultural producers, community gardens, and farm markets is needed. These are precisely the services that MarketMaker provides.

What has been done

MarketMaket is an interactive mapping system that located businesses and markets of agricultural products in Ohio, providing an important link between producers and consumers. The program is part of a national network of state websites connecting farmers with food retailers, grocery stores, processors, caterers, chefs, & other food supply chain contacts. It boasts one of the most extensive collections of searchable food industry-related data in the country categorized by buyers, sellers & location.

Results
1475 producers registered with MarketMaker as of the end of 2011. More than 7000 people have visited the Ohio MarketMaker site to locate farmers, farmers markets, food retailers, eating places, and agri-tainment.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
502	New and Improved Food Products
503	Quality Maintenance in Storing and Marketing Food Products
607	Consumer Economics
701	Nutrient Composition of Food
703	Nutrition Education and Behavior
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #14

1. Outcome Measures

Establishment of a number of local/regional food systems.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	25

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Increasingly, across Ohio and the US, there is a growing demand by consumers for locally grown and fresh food products. Additionally, there is a need for fresh fruits and vegetables by underserved and/or disadvantaged communities and/or individuals and an increasing need and desire by school systems to offer locally grown and fresh food products. Community governments and or associations increasingly express interest in hosting/sponsoring farmers markets in their communities as well.

What has been done
A "harvest local food guide for Delaware County" was updated & distributed in Delaware Co. A ?Bridging the Gap from Farm to School for Local Foods? was held with the goal being to connect schools to local foods. Educational programs on community gardens, farmers markets & produce auctions were conducted. Season Extension workshops were conducted @ 2011 2011 Fruit and Vegetable Growers Congress.

Results
Result of "Bridging the Gap from Farm to School for Local Foods" meeting - OSU Extension developed a list of local farmers who are interested in selling to local schools & encourage any farmer who would like to be included on this list to contact our offices; Ohio Wholesale Produce Auction Development - 8 produce auctions currently operate in Ohio with an estimated $10 million in annual sales; 100+ community gardens and 12+ farmers markets established across Ohio helping to promote a healthy, equitable, sustainable food system.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
502	New and Improved Food Products
607	Consumer Economics
703	Nutrition Education and Behavior
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

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

The primary outcome measure of the EFNEP program is the number of adults & youth that changed behaviors necessary to achieve nutritionally sound diets.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	22245

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Limited income families with young children and low income youth would benefit from education on food resource management, nutrition, food safety, food budgets to help improves the individual and/or total family diet and nutritional well-being.

What has been done
8-lesson classes were offered to low income adults with children on how to select more nutritional foods & gain skills in food preparation, and food safety. The EFNEP program reached numerous adults and children across Ohio through programs, displays, after-school programs, community fairs, etc.

Results
A total of 5,593 adults and 6377 youth were reached by our EFNEP program in FY 2011 in Ohio. 42% percent were African American, 47% were White, and 11% reported other or mixed race; 12% were Latino. With an average of 4 members in each participant?s family, EFNEP impacted 22,245 people with 83% improved in food resource management practices; 90% improved in nutrition practices; 64% of adults with improved food safety practices; & 34% of adults increasing their physical activity.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

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

In adddition to the items noted above, the cost of fuel for distributing food aid and the ablility to distribute food are major barriers for short term relief. Until long - term and adaquate funding are available to build agricultural capacity in countries that depend on food aid, global food security will continue to be a vexing problem. Likewise donor countries such as the US, and in particular our land grant universities, must rebuild our international capacity to help underdeveloped and developing countries become food secure.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

OARDC: not formally reporting evaluation data for 2011. Our Plan of Work for 2013 - 17 outlines the areas we propose to report in for that period.

OSUE: The EFNEP program participants in FY 2011: 42% percent were African American, 47% were White, and 11% reported other or mixed race; 12% were Latino. With an average of 4 members in each participant's family, EFNEP impacted 22,245 people with 83% improved in food resource management practices; 90% improved in nutrition practices; 64% of adults with improved food safety practices; & 34% of adults increasing their physical activity.

Key Items of Evaluation

OARDC: not formally reporting evaluation data for 2011. Our Plan of Work for 2013 - 17 outlines the areas we propose to report in for that period.

OSUE: Improved skills and practices among participants representing underserved and/or disadvantaged communities and/or individuals in food resource management, nutrition practices, food safety, physical activity.

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Soil, Air and Water (OARDC Led)

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
101	Appraisal of Soil Resources	0%		10%	
102	Soil, Plant, Water, Nutrient Relationships	0%		25%	
103	Management of Saline and Sodic Soils and Salinity	0%		5%	
111	Conservation and Efficient Use of Water	0%		15%	
112	Watershed Protection and Management	0%		10%	
131	Alternative Uses of Land	0%		10%	
132	Weather and Climate	0%		5%	
133	Pollution Prevention and Mitigation	0%		10%	
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: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	6.7	0.0
Actual Paid Professional	0.0	0.0	7.0	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	631841	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	594688	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 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: 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

2011	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: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	0	25	25

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of graduate students completed

Year	Actual
2011	2

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

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

Outcome #1

1. **Outcome Measures**

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

   Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

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

   Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

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

   Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

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

   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 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Soil byproducts and soil amendments have great potential to remediate contaminated soil. Such inexpensive in situ soil remediation will result in hundreds of millions of dollars of savings by not requiring expensive dig, haul, and soil replacement technology. One key barrier is regulators? acceptance of inexpensive remediation via of soil byproduct amendment to sites having human and ecological health risks.

What has been done
An inexpensive test, arsenic sequential extraction procedure (SEP) was developed at OARDC providing a means to remove the regulatory barrier for inexpensive remediation of contaminated soils using inexpensive widely available iron or aluminum oxide soil amendments.

Results
OARDC scientist report a soil chemical method that can be used to accurately assess human health risk from soils contaminated with historical use of arsenic (agricultural pesticides and mining). The arsenic sequential extraction procedure (SEP) measures arsenic in soil that can be a threat to humans if ingested. The SEP also measures arsenic that no longer poses any health risk. The results indicate that soil and soil amendments high in iron or aluminum oxides chemically immobilize the harmful forms of arsenic. The SEP can be used to evaluate the ability of these soils to detoxify historical arsenic contamination in soil.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
112	Watershed Protection and Management
131	Alternative Uses of Land
133	Pollution Prevention and Mitigation

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

In addition to the afore noted items, soil, air, and water research and extension programs at OSU, and nationwide, do not have the capacity in terms of personnel and resources to meet demand for both basic and applied reserach, and for statewide of extension services.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

OSU is not formally reporting evaluation data for 2011. Our Plan of Work for 2013 - 17 outlines the areas we propose to report in for that period.

Key Items of Evaluation

OSU is not formally reporting evaluation data for 2011. Our Plan of Work for 2013 - 17 outlines the areas we propose to report in for that period.

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Natural Resources and Environmental Systems (OARDC Led)

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
121	Management of Range Resources	0%		5%	
122	Management and Control of Forest and Range Fires	0%		5%	
123	Management and Sustainability of Forest Resources	0%		15%	
124	Urban Forestry	0%		10%	
125	Agroforestry	0%		10%	
134	Outdoor Recreation	0%		10%	
135	Aquatic and Terrestrial Wildlife	0%		35%	
136	Conservation of Biological Diversity	0%		10%	
	Total	0%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	2.7	0.0
Actual Paid Professional	0.0	0.0	3.1	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	236079	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	405424	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 greatly enhances program capacity and outputs/impacts. 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 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

2011	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: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	0	40	40

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of graduate students completed

Year	Actual
2011	5

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 forest systems 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 forest systems 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 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Our planet continues to become urbanized, and the majority of the human population now lives in urban areas. Although scientists agree that it is imperative to better understand how plant and animal communities respond to human activities related to urbanization, few studies have investigated the underlying mechanisms of landscape-scale responses to urban development. Rural-urban interface and ecosystem benefits to society are central to this investigation.

What has been done
Bird population dynamics provide one approach to understanding the impacts of urbanization. OSU/OARDC scientists? 11-year study has focused on population and community responses of birds to urban development. The study has monitor effects over time of urbanization on forest bird communities in urbanizing Midwestern landscapes. Bird communities at 28 riparian-forest sites in central Ohio along an urbanization gradient ranging from primarily agricultural matrices to urbanizing matrices have been monitored.

Results
Evaluating factors that guide avian community response to urbanization provides information regarding the amount and type of development that can occur near forest reserves. The amount of urban development surrounding riparian forests is the most important determinant of the bird community. Thus, the dominant management approach, maximizing forest width, is not sufficient. Communities should aim to establish low-development buffers around riparian forests. Such a strategy could complement current farmland preservation efforts, such as purchases of development rights and programs like the Farm and Ranch Lands Protection Program. This ultimately will require more complex conservation planning and land acquisition strategies involving a variety of partners concerned with the social and ecological values of riparian forests.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
124	Urban Forestry
125	Agroforestry
134	Outdoor Recreation

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.

Not Reporting on this Outcome Measure

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.

Not Reporting on this Outcome Measure

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.)
- Other (Invasive species)

Brief Explanation

In addition to the afore mentioned items, the variability and uncertainty associated with climate change is a significant external factor affecting this program. Nationwide funding in this area is a challange.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

OSU is not formally reporting evaluation data for 2011. Our Plan of Work for 2013 - 17 outlines the areas we propose to report in for that period.

Key Items of Evaluation

OSU is not formally reporting evaluation data for 2011. Our Plan of Work for 2013 - 17 outlines the areas we propose to report in for that period.

V(A). Planned Program (Summary)

Program # 8

1. Name of the Planned Program

Plants Systems (OARDC Led)

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		10%	
202	Plant Genetic Resources	0%		15%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		5%	
204	Plant Product Quality and Utility (Preharvest)	0%		20%	
205	Plant Management Systems	0%		10%	
206	Basic Plant Biology	0%		5%	
211	Insects, Mites, and Other Arthropods Affecting Plants	0%		5%	
212	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%		15%	
	Total	0%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	26.8	0.0
Actual Paid Professional	0.0	0.0	29.7	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	2281319	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	3623698	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 yeilds. On-farm research takes place as does national and international studies. 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 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

2011	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: 2011

Actual: 2

Patents listed

Cloning the Characterization of the Broad-Spectrum Resistance Gene Pi2 (effective resistance to the rice blast disease) Patent # 7,767,424

Bacteria and Yeasts for Reducing Fusarium Head Blight in Cereals and Selection Thereof Patent # 2323019

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	0	164	164

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of graduate students completed

Year	Actual
2011	28

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.

   Not Reporting on this Outcome Measure

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.

2. **Associated Institution Types**

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Over 50% of the world population depends on rice as a major food source. Rice blast devestates a portion of that crop each year. The Pi2/9 locus has been extensively used for effective resistance to the devastating rice blast disease caused by the fungus Magnaporthe oryza in rice breeding programs.

What has been done
OARDC scientists and colleagues first identified the Pi2 gene using a map-based cloning strategy. The Pi2 gene is a member of a gene cluster comprising nine gene members (named Nbs1-Pi2 to Nbs9-Pi2) and encodes a protein with a nucleotide-binding site and leucine-rich repeat (LRR) domain. Fine genetic mapping, molecular characterization of the Pi2 susceptible mutants, and complementation tests indicated that Nbs4-Pi2 is the Pi2 gene. The Piz-t gene, a Pi2 allele in the rice cultivar Toride 1, was isolated based on the Pi2 sequence information. This locus has been found to harbor at least 6 resistance genes [Pi9, Pi2, Piz-t, Piz, Pigm(t), and Pi40(t)]; this confer broad-spectrum resistance against different sets of M. oryzae isolates.

Results
OARDC scientists and their colleagues have successfully characterized three resistant genes (Pi9, Pi2, and Piz-t) using multi-faceted approaches. All the three genes encode proteins with a nucleotide-binding site (NBS) and leucine-rich repeat (LRR) domain and belong to a member of a gene cluster comprising of multiple gene members in each resistant cultivar.
The cloning of the three resistance genes and evolutionary analysis of the Pi2/9 locus provides insight into the understanding of the mechanism underlying the broad-spectrum resistance and its evolution. Patent number 7,767,424.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems

206	Basic Plant Biology
212	Pathogens and Nematodes Affecting Plants
216	Integrated Pest Management Systems

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.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Non-GMO, i.e. not a genetically modified organism, soybean is in high demand, especially for select international markets. Such exports benefit the agriculture community and contributes to local, state, and national economies. Developing non-GMO varieties that thrive in select regions is important.

What has been done
About 15 percent of Ohio?s 4.5 million acres of soybeans are non-GMO types, which are often grown for human food and bring a premium of $1? 2 per bushel. OARDC and OSU Extension scientists continue to research and develop new varieties and integrated pest, weed, and pathogen programs to protect this industry.

Results
Ohio grows more non-GMO soybean than any other state. The OARDC/OSU Extension soybean-breeding program?s latest new non-GMO variety, named Summit, specially suited to northern Ohio, yields 2.4 bushels more per acre than a similar predecessor. Based on an example yield of 48 bushels an acre, non-GMO soybeans can bring an extra $32?64 million every year to Ohio farmers and the state?s economy.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
206	Basic Plant Biology

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

Climate change, invasive species, and resistance of pest, pathogens, and weeds to control mechanisms, while providing fertile research ground, greatly hampers productivity and economic return.....all impacting other programs such as global food secutiry and human health. Collectively all of these, and the items noted above, limit goal attainment.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

OSU is not formally reporting evaluation data for 2011. Our Plan of Work for 2013 - 17 outlines the areas we propose to report in for that period.

Key Items of Evaluation

OSU is not formally reporting evaluation data for 2011. Our Plan of Work for 2013 - 17 outlines the areas we propose to report in for that period.

V(A). Planned Program (Summary)

Program # 9

1. Name of the Planned Program

Animals Systems (OARDC Led)

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

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

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	16.1	0.0
Actual Paid Professional	0.0	0.0	19.8	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	1293040	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	3429495	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. Laboratory, animal enclosures, farms, and multiple field sites/research stations are available throughout state to permit data gathering and to continue long - term experiments. Ohio on-farm research takes place as do national and international studies. Effective research requires a mixture of laboratory, animal enclosed, and on-farm research to maximize knowledge. Emerging threats now require more advanced facilities such as a biosecurity lab, particularly needed in the study infectious animal diseases. OARDC began construction of a BL3 biosecurity lab in 2010, dedicated it in 2011, and expects full operation in 2012, greatly expanding our animal research capabilities. 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

2011	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: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	0	83	83

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of graduate students completed.

Year	Actual
2011	14

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

Not Reporting on this Outcome Measure

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

Not Reporting on this Outcome Measure

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

Not Reporting on this Outcome Measure

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.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
303	Genetic Improvement of Animals
304	Animal Genome
305	Animal Physiological Processes
306	Environmental Stress in Animals

307	Animal Management Systems
308	Improved Animal Products (Before Harvest)
311	Animal Diseases

Outcome #8

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
306	Environmental Stress in Animals
307	Animal Management Systems
311	Animal Diseases

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

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Bovine mastitis is a serious condition affecting not only animals and the animal industry, but also consumers of dairy products. The possibility of bacteria developing resistance to antimicrobials poses a potential health risk to cows as well as humans, and concern has arisen that routine use of antimicrobial agents to treat bovine mastitis over the last 25 years has led to an emergence of E. coli strains resistant to antimicrobials.

What has been done
OSU/OARDC scientists carried out a careful review of E. coli isolated from bovine mastitis and the bacteria?s susceptibility to antimicrobials in an attempt to qualify antimicrobial resistance. They reviewed antimicrobial resistance of E. coli from a 25-year sample set maintained at OARDC. Isolates from mastitis samples submitted to the OARDC Mastitis Diagnostic Lab in the mid-1980s and those submitted in 2009 were compared for antimicrobial susceptibility of E. coli to commonly used therapeutic drugs.

Results
This study addressed antimicrobial resistance as a question rather than as a problem and led to an important conclusion for the dairy and medical communities. Although antimicrobial resistance is a legitimate concern, the evidence showed that antimicrobial drugs used in treatment of bovine mastitis over the past quarter century have not resulted in an emergence or progression of antimicrobial resistance among E. coli causing the disease.

4. Associated Knowledge Areas

KA Code	Knowledge Area
305	Animal Physiological Processes
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)
311	Animal Diseases

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

The economy, namely access to extramural and base funding, and limited resources for hiring new reseach faculty, have limited goal attainment in some areas. Also many of the animal science researchers are concontibuting to impacts in other programs, e.g. biomasss to energy, rather than the stated goal of this program, per se.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

OSU is not formally reporting evaluation data for 2011. Our Plan of Work for 2013 - 17 outlines the areas we propose to report in for that period.

Key Items of Evaluation

OSU is not formally reporting evaluation data for 2011. Our Plan of Work for 2013 - 17 outlines the areas we propose to report in for that period.

V(A). Planned Program (Summary)

Program # 10

1. Name of the Planned Program

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

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

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

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	3.2	0.0
Actual Paid Professional	0.0	0.0	4.1	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	262606	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	335730	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 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

2011	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: 2011

Actual: 1

Patents listed

Patent #7,967,979 Bi-phasic bioretention system (storm water management)

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	0	37	37

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- number of graduate students completed

Year	Actual
2011	9

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

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Efficiency and effectiveness of spray technologies are critical to multiple sectors of agriculture in terms of economics, environmental compliance, and employee health. The current equipment with variable rate functions for tree crops is limited to ultrasonic sensor based control systems that only detect tree occurrence to switch nozzles on or off and measure tree width with low accuracy. However, the size and foliage density of canopies can vary greatly with trees, even in the same orchard or nursery.

What has been done
An experimental variable-rate sprayer was developed with a plant recognition sensor control system and an air and liquid delivery system. Field experiments were conducted: 1) to further evaluate performance of prototype intelligent sprayer (IS) under field conditions by determining spray coverage and deposition inside target tree canopies; and spray losses through gaps between trees, on the ground, and in the air; and 2) to evaluate overall performance of the IS and its individual components for future improvements in its design.

Results
A sprayer equipped with sensors and electronics (Intelligent Sprayer) that can reduce pesticide consumption by turning the sprayer off when there is no target, i.e. by detecting the gaps between trees, and by applying the optimum level of spray mixture in accordance to the target tree (size, shape and foliage density) was designed and developed. This is the first sprayer of its type in the U.S. The Intelligent Sprayer reduced liquid volume by up to 66% compared to the conventional air blast sprayer. By automatically spraying the optimal amount of spray mixtures into tree canopies and stopping spraying beyond target areas, the Intelligent Sprayer can significantly reduce the amount and cost of pesticides for growers, reduce the risk of environmental pollution by pesticides, and provide safer and healthier working conditions for workers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
402	Engineering Systems and Equipment
404	Instrumentation and Control Systems
723	Hazards to Human Health and Safety

Outcome #5

1. Outcome Measures

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

Not Reporting on this Outcome Measure

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

Not Reporting on this Outcome Measure

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

Brief Explanation

In this program, the tornado of 2010 and the loss of the Wooster campus agricultural engineering building, has been the greatest extral factor affecting for this program.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

OSU is not formally reporting evaluation data for 2011. Our Plan of Work for 2013 - 17 outlines the areas we propose to report in for that period.

Key Items of Evaluation

OSU is not formally reporting evaluation data for 2011. Our Plan of Work for 2013 - 17 outlines the areas we propose to report in for that period.

V(A). Planned Program (Summary)

Program # 11

1. Name of the Planned Program

Agricultural, Environmental, and Development Economics (OARDC Led)

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%		15%	
604	Marketing and Distribution Practices	0%		5%	
605	Natural Resource and Environmental Economics	0%		10%	
606	International Trade and Development	0%		5%	
607	Consumer Economics	0%		5%	
608	Community Resource Planning and Development	0%		5%	
609	Economic Theory and Methods	0%		20%	
610	Domestic Policy Analysis	0%		10%	
611	Foreign Policy and Programs	0%		5%	
	Total	0%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	7.4	0.0
Actual Paid Professional	0.0	0.0	5.8	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	670695	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	385203	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 Development Economics 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 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

2011	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: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	0	27	27

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Report number of graduate students completed

Year	Actual
2011	19

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.

Not Reporting on this Outcome Measure

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 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

In 2011, the Centers for Disease Control and Prevention (CDC) issued new figures for the incidence of foodborne illness, estimating that about 48 million people in the United States suffer from foodborne illnesses each year, resulting in 128,000 hospitalizations, and 3,000 deaths. It is important to determine the true costs of food borne illness in the United States in both the economic and social costs, as well as important in helping leaders and the medical community

determine how best to allocated limited resources to mitigate impacts.

What has been done
Using the new methodological changes issued by the Centers for Disease Control and Prevention in how the incidence of foodborne illness is measured, OARDC economist devised a methodology for calculating the true annual costs of food borne illness in the U.S. The scientists found that both the CDC numbers and the new OARDC estimates of related costs are more accurate than in previous years.

Results
Using the new methodological changes by the Centers for Disease Control and Prevention in how the incidence of foodborne illness is measured, OARDC economist devised a methodology for calculating the true annual costs of food borne illness in the U.S. That costs is now 77.7 billion dollars per year. The scientists found that both the CDC numbers and the new OARDC estimates of related costs are more accurate than in previous years. The researchers arrived at the costs figure by including values for medical costs, productivity losses, mortality, and pain and suffering. Estimates include costs attributable to both acute illnesses and resulting conditions, such as hemolytic uremic syndrome and reactive arthritis. While the enhanced model offers the best estimate of true costs, it should be recognized that many regulatory economists continue to use a method that does not include pain and suffering losses.

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
603	Market Economics
604	Marketing and Distribution Practices
607	Consumer 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.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Conversion of or impacts to agricultural lands is a research and extension issue. Shale oil leases on agricultural lands have consequences for multiple sectors of agriculture. OARDC and OSU Extension economists sought to inform the decision making process. The economic value of shale oil in Ohio has became a major topic in 2011 with some individuals seeing windfall profits, others discouraged by low leasing fees in some areas, and state officials looking at the much needed potential tax revenues, as well as potential negative social and environmental impacts.

What has been done
Economists conducted an assessment of economic impacts, both positive and negative, of gas from shale strata in Ohio. Development of these resources is under way in Pennsylvania and West Virginia. This study assesses whether the economic benefits generated by shale energy production in Ohio justify incurring certain unavoidable environmental costs. At the same time OSU Extension is helping to provide leadership within the College of Food, Agricultural, and Environmental Sciences, and campus-wide, for the development and management of the OSU Subsurface Energy Resource Center.

Results

The risks and gains for landowners, rural communities, agriculture in general, and the state, are somewhat uncertain. The 2011 publication 'The Economic Value of Shale Natural Gas in Ohio' provides an assessment of expectations, as well as guidance for policy makers. The study projects 20,000 new jobs in Ohio, as opposed to the 100,000 put forth by some. The scientists report that while Ohio should not expect natural gas to be a big job creator, there are significant benefits to producing natural gas. The true benefits of natural gas need to be highlighted, while putting the costs into perspective. Plans are needed to make gains from the energy boom permanent. Innovative policies are needed to ensure that infrastructure is funded into the future. The study has analyzed the lack of decision - based knowledge in other oil shale regions and provides an unbiased assessment to aid in Ohio?s decision-making.

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
605	Natural Resource and Environmental Economics
607	Consumer Economics
608	Community Resource Planning and Development
610	Domestic Policy Analysis

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.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
In 2011, the Centers for Disease Control and Prevention (CDC) issued new figures for the incidence of foodborne illness, estimating that about 48 million people in the United States suffer from foodborne illnesses each year, resulting in 128,000 hospitalizations, and 3,000 deaths. Reductions in such illness will require changes in food industry practices, government regulations, and ultimately in who will pay.

What has been done
OSU/OARDC scientist completed a study on consumers? Willingness To Pay (WTP) for reduction in threats from foodborne pathogens. Data were obtained from a national survey to estimate consumer willingness to pay for reductions in the probability of buying products contaminated with pathogens and to estimate consumer WTP for vaccines designed to prevent illness from foodborne pathogens. Next they used estimates and secondary data on the U.S. beef market to project the possible impacts of such a vaccine on the participants.

Results

The researchers found that consumers do not take promised reductions of the probability of contaminated food at face value. Consumers' perceived changes in the probability of getting ill are substantially smaller than the promised reductions. Estimates of consumer WTP for various vaccines that could provide protection against foodborne illness were between $42 and $50 for a single-year oral vaccine that protects against foodborne illness caused by E. coli pathogens. Even if the vaccine were made available free, about 30% of respondents would choose not to become vaccinated. When combining the vaccine uptake model with a partial equilibrium model of the U.S. beef sector, and introduction of a voluntary consumer vaccine against E. coli, scientists reported that the vaccine's introduction stimulates demand for beef by removing the threat of illness for consumers who choose vaccination.

4. Associated Knowledge Areas

KA Code	Knowledge Area
603	Market Economics
604	Marketing and Distribution Practices
607	Consumer Economics
610	Domestic Policy Analysis

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 (Fluctuations in markets, intenational financial insecurity)

Brief Explanation

No items other than those noted above.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

OSU is not formally reporting evaluation data for 2011. Our Plan of Work for 2013 - 17 outlines the areas we propose to report in for that period.

Key Items of Evaluation

OSU is not formally reporting evaluation data for 2011. Our Plan of Work for 2013 - 17 outlines the areas we propose to report in for that period.

V(A). Planned Program (Summary)

Program # 12

1. Name of the Planned Program

Human Health (OARDC Led)

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	0%		5%	
721	Insects and Other Pests Affecting Humans	0%		20%	
722	Zoonotic Diseases and Parasites Affecting Humans	0%		50%	
723	Hazards to Human Health and Safety	0%		10%	
724	Healthy Lifestyle	0%		15%	
	Total	0%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	2.7	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	98476	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	101546	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

Research activities in 2011 sought to advance human health goals for societal well being and included 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 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

2011	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: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	0	37	37

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of graduate students completed

Year	Actual
2011	6

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

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 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
European starlings (Sturnus vulgaris) are an invasive species in the United States and are considered a nuisance pest to agriculture. There is an assumed potential for these birds to be reservoirs and/or vectors for the human pathogen Escherichia coli O157:H7.

What has been done
Under biosecurity confinement, starlings were challenged with various doses of E. coli O157:H7 to determine a minimum infectious dose, the magnitude and duration of pathogen shedding, and the potential of pathogen transmission among starlings and between starlings and cattle. Birds transiently excreted E. coli O157:H7 following low-dose inoculation. Cohabitating E. coli O157:H7-positive starlings with culture-negative birds or 12-week-old calves resulted in intra- and interspecies pathogen transmission within 24 hours.

Results
OARDC studies have conclusively demonstrated that European starlings play a role in the dissemination of E. coli O157 from one dairy farm to another. Control of these invasive pests on

farms may reduce the burden of food animal carriage of this important foodborne pathogen and subsequently improve food safety and human health. We have also identified live cattle as possible source of Campylobacter jejuni causing human illness and Clostridium difficile. Given the duration and magnitude of E. coli O157:H7 shedding by European starlings, European starlings should be considered a public health hazard. Measures aimed at controlling environmental contamination with starling excrement, on the farm and in public venues, may decrease food-producing animal and human exposure to this pathogen.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Rotaviruses are the leading cause of viral gastroenteritis in children and young animals including pigs. Current rotavirus vaccines are highly effective in developed countries, but they have reduced efficacy in developing countries (less than 50%). Vitamin A deficiency in children from developing countries is high (11% to 40%) and may result in reduced efficacy of rotavirus vaccines. The World Health Organization has recommended supplemental childhood vitamin A, but the impact of such vitamin A supplementation on rotavirus vaccines has not been investigated.

What has been done
OSU/OARDC scientists established a vitamin A deficient germfree piglet model to investigate the effects of vitamin A deficiency and supplementation on a human rotavirus vaccine and virus

challenge studies.

Results
The OSU/OARDC studies provide critical information about the effects of vitamin A and vitamin A deficiency in a neonatal germfree piglet model, closely resembling infants in gut physiology, anatomy, nutritional requirements, and immune responses. The scientists found that use of inexpensive vitamin A as an adjuvant with current rotavirus vaccines improves the efficacy of rotavirus vaccines in children with micronutrient deficiencies and improves the overall health of children in developing countries. This strategy may also be applicable to rotavirus vaccines for animals and to vaccines for other important mucosal infections.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
722	Zoonotic Diseases and Parasites Affecting Humans
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.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Human norovirus accounts for more than 90% of acute nonbacterial gastroenteritis. It is highly contagious, and only a few virus particles are thought to be sufficient to cause an infection. NIH classifies human norovirus as a category B priority biodefense pathogen. Human norovirus cannot grow in cell culture and lacks a small animal model for pathogenicity studies. Thus, there is no vaccine for this virus.

What has been done
A novel approach was developed by OSU/OARDC scientists to generate human norovirus virus-like particles, antibodies, and a vaccine against an organism that causes 90% of all food borne illness and for which there is no current vaccine. The scientists constructed a recombinant vesicular stomatitis virus (rVSV-VP1) expressing VP1, the major capsid protein of human norovirus. Expression of the capsid protein by VSV resulted in the formation of human norovirus virus-like particles (VLPs) that are morphologically and antigenically similar to native virions.

Results
A novel approach was developed by OSU/OARDC scientists to generate human norovirus virus-like particles, antibodies, and a vaccine against an organism that causes 90% of all food borne illness and for which there is no current vaccine. The scientists constructed a recombinant vesicular stomatitis virus (rVSV-VP1) expressing VP1, the major capsid protein of human norovirus. Expression of the capsid protein by VSV resulted in the formation of human norovirus virus-like particles (VLPs) that are morphologically and antigenically similar to native virions.

4. Associated Knowledge Areas

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

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
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Annually human rotavirus (HRV) diarrhea accounts for 660,000 deaths in children worldwide and ~$1 billion in health-related costs in the US. The high costs and unexplained low effectiveness of licensed oral HRV vaccines in infants in impoverished countries remain obstacles to their

universal adoption. Scientists do know that breast milk and the gut microflora play important roles in neonatal immune development, responses to oral vaccines, gut integrity, and resistance to infectious or inflammatory bowel diseases.

What has been done
OARDC scientists assessed the impact of sow colostrum/milk supplementation and probiotic bacterial colonization on resistance to HRV diarrhea as well as the effectiveness of HRV vaccines. Also assessed were mucosal transcriptome responses to Lactobacillus spp. to define the underlying mechanisms for their beneficial effects. Findings were that: 1) sow colostrum/milk feeding enhanced probiotic colonization; and 2) probiotic bacteria help maintain intestinal integrity and stimulate systemic and intestinal regulatory immune responses to HRV vaccines and/or the virulent HRV.

Results
Developing low cost measures to modulate neonatal immune responses by using probiotics/milk supplementation has important implications for public health. These discoveries will allow development of cost effective methods to maintain gut integrity and mediate rapid recovery from intestinal infections, including HRV diarrhea. Also their administration to pregnant mothers or to infants should have pronounced beneficial impacts on oral HRV vaccine effectiveness. A greater understanding of how these probiotic bacteria modulate innate and adaptive immune responses will permit their rational use as biotherapeutic agents and/or adjuvants. In particular, the process permits tailoring beneficial effects depending on the species of probiotic bacteria used.

4. Associated Knowledge Areas

KA Code	Knowledge Area
722	Zoonotic Diseases and Parasites Affecting Humans

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 (rapid spread of disease worldwide)

Brief Explanation

None others than those noted above.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

OSU is not formally reporting evaluation data for 2011. Our Plan of Work for 2013 - 17 outlines the areas we propose to report in for that period.

Key Items of Evaluation

OSU is not formally reporting evaluation data for 2011. Our Plan of Work for 2013 - 17 outlines the areas we propose to report in for that period.

V(A). Planned Program (Summary)

Program # 13

1. Name of the Planned Program

Human and Community Resource Development (OARDC Led)

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%		15%	
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%		5%	
805	Community Institutions, Health, and Social Services	0%		5%	
901	Program and Project Design, and Statistics	0%		10%	
902	Administration of Projects and Programs	0%		10%	
903	Communication, Education, and Information Delivery	0%		25%	
	Total	0%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	2.2	0.0
Actual Paid Professional	0.0	0.0	2.4	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	274778	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	283823	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 in 2011 are primarily applied research; no impact are reported yet like in all Planned Programs incremental gains have been made.

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

2011	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: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	0	13	13

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of gradaute students completed.

Year	Actual
2011	10

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.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management
802	Human Development and Family Well-Being
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services
901	Program and Project Design, and Statistics
902	Administration of Projects and Programs

903 Communication, Education, and Information Delivery

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

This group has limited number of research faculty thus their collective impacts are always limited. This line of research continues to be impacted, to a greater or lesser extent, by the items noted above.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

OSU is not formally reporting evaluation data for 2011. Our Plan of Work for 2013 - 17 outlines the areas we propose to report in for that period.

Key Items of Evaluation

OSU is not formally reporting evaluation data for 2011. Our Plan of Work for 2013 - 17 outlines the areas we propose to report in for that period.

V(A). Planned Program (Summary)

Program # 14

1. Name of the Planned Program

New Start for Financial Success (Extension)

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	100%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	16.0	0.0	0.0	0.0
Actual Paid Professional	0.0	0.0	0.0	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	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	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

This program is being reported under the 'Strengthening Families and Communities' planned program.

2. Brief description of the target audience

This program is being reported under the 'Strengthening Families and Communities' planned program.

3. How was eXtension used?

This program is being reported under the 'Strengthening Families and Communities' planned program.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	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: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of educational sessions

  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	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.

   Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

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

   Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

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

   Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

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

   Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

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

   Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

Outcome #7

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Other (This program is being reported under the 'Strengthening Families and Communities' planned program.)

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

This program is being reported under the 'Strengthening Families and Communities' planned program.

Key Items of Evaluation

This program is being reported under the 'Strengthening Families and Communities' planned program.

V(A). Planned Program (Summary)

Program # 15

1. Name of the Planned Program

Why Trees Matter: Next STEP (Extension)

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
104	Protect Soil from Harmful Effects of Natural Elements	5%		0%	
112	Watershed Protection and Management	20%		0%	
124	Urban Forestry	20%		0%	
141	Air Resource Protection and Management	20%		0%	
605	Natural Resource and Environmental Economics	15%		0%	
608	Community Resource Planning and Development	20%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	10.0	0.0	0.0	0.0
Actual Paid Professional	0.0	0.0	0.0	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	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	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

This program is being reported under the 'Enhancing Agriculture and the Environment' planned program.

2. Brief description of the target audience

This program is being reported under the 'Enhancing Agriculture and the Environment' planned program.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2011	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: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	2	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of programs presented.
  Not reporting on this Output for this Annual Report

Output #2

Output Measure

- Number of volunteers participating in WTM educational programs.
  Not reporting on this Output for this Annual Report

Output #3

Output Measure

- Number of volunteer hours committed to WTM programs.
  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	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.

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

Number of participants that have improved knowledge of tree identification.

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Other (This program is being reported under the 'Enhancing Agriculture and the Environment' planned program.)

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

This program is being reported under the 'Enhancing Agriculture and the Environment' planned program.

Key Items of Evaluation

This program is being reported under the 'Enhancing Agriculture and the Environment' planned program.

V(A). Planned Program (Summary)

Program # 16

1. Name of the Planned Program

Dining with Diabetes (Extension)

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	100%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	15.0	0.0	0.0	0.0
Actual Paid Professional	0.0	0.0	0.0	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	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	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

This program is now being reported under the 'Strengthening Families and Communities' planned program.

2. Brief description of the target audience

This program is now being reported under the 'Strengthening Families and Communities' planned program.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2011	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: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of classes
  Not reporting on this Output for this Annual Report

Output #2

Output Measure

- Total number of volunteers participating in the planning and implementation of this program (e.g., committee members, teachers/trainers, unpaid staff, etc.)
  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	Number of participants whose knowledge of diabetes management has increased.
2	Number of participants who understand the plate method.
3	Number of participants who are able to count carbohydrates.
4	Number of participants who are eating smaller portion sizes.
5	Number of participants who are practicing food safety techniques learned in class.
6	Number of participants who have lowered blood sugar levels.

Outcome #1

1. **Outcome Measures**

Number of participants whose knowledge of diabetes management has increased.

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

Number of participants who understand the plate method.

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

Number of participants who are able to count carbohydrates.

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

Number of participants who are eating smaller portion sizes.

Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

Number of participants who are practicing food safety techniques learned in class.

Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

Number of participants who have lowered blood sugar levels.

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Other (This program is now being reported under the 'Strengthening Families and Communities' planned program.)

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

This program is now being reported under the 'Strengthening Families and Communities' planned program.

Key Items of Evaluation

This program is now being reported under the 'Strengthening Families and Communities' planned program.

V(A). Planned Program (Summary)

Program # 17

1. Name of the Planned Program

Real Money, Real World (Extension)

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	50%		0%	
806	Youth Development	50%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	20.0	0.0	0.0	0.0
Actual Paid Professional	0.0	0.0	0.0	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	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	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

This program is now being reported under 'Preparing Youth for Success' planned program.

2. Brief description of the target audience

This program is now being reported under 'Preparing Youth for Success' planned program.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2011	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: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	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.)
  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	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.

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

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.

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

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.

Not Reporting on this Outcome Measure

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.

Not Reporting on this Outcome Measure

Outcome #8

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Other (This program is now being reported under 'Preparing Youth for Success' planned program.)

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

This program is now being reported under 'Preparing Youth for Success' planned program.

Key Items of Evaluation

This program is now being reported under 'Preparing Youth for Success' planned program.

V(A). Planned Program (Summary)

Program # 18

1. Name of the Planned Program

Increasing Profitable Crop Yields Above Trendline-2014 (Extension)

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	25%		25%	
211	Insects, Mites, and Other Arthropods Affecting Plants	20%		15%	
212	Pathogens and Nematodes Affecting Plants	20%		13%	
213	Weeds Affecting Plants	10%		20%	
402	Engineering Systems and Equipment	5%		7%	
601	Economics of Agricultural Production and Farm Management	5%		5%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	17.0	0.0	0.0	0.0
Actual Paid Professional	0.0	0.0	0.0	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	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	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

This program is now being reported under the 'Enhancing Agriculture and the Environment' planned program.

2. Brief description of the target audience

This program is now being reported under the 'Enhancing Agriculture and the Environment' planned program.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2011	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: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Crop Observation and Recommendation Network Newsletter distribution
  Not reporting on this Output for this Annual Report

Output #2

Output Measure

- Number of participants reached with agronomic information provided in Regional/Local Agronomy Meetings
  Not reporting on this Output for this Annual Report

Output #3

Output Measure

- Number of participants in Production and Issues Workshops
  Not reporting on this Output for this Annual Report

Output #4

Output Measure

- Website which reaches an estimated 60,000 hits per year
  Not reporting on this Output for this Annual Report

Output #5

Output Measure

- Local/On-Farm Research project sites.
  Not reporting on this Output for this Annual Report

Output #6

Output Measure

- Number of participants in annual Field Days
  Not reporting on this Output for this Annual Report

Output #7

Output Measure

- Weed Control Guide for Ohio and Indiana distribution
  Not reporting on this Output for this Annual Report

Output #8

Output Measure

- Tri-State Fertilizer Recommendations for Corn, Soybean, Wheat and Alfalfa distribution
  Not reporting on this Output for this Annual Report

Output #9

Output Measure

- Field Crop Insects of Ohio distribution available via web only updated annually
  Not reporting on this Output for this Annual Report

Output #10

Output Measure

- Corn, Soybean, Wheat and Alfalfa Field Guides distributed
  Not reporting on this Output for this Annual Report

Output #11

Output Measure

- Corn Disease Management in Ohio distribution
  Not reporting on this Output for this Annual Report

Output #12

Output Measure

- Profitable Soybean Disease Management in Ohio distribution
  Not reporting on this Output for this Annual Report

Output #13

Output Measure

- Number of "Wheat Disease Management in Ohio" distributed annually
  Not reporting on this Output for this Annual Report

Output #14

Output Measure

- Seed Treatment for Ohio Agronomic Crops distribution
  Not reporting on this Output for this Annual Report

Output #15

Output Measure

- Ohio Agronomy Guide distribution
  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	Those who participate in technology workshops will improve efficiency of field activities by $15 per acre.
2	Number of meeting participants will indicate they will implement new management practices based on information received at the meetings.
3	Acreage of Ohio Corn where producers implement a nitrogen efficiency model on their farm.
4	Number of crop production acres that implement weed resistance management strategies.
5	Number of Ohio crop acres where appropriate utilization of IPM practices occurs
6	Number of individuals taught about disease identification, control and scouting or key weed control concepts.
7	Number of participants with an increase in knowledge of farm financial analysis and risk management.
8	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.
9	Number of farmers reporting positive changes in management and or profitability of their farm from use of information from farm financial analysis.
10	Reported economic impact of cost savings, increased yield or other increased profitability from use of CORN newsletter reported as total dollars.
11	Reported economic impact of cost savings, increased yield or other increased profitability from use of disease identification, control and scouting or key weed control concepts reported as total dollars.
12	Reported economic impact of cost savings, increased yield or other increased profitability resulting from farm financial analysis.

Outcome #1

1. **Outcome Measures**

   Those who participate in technology workshops will improve efficiency of field activities by $15 per acre.

   Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

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

   Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

   Acreage of Ohio Corn where producers implement a nitrogen efficiency model on their farm.

   Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

   Number of crop production acres that implement weed resistance management strategies.

   Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

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

   Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

Outcome #7

1. **Outcome Measures**

Number of participants with an increase in knowledge of farm financial analysis and risk management.

Not Reporting on this Outcome Measure

Outcome #8

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.

Not Reporting on this Outcome Measure

Outcome #9

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.

Not Reporting on this Outcome Measure

Outcome #10

1. **Outcome Measures**

Reported economic impact of cost savings, increased yield or other increased profitability from use of CORN newsletter reported as total dollars.

Not Reporting on this Outcome Measure

Outcome #11

1. **Outcome Measures**

Reported economic impact of cost savings, increased yield or other increased profitability from use of disease identification, control and scouting or key weed control concepts reported as total dollars.

Not Reporting on this Outcome Measure

Outcome #12

1. **Outcome Measures**

Reported economic impact of cost savings, increased yield or other increased profitability resulting from farm financial analysis.

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Other (This program is now being reported under the 'Enhancing Agriculture and the Environment' planned program

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

This program is now being reported under the 'Enhancing Agriculture and the Environment' planned program.

Key Items of Evaluation

This program is now being reported under the 'Enhancing Agriculture and the Environment' planned program.

V(A). Planned Program (Summary)

Program # 19

1. Name of the Planned Program

Preparing Youth for Success (Extension)

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
801	Individual and Family Resource Management	25%		0%	
806	Youth Development	75%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	63.0	0.0	0.0	0.0
Actual Paid Professional	52.0	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**
2799584	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
2799584	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 creations
- Partnering with businesses and other organizations

Under the 'Real Money Real World' signature program: 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

- Youth - infant through 18 years of age (with a special focus on new and underserved audiences);
- Parents of youth
- Volunteers working with youth audiences
- Teachers/Educators working with youth audiences
- Youth Development Professional Staff
- Community Leaders involved in subject specific areas

3. How was eXtension used?

Limited use; there are a few 4-H Professionals who are on CoPs, but the major content of eXtension so far is subject matter content-related, not organizational-related, which does not provide substantive resources to 4-H Professionals

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	255760	26950	279960	0

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	20	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
2011	77610

Output #2

Output Measure

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

Year	Actual
2011	831

Output #3

Output Measure

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

Year	Actual
2011	457

Output #4

Output Measure

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

Year	Actual
2011	128637

Output #5

Output Measure

- Number of youth participating in School Enrichment programs

Year	Actual

2011	82176

Output #6

Output Measure

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

Year	Actual
2011	18856

Output #7

Output Measure

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

Year	Actual
2011	4664

Output #8

Output Measure

- Number of adult volunteers

Year	Actual
2011	20949

Output #9

Output Measure

- Number of teen volunteers

Year	Actual
2011	11914

Output #10

Output Measure

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

Year	Actual
2011	3500

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 participants who increased awareness about what it costs to maintain a household (RMRW)
7	number of participants who increased awareness about how every spending decision affects other spending opportunities (RMRW)
8	number of participants who increased awareness about how the type of job they have affects how much money they will make (RMRW)
9	number of participants who increased feeling of importance about getting more education or training after high school (RMRW)
10	number of participants who increased feeling of importance about waiting to have children until financially ready (RMRW)
11	number of participants who increased feeling of importance about having a plan for spending that includes both needs and wants (RMRW)
12	number of participants who indicated their likeliness to make changes relative to getting more education or training after high school (RMRW)
13	number of participants who indicated their likeliness to make changes relative to learning how to make wise financial decisions (RMRW)

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
2011	51200

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
Averaged 11 club meetings per year; 90% or more of clubs met monthly March thru July, 70%-89% met in February & August, 40%-50% met January, September and October, while less than 30% met November & December; Educational Delivery Methods employed by clubs included: Work nights (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
Percentage of 4-H members who answered YES to the following when asked if they learned any Decision Making Skills through their 4-H club experience: 90% -Think about what might happen because of the decision; 90% - Generate ideas for possible solutions before making a decision; 89% - Determine the best alternative and actually make the decision; 88% - Implement the decision; 86% - Gather background information that will help to make a decision; 85% - Evaluate the outcome of the decision; 79% - Make decisions without delaying too much (timely).

4. Associated Knowledge Areas

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
2011	64200

3c. Qualitative Outcome or Impact Statement

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

What has been done
Responding 4-H members reported results including: average age of youth respondent - 13.5; average years in 4-H - 4.9; 62% of the youth respondents held one of the seven 4-H club offices in 2010; 34% male and 66% female. 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

Results
4-H members were asked to rate the amount of project knowledge/ skills gained through 4- H on a four point scale where 1=NONE and 4=A LOT; the highest ratings were "Exhibiting the product(s) of a 4-H project"? and "Working on a 4-H project". Next were: "4-H project books and written 4-H materials" and then "One-on-one visits with an adult 4-H volunteer". The lowest rating was "Attending 4-H workshops/ clinics". However, all 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
2011	51200

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 returned usable questionnaires.

Results
Over 90% of the respondents stated that half or more of their members demonstrated skills, when 4-H Club advisors were asked to indicate about how many of your club's members can demonstrate decision making skills, on each of the seven decision making skills; 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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	67800

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 4-H clubs, a survey was completed in the fall of 2010. Eighteen counties were randomly selected, and from each county, five 4-H clubs were randomly selected. All 4-H volunteers and 4-H members in these 4-H 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
When 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% = Understand it is important to follow through on commitments have made; 96% = Have control over my own personal goals/future; 95% = Work/play with people who are different from me; 94% = Use my time wisely; 94% = Take care of my personal belongings; 94% = Listen carefully to what others say; 93% = Treat people who are different from me with respect; 93% = Have friendships with people who are different from me; 93% = Realize that people lead in different ways; 89% = Do what is right for myself when with a group; 87% = Make a presentation

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

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
2011	37200

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 2011 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 was, "Display positive attitudes" (99%); the lowest was, "Demonstrate self motivation" (92%). Other skills members achieved: "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 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
2011	17977

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Parents care because children are more likely to understand the money issues parents face in real life.

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

Results
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 when getting out on their own to make important purchases.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management
806	Youth Development

Outcome #7

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	17773

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, 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 buy the most important things first such as housing, utilities and transportation and leave the extras until the end. This helps them better understand needs versus wants.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management
806	Youth Development

Outcome #8

1. Outcome Measures

number of participants who increased awareness about how the type of job they have affects how much money they will make (RMRW)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	17606

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 and get a better education thus leading to a better job in the future.

What has been done
Students participated in Real Money Real World simulation and made decisions on what to purchase based on a salary received, 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 to stay in school, get good grades so one can go to college for a better job in the future.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management
806	Youth Development

Outcome #9

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
2011	16744

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 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 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
801	Individual and Family Resource Management
806	Youth Development

Outcome #10

1. Outcome Measures

number of participants who increased feeling of importance about waiting to have children until financially ready (RMRW)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	14230

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 were to wait to have children until you had a job and could afford them.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management
806	Youth Development

Outcome #11

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	17842

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Parents, teachers. Students are still egotistically 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 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 nonessentials 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
801	Individual and Family Resource Management
806	Youth Development

Outcome #12

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	16911

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Parents don't want to have to support their children for ever and this 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
801	Individual and Family Resource Management
806	Youth Development

Outcome #13

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	18509

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 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.

Results
As a result of these 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
801	Individual and Family Resource Management
806	Youth Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Other (Personnel & Management)

Brief Explanation

Two personnel and management situations affected the reporting of 2011 Ohio 4-H statistics: [1] The person who managed the 4-H Enrollment system retired in August, and a new person was not put in place until November 15; and [2] We implemented ACCESS 4-H as the Ohio 4-H enrollment computer program; the ACCESS 4-H Team assisted in importing the old data into ACCESS 4-H, and we were told that the E237 numbers would be available no later than February 15; at this writing (4-25-2012) that data is still not available, due to a series of management and technical issues encountered by the ACCESS 4-H Team. Therefore, the numerical data included in this report are based on the most recent available enrollments, which are 2010.

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. Eighteen counties were randomly selected, and from each county, five 4-H clubs were randomly selected. All 4-H volunteers and 4-H members in these 4-H 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. One hundred ninety-one (191) volunteers and 336 youth returned usable questionnaires. These results will be reported for the respondents and extrapolated to the 2010 Ohio 4-H community club members. Of the Volunteers who responded 19% Male and 81% Female; Average Tenure as 4-H Advisor =11 years; 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%); 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%) Of the 4-H Members who responded ; average age of youth respondent =13.5; average years in 4-H = 4.9; 62% of the youth respondents held one of the seven 4-H club offices in 2010; 34% 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.

Under the 'Real Money Real World' signature program, participants are more aware of the decision making process it takes to live in the real world today. Participants are able to see the direct correlation between getting an education and having a good job. Students are more determined to wait to have children until they are financially ready.

Key Items of Evaluation

I. When 4-H Club Advisors were asked to indicate about how many of your club's members can demonstrate decision making skills, on each of the seven decision making skills, 91%-96% of the respondents stated that half or more of their members demonstrated such skills. The highest rated skill was "Generate ideas for possible solutions before making a decision"? (96%) and the lowest was, "Implement the decision"? (91%)

II. When 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: 96% - Understand it is important to follow through on commitments have made; 96% - Have control over my own personal goals/future; 95% - Work/play with people who are different from me; 94% - Use my time wisely; 94% - Take care of my personal belongings; 94% - Listen carefully to what others say

III. 92%-99% of the 4-H Advisors stated that half or more of members demonstrated skills: "Display positive attitudes"? (99%) and the lowest was, "Demonstrate self-motivation"? (92%). Other transferable workforce skills for which volunteer respondents stated more than half their members achieved included: 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%).

V. When 4-H members were asked if they learned any Decision Making Skills through their 4-H club experience, the percentage of respondents who answered YES to the following Decision Making Skills is listed below: 90% - Think about what might happen because of the decision; 90% - Generate ideas for possible solutions before making a decision; 89% - Determine the best alternative and actually make the decision

V. When 4-H members were asked to rate the amount of project knowledge/ skills gained through 4-H on a four point scale where 1=NONE and 4=A LOT, the highest ratings were "Exhibiting the product(s) of a 4-H project"? and "Working on a 4-H project"?. Next were: "4-H project books and written 4-H materials" and then "One-on-one visits with an adult 4-H volunteer"? The lowest rating was "Attending 4-H workshops/ clinics"?. However, all but the last were rated 3 or higher on a 4 point scale.

Under the 'Real Money Real World' program, 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.

V(A). Planned Program (Summary)

Program # 20

1. Name of the Planned Program

Strengthening Families & Communities (Extension)

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	10%		0%	
703	Nutrition Education and Behavior	20%		0%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	5%		0%	
723	Hazards to Human Health and Safety	10%		0%	
724	Healthy Lifestyle	20%		0%	
801	Individual and Family Resource Management	25%		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: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	20.0	0.0	0.0	0.0
Actual Paid Professional	33.0	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**
1776659	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1776659	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

Under the 'Dining with Diabetes' signature program:

- newsletter distribution
- trainings offerred for statewide Dining with Diabetes (DWD) team and invited speakers
- curriculum review and development by DWD team
- collaborations with agencies to offer programming include: registered dieticians, 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

Under the 'New Start for Financial Success' program: Two-hour course approved by the Department of Justice.
The subjects covered are:

- budget development
- money management
- wise credit use
- consumer information

2. Brief description of the target audience

Strengthening Families and Communities programming is tailored to meet the needs of the intended audience. For example 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 of the county. 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
- the DWD program specifically targets individuals with diabetes and their caregivers / family support members
- 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?

As a source of participant hand-out materials and a reference source that participants are encouraged to consult.

As part of the DWD signature program, participants were encouraged to use eXtension as an additional resource, particularly the Families, Food & Fitness CoP.

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

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	47211	130843	4673	0

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

Year: 2011
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	12	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Educational sessions held with two or more participants

Year	Actual
2011	6580

Output #2

Output Measure

- Volunteers participating in the planning and implementation of the program.

Year	Actual
2011	6240

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

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
2011	30322

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Improved knowledge is a key factor in bringing about behavior change.

What has been done
Relevant programs designed and offered.

Results
30,244 participants of programs related to 'Strengthening Families and Communities' programming indicate they learned new information.

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
2011	18871

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Intentions are the strongest predictors of behavior change, planning to adopt is a measure of intention.

What has been done
Consubstantiation occurred.

Results
18,871 participants indicate intent to change their behavior(s).

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
2011	15146

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
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
Participants have internalized educational objectives and implemented new/improved practices in their daily lives.

Results
15,146 participants have changed their behaviors.

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	1311

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Diabetes Mellitus (DM) affects 25.8 million Americans, with 79 million estimated to have prediabetes. DM results in uncontrolled blood glucose levels if not properly treated, increasing a person?s risk of heart disease, stroke, neuropathy, nephropathy, and eye impairments. Yet, DM can be controlled through a balance of meal planning, medications, exercise and glucose testing.

What has been done
OSU Extension offers diabetes education through the Dining with Diabetes (DWD) program. The primary goal of DWD is to better educate those with, or someone associated with, the disease. DWD aims to increase participants? knowledge and behaviors related to diabetes management. The program consists of three lessons using a standardized curriculum, and is taught in conjunction with a registered dietician.

Results
Results suggest the DWD program is improving knowledge and positive behaviors related to diabetes management.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

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

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Of those attending Extension educational sessions aimed at strengthening families and communities: 67% reported gaining knowledge; 42% reported intentions to adopt one or more recommended practices; and 34% reported they actually adopted one or more recommended practices.

Evaluation results from the DWD signature program include the following: Usable data from 740 pre- and post-intervention surveys that collected information on participants' food and nutrition knowledge (10 questions), behaviors (14 questions), and demographics were analyzed. Generalized linear mixed effects models were used to determine outcome measures. Significance was set at $p<.05$. Participants were mostly white (96%) and female (75%) with a mean age of 58.7+9.8 years. Participants' knowledge about foods containing carbohydrates increased significantly ($p=.012$). Females scored higher ($p<.001$), on average, than males when adjusting for age, education, ethnicity, and home size. Of the participants with DM (n=459), participants were more likely, on average, to report checking blood glucose daily post-intervention compared to pre-intervention ($p<.001$). Results suggest the DWD program is improving knowledge and positive behaviors related to diabetes management.

Key Items of Evaluation

Of those attending Extension educational sessions aimed at strengthening families and communities: 67% reported gaining knowledge; 42% reported intentions to adopt one or more recommended practices; and 34% reported they actually adopted one or more recommended practices.

Evaluation results from the DWD signature program include the following: Participants' knowledge about foods containing carbohydrates increased significantly ($p=.012$). Females scored higher ($p<.001$), on average, than males when adjusting for age, education, ethnicity, and home size. Of the participants with DM, participants were more likely, on average, to report checking blood glucose daily post-intervention compared to

pre-intervention (p<.001). Results suggest the DWD program is improving knowledge and positive behaviors related to diabetes management.

V(A). Planned Program (Summary)

Program # 21

1. Name of the Planned Program

Advancing Employment and Income Opportunities (Extension)

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	33%		0%	
608	Community Resource Planning and Development	34%		0%	
801	Individual and Family Resource Management	33%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	17.0	0.0	0.0	0.0
Actual Paid Professional	25.0	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
1345954	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1345954	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, and
- Research to build plans and implement strategies

The Business Retention and Expansion (BR&E) signature program is also reported under the 'Advancing Employment and Income Opportunities' planned program. The following activities occurred in 2011 for BR&E.

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

Community Leaders, economic development professionals, citizens (families and individuals), local development officials, community volunteers, Extension professionals.

3. How was eXtension used?

Respond to specific requests pertaining to community economics tools.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	35591	300030	8368	100000

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	13	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of volunteers who have participated

Year	Actual
2011	3976

Output #2

Output Measure

- # of volunteer hours

Year	Actual
2011	18704

Output #3

Output Measure

- # of formal training workshops for BR&E

Year	Actual
2011	2

Output #4

Output Measure

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

Year	Actual
2011	12

Output #5

Output Measure

- number of hard-copy questionnaires

Year	Actual
2011	1

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	dollars leveraged for new business investment, job retention and / or creation
9	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. (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
2011	30963

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
For some, the loss of good-paying jobs with benefits has greatly affected families and their communities. For others, it is declining health along with inadequate health insurance coverage that puts their economic well-being and quality of life at risk.

What has been done
County Extension 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/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 many Ohioans make progress in their financial management skills and behavior. Nearly 31,000 Ohioans increased their financial literacy.

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
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
2011	817

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Ohioans participating in related programs were impacted. 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.

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 have been conducted and individuals were assisted with developing plans for achieving financial security.

Results
817 individuals developed an integrated plan 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
2011	24

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Local communities lack an understanding of issues related to their economy.

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
2011	9

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Local communities lack an understanding of issues related to their economy.

What has been done
Workshops 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
2011	16

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Local communities lack an understanding of issues related to their economy.

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
2011	323

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 America Saves to "Build Wealth, Not Debt" that will 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: - Motivate people to take financial action. - Promote increased saving through social marketing, and provide access to products and education.

Results
323 individuals responded to surveys indicating they had reduced their total debt load.

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
801	Individual and Family Resource Management

Outcome #7

1. Outcome Measures

# of jobs created and retained

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	4209

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Local officials / businesses lack knowledge of existing business needs and resulting expansion strategies.

What has been done
Community leaders, residents, and businesses were engaged in formal dialogue and BR&E 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.

4. Associated Knowledge Areas

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

Outcome #8

1. Outcome Measures

dollars leveraged for new business investment, job retention and / or creation

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual

2011	8300000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Job creation requires capital investment coupled with strategic business planning. Business planning enables loan applicants to secure financing that would not otherwise be extended.

What has been done
More than 5900 hours of business counseling was provided to over 400 existing or prospective business owners.

Results
22 new businesses were created, supporting 805 new jobs and retention of 2,006 jobs.

4. Associated Knowledge Areas

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

Outcome #9

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. (BR&E)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	21

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Local leaders lack an understanding of key economic issues necessary to make informed policy decisions.

What has been done

Key local economic issues were identified via formal Business Retention & Expansion survey methods involving local businesses and survey volunteers.

Results
Survey results have been shared with local leaders, thereby informing their understanding of key local economic issues. Decision making abilities of local officials have been improved.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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

One group has used their completed strategic plan to restructure many of the group's committees and revise their membership marketing materials. As a result of the plan, they have also hired a new staff member and developed a partnership with similar organization and established an endowment. Further, the economic development team has used their strategic plan goals to put together a proposal that has attracted a software development business (BTS Solutions) to the community. Beginning in January 2012, the new business will open a satellite office in the community, creating 20 new jobs. Program participants have identified the need to establish a local revolving loan fund to augment traditional business financing and are currently in the process of establishing the program.

As part of the evaluation of the BR&E signature program: Nearly 350 businesses throughout Ohio's communities participated in a formal Business Retention & Expansion survey project, sharing key business and economic concerns standing in the way of retaining or expanding local employment. Community volunteers were employed in gathering this data and conducting business visits. Policy decisions were made that enabled participating businesses to create or retain over 700 jobs, contributing over $27 million of personal income to the Ohio economy.

Key Items of Evaluation

Landowners have signed leases that include addenda more favorable to their wants and needs. Land groups received more than $5000 per acre on lease payments and more than 20% in royalties. Drilling and associated companies have become more engaged in local communities and support of local activities.

As part of the evaluation of the BR&E signature program: Policy decisions were made that enabled participating businesses to create or retain over 700 jobs, contributing over $27 million of personal income to the Ohio economy.

V(A). Planned Program (Summary)

Program # 22

1. Name of the Planned Program

Enhancing Agriculture and the Environment (Extension)

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	5%		0%	
104	Protect Soil from Harmful Effects of Natural Elements	5%		0%	
112	Watershed Protection and Management	5%		0%	
123	Management and Sustainability of Forest Resources	5%		0%	
124	Urban Forestry	5%		0%	
133	Pollution Prevention and Mitigation	5%		0%	
205	Plant Management Systems	5%		0%	
211	Insects, Mites, and Other Arthropods Affecting Plants	5%		0%	
212	Pathogens and Nematodes Affecting Plants	5%		0%	
213	Weeds Affecting Plants	5%		0%	
216	Integrated Pest Management Systems	5%		0%	
307	Animal Management Systems	5%		0%	
308	Improved Animal Products (Before Harvest)	5%		0%	
315	Animal Welfare/Well-Being and Protection	5%		0%	
402	Engineering Systems and Equipment	5%		0%	
403	Waste Disposal, Recycling, and Reuse	5%		0%	
601	Economics of Agricultural Production and Farm Management	5%		0%	
602	Business Management, Finance, and Taxation	5%		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: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	58.0	0.0	0.0	0.0
Actual Paid Professional	28.0	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
1507468	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1507468	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 and 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 and 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 which would offer 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 bio-security through worksheets, factsheets, web-based sites, podcasts, and other emerging technologies.
• Offer Pesticide Applicator Training, Transitioning Your Farm Business to the Next Generation Workshops, and Women in Agriculture seminars.

Under the 'Increasing Profitable Crop Yields' signature program:

• 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
- 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

Under the 'Why Trees Matter' program, 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

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, and non-government organizations, new and small farm owners, and tax practitioners.

Under the 'Increasing Profitable Crop Yields' signature program: grain producers, fertilizer chemical retailers, input company representatives, crop advisors, agency soil and water conservation districts, Natural Resources Conservation Service, Ohio Department of Agriculture Environmental Protection Agency.

Under the 'Why Trees Matter' program, Ohio citizens, community leaders / officials, master gardener volunteers.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	47824	737180	5998	250

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	59	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
2011	2908

Output #2

Output Measure

- number of multi-state partnerships

Year	Actual
2011	274

Output #3

Output Measure

- Number of people completing the Transitioning Farm to the Next Generation Workshops.

Year	Actual

2011	96

Output #4

Output Measure

- number of people completing the OSU Tax Practitioners School

Year	Actual
2011	1000

Output #5

Output Measure

- number of people completing the Small Farm College

Year	Actual
2011	53

Output #6

Output Measure

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

Year	Actual
2011	250

Output #7

Output Measure

- number of Crop Observation and Recommendation Network Newsletters distributed (Inc. Profitable Crop Yields)

Year	Actual
2011	7700

Output #8

Output Measure

- number of participants reached with agronomic information provided in Regional / Local agronomy meetings (Inc. Profitable Crop Yields)

Year	Actual
2011	4700

Output #9

Output Measure

- number of participants in Production and Issues workshops (Inc. Profitable Crop Yields)

Year	Actual
2011	120

Output #10

Output Measure

- number of website hits (Inc. Profitable Crop Yields)

Year	Actual
2011	3200000

Output #11

Output Measure

- number of local / on-farm research project sites (Inc. Profitable Crop Yields)

Year	Actual
2011	30

Output #12

Output Measure

- number of participants in annual Field Days (Inc. Profitable Crop Yields)

Year	Actual
2011	320

Output #13

Output Measure

- number of Weed Control Guides for Ohio and Indiana distributed (Inc. Profitable Crop Yields)

Year	Actual
2011	4800

Output #14

Output Measure

- number of Corn, Soybean, Wheat and Alfalfa Field Guides distributed (Inc. Profitable Crop Yields)

Year	Actual
2011	1200

Output #15

Output Measure

- number of volunteers participating in WTM educational programs

Year	Actual
2011	68

Output #16

Output Measure

- number of volunteer hours committed to WTM programs

Year	Actual
2011	2613

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 technologie.
4	Number of youth shows/county fairs that implement animal ID/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	Dollar amount 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 Schedule "F" tax forms filed by tax practitioners that participated in OSU Income Tax Schools.
10	number of participants in farm transitioning planning programs and training that indicate action changes.
11	number of meeting participants that indicated they will implement new management practices based on information received at the meetings (Inc. Profitable Crop Yields)
12	number of crop production acres that implement weed resistance management strategies (Inc. Profitable Crop Yields)
13	number of Ohio crop acres where appropriate utilization of Integrated Pest Management (IPM) practices occur (Inc. Profitabl Crop Yields)
14	number of participants that appreciate the value of community forests (WTM)
15	number of participants that have improved knowledge of tree identification (WTM)
16	dollar value of energy savings to Ohioans documented from WTM studies in local communities
17	dollar value of storm water remediation savings documented from WTM studies in local communities

Outcome #1

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	563

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
There is a need to increase the awareness of the threats to U.S. agriculture and the environment from introduced or emerging plant diseases and pests; improve practices for the transportation of livestock through Livestock Haulers Training to help eliminate and/or decrease the spread of disease; and improve methods for the disposal of livestock mortality through on-farm composting.

What has been done
Conducted certification training for First Detectors; Conducted certification training for Livestock Mortality Composting Training; Conducted certification training for Livestock Haulers Training Program.

Results
243 First Detectors trained; 315 Livestock Mortality Training certifications issued; and 40 Livestock Haulers completed training.

4. Associated Knowledge Areas

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

721 Insects and Other Pests Affecting Humans

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
2011	315

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Disease and the containment of disease directly affect agricultural production and public health.

What has been done
Livestock Mortality Composting training conducted at multiple locations across the state.

Results
315 certifications in 2011 were issued for on-farm livestock mortality composting upon completion of course training.

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 technologie.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	4213

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Safe use of pesticides to ensure the protection of people, the environment, and our food chain is essential. OSU Extension's Pesticide Applicator Training helps ensure the safe use of pesticides, proper disposal of pesticides, and helps prevent misuse and mishandling. Reducing the environmental, economic & social risk associated with managing pests / insects, disease or weeds is a constant issue and is the goal of OSUE programming.

What has been done
52 private schools and 6 commercial schools were offered in 2011.

Results
Commercial and private applications received certification and re-certification credits toward their Ohio Department of Agriculture Pesticide Applicator licenses.

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
403	Waste Disposal, Recycling, and Reuse
601	Economics of Agricultural Production and Farm Management
721	Insects and Other Pests Affecting Humans

Outcome #4

1. Outcome Measures

Number of youth shows/county fairs that implement animal ID/quality assurance programs.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	96

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Safe food, better livestock care, prevention of the outbreak of animal and human diseases, and the encouragement of local food production is key to today's society. One example of this issue is the number of animals entering the food supply through the youth livestock program (exceeds 59,000). An educational program for youth that covers Food Animal Quality Assurance is required for all youth enrolled in food animal projects in the state of Ohio.

What has been done
Fair sponsors, typically the local Agricultural Society, are responsible for the safety of the food animals entering the food supply from their fair's livestock sale. OSU Extension, in partnership with fair sponsors, provides educational programs on Food Animal Quality Assurance in all 88 counties for the 88 county & 7 independent fairs in Ohio. Additionally, a Beef Quality Assurance Program for youth is offered at the Ohio Beef Expo. Youth enrolled in market livestock projects are required to participate.

Results
The Quality Assurance Program helps to ensure the safety of the 59,000+ animals entering our food system each year by educating youth on food animal quality assurance. These programs may include, but are not limited to topics such as animal welfare, illness & condition treatments, adequate housing, meat cuts, proper feeding practices.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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 #5

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	35

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Grazing schools help farm managers increase food production per acre, which helps managers as they can increase stocking rates yet keep overhead costs down. Reducing input costs, many times, can have huge beneficial effects on a producer's net profit.

What has been done
5 OSU Extension Grazing Schools were held with a total of 130 participants; 32 fields days and presentations on grazing reaching approximately 1200 producers.

Results
35 farmers/producers representing 7000+ acres of Ohio farmland with 1800 head of livestock attended grazing schools in 2011; 30 producers participated in the pasture management project coordinated by the OSU Forage Team; the OSU Forage Team blog had 13,278 hits in 2011 and their website had 3,619 hits. Additionally, team members helped coordinate the Regional Grazing Conference and the American Grassland & Forage Council conference.

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
216	Integrated Pest Management Systems
402	Engineering Systems and Equipment
403	Waste Disposal, Recycling, and Reuse

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
2011	17000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Increased profitability in a livestock operation is difficult with the continued rise in input costs.

What has been done
Worked with a local feed company to create a custom mineral mix at the request of the County Cattlemen's Association. Worked in partnership with OSU's Dept. of Agricultural, Environmental and Developmental Economics to create a series of spreadsheets for economic and nutrition calculations that are available from the web: Market Steer, Market Yearling Steer, Market Heifer,and Cow-Calf @ http://aede.osu.edu/Programs/FarmManagement/Budgets/

Results
County Cattlemen's Association members reported that they save $17,000 annually in mineral costs. Spreadsheets for economic and nutrition calculations have just been made available, so at this time the economic impact or their usage is unknown.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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

Dollar amount of Schedule "F" tax forms filed by tax practitioners that participated in OSU Income Tax Schools.

Not Reporting on this Outcome Measure

Outcome #8

1. Outcome Measures

Number of farms using transitioning planning.

Not Reporting on this Outcome Measure

Outcome #9

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 Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	1600

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Tax schools provide tax practitioners with current information on rules and regulations and income tax management information which assists filers to accurately report income tax for small businesses and farms.

What has been done
8 general 2-day tax schools plus 8 specific farm income tax schools for practitioners were offered in Ohio in 2011.

Results
150 tax practitioners participated in the farm income tax schools and 850 participants in the 2-day general tax schools.

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation

Outcome #10

1. Outcome Measures

number of participants in farm transitioning planning programs and training that indicate action changes.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	105

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Across the United States and Ohio, there is a growing concern about our aging farmer population. One of the major concerns cited is that many farm operators are close to retirement.

What has been done
A series of "Transferring the Farm to the Next Generation" workshops were held, followed up by a survey after 6 months that was sent to all participants. Additional OSU Extension fact sheets and curriculum have been authored by the teaching team.

Results

105 individuals participated 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 inter-generational 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

Outcome #11

1. Outcome Measures

number of meeting participants that indicated they will implement new management practices based on information received at the meetings (Inc. Profitable Crop Yields)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	3760

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Adaption of management techniques which have been researched through Extension and land grants is the ultimate goal.

What has been done
Topics at agronomy programs focus maximizing production, integrated pest management, reducing pesticide reliance, understanding social impacts of decisions,and best management practice adaption.

Results
End of program surveys using paper surveys and in-program clicker survey technology find producers at a rate of 80% intend to implement practices discussed during the educational program in their on farm management.

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 #12

1. Outcome Measures

number of crop production acres that implement weed resistance management strategies (Inc. Profitable Crop Yields)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	3200000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Weed resistance causes yield loss and loss of key 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 reduced weed impacts and cost of controlling weeds.

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

Results

Through surveys of CORN newsletter readers and participants in CTC conference we see an increased adoption of preemergent herbicide use for soybean production at the rate of 80% of soybean acres (approximately 3.2 million acres). End of season observations of soybean fields indicate that prevalence of lambsquarters has been reduced from 15% to 7% of fields and giant ragweed from 42% to 26% of fields. Reduction in prevalence in both weeds can be attributed in part to increased preemergent control adoption. Marestail has become a more troublesome weed with increases from 19% to 40% of fields. This weed is known to be both glyphosate and ALS resistant. Educational programming for 2012 focused on this winter annual weed.

4. Associated Knowledge Areas

KA Code	Knowledge Area
213	Weeds Affecting Plants

Outcome #13

1. Outcome Measures

number of Ohio crop acres where appropriate utilization of Integrated Pest Management (IPM) practices occur (Inc. Profitabl Crop Yields)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	280151

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Utilizing IPM practices has the intent of reducing pesticide utilization. This has environmental and economic benefits.

What has been done
The CORN newsletter is distributed to over 2900 growers weekly via e-mail. There were 170,000 unique visitors to the website during 2011 during the growing season.

Results
Resopondants to the 2011 survey of CORN users indicated they had reduced fungicide and insecticide applications to 280,151 acres while increasing corns yields by 8.2 bushels per acre and soybean yields by 3.2 bushels.

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 #14

1. Outcome Measures

number of participants that appreciate the value of community forests (WTM)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	1588

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The need to raise the awareness of the importance of trees and forests to our communities exists.

What has been done
Tree-Mendous Day youth programming continued for the Harold Schnell Elementary School in West Carrolton and Cox Arboretum in Dayton. Curriculum in development for the TreEAB program - a youth environmental education effort to reach teachers with more detailed teaching tools.

Results
Participants were made more aware of the benefits of trees and the importance of planting a more diverse tree canopy.

4. Associated Knowledge Areas

KA Code	Knowledge Area
104	Protect Soil from Harmful Effects of Natural Elements
112	Watershed Protection and Management
124	Urban Forestry

Outcome #15

1. Outcome Measures

number of participants that have improved knowledge of tree identification (WTM)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	1679

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Communities need assistance in gathering information on the trees within the community such as tree identification, location and value.

What has been done
Numerous trainings for landowners, Master Gardeners, OCVN volunteers and other volunteers to increase their proficiency at tree identification.

Results
Participants and community leaders became more aware of difference in structure of trees and how to identify them. Along with identification participants have become more aware of the benefits and values of trees.

4. Associated Knowledge Areas

KA Code	Knowledge Area
124	Urban Forestry

Outcome #16

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
2011	759623

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Dollar value of energy savings to Ohioans documented from WTM studies in local communities.

What has been done
Numerous tree inventories were completed around the state for a variety of Ohio communities.

Results
A total of 16 communities were involved in the process of creating plans for their urban community forests.

4. Associated Knowledge Areas

KA Code	Knowledge Area
124	Urban Forestry

Outcome #17

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

2011 249940

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

As a result of a law suit filed by the US EPA and the Sierra Club, the Metropolitan Sewer District of Greater Cincinnati (MSD) is under court order to mitigate combined sewer overflows (CSO's). The MSD has two potential courses of action to come into compliance; 1) dig a tunnel several miles long at a cost of $1.2 billion to capture and store storm water during heavy rain events 2) Develop and establish "green storm water management systems" (landscape plant installations).

What has been done

In Feb. 2011, in conjunction with the Cincinnati Area Professional Green Industry Infrastructure Network (CAPGIN), conducted an all day symposium on green infrastructure design issues that attracted 137 stormwater management professionals; developed and conducted 12 educational PowerPoint sessions on landscape stormwater management and related issues, with a total audience of 357; conducted infiltration research on 5 area rain gardens and plant growth research on 2 additional gardens.

Results

494 stormwater mangement professionals and non-professionals were able to use the latest information on landscape stormwater management strategies and systems to select, design, and construct those systems. Landscape stormwater management professionals and others were able to access unique data on the infiltration rates of various substrates in bio-infiltrations systems.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
124	Urban Forestry

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
- Other (staffing changes)

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Families are beginning the process of transferring the farm to the next generation. 105 participants in the "Transferring the Farm to the Next Generation" workshops where they gained skills to develop a farm transfer plan and to increase fammily communication. the 6-month survery 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 communiction, 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.

Evaluation results for the 'Increasing Profitable Crop Yields Above Trendline' program: The Crop Observation and Recommendation Network (C.O.R.N.) Newsletter is a main delivery tool of information for Ohio row crop growers. The newsletter is produced weekly in season and biweekly during the winter, reaching over 2900 growers and industries on the e-mail distribution list. There were 170,000 unique address hits to the website in 2011. Through surveys of CORN newsletter readers and participants in CTC conference we see an increased adoption of preemergent herbicide use for soybean production at the rate of 80% of soybean acres which would be approximately 3.2 million acres. End of season observations of soybean fields indicate that prevalence of lambsquarters has been reduced from 15% to 7% of fields and giant ragweed from 42% to 26% of fields. Reduction in prevalence in both weeds can be attributed in part to increased preemergent control adoption. Marestail has become a more troublesome weed with increases from 19% to 40% of fields. This weed is known to be both glyphosate and ALS resistant. Educational programming for 2011 focused on this winter annual weed. Additional survey results include the calculated value to Ohio farmers and dealers, CORN Newsletter users of 21.2 million dollars in 2010. This value can be separated by input savings and crop yield increases for corn and soybeans. For example, 53,676 acres of crops were not treated with fungicides and/or insecticides by Ohio farmers after reading the research based recommendations from Ohio State University Extension State Specialists in the CORN Newsletter. CORN readers also reported increased corn and soybean yields of 8.6 and 3.7 bushels per acre respectively. Further, Ohio farmers reading the CORN newsletter reported applying phosphorus at crop removal rates (based on state average yields). The above findings support the value of CORN to Ohio farmers in protecting the environment and improving water quality.

Under the 'Why Trees Matter' program, 49 community projects were completed as part of WTM; 1328 participants improved their knowledge of tree identification; 5 private industry / public partnerships were developed as a result of WTM programming; 159 individuals improved their tree inventory skills; 199 volunteers participated in Emerald Ash Borer related programs.

Key Items of Evaluation

20,456 under-represented individuals participated in OSU Extension programming relating to "agriculture and the environment".

Under the 'Why Trees Matter' program, 199 volunteers participated in WTM emerald ash borer-related events; 2400 youth attendees at WTM-related events; 16 local communities involved in WTM events and/or programs; 101 green industry companies involved in WTM events &and/or programs; 759,623 Dollar value of energy savings to

Ohioans documented from WTM studies in local communities.

V(A). Planned Program (Summary)

Program # 23

1. Name of the Planned Program

Business Retention and Expansion Initiative (Extension)

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
608	Community Resource Planning and Development	100%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	4.0	0.0	0.0	0.0
Actual Paid Professional	0.0	0.0	0.0	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	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	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

This program will now be reported under the 'Advancing Employment and Income Opportunities' planned program.

2. Brief description of the target audience

This program will now be reported under the 'Advancing Employment and Income Opportunities' planned program.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2011	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: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Formal training workshops

Not reporting on this Output for this Annual Report

Output #2

Output Measure

- one-on-one consultations

Not reporting on this Output for this Annual Report

Output #3

Output Measure

- formal community presentation of findings
  Not reporting on this Output for this Annual Report

Output #4

Output Measure

- web-based questionnaires
  Not reporting on this Output for this Annual Report

Output #5

Output Measure

- hard-copy questionnaires
  Not reporting on this Output for this Annual Report

Output #6

Output Measure

- Number of program planning and implementation volunteers
  Not reporting on this Output for this Annual Report

Output #7

Output Measure

- Number of program planning and implementation volunteer hours donated
  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	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.

Not Reporting on this Outcome Measure

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.

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Other (This program will now be reported under the 'Advancing Employment and Income Opportunities' planned program.)

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

This program will now be reported under the 'Advancing Employment and Income Opportunities' planned program.

Key Items of Evaluation

This program will now be reported under the 'Advancing Employment and Income Opportunities' planned program.