2010 Ohio State University Combined Research and Extension Annual Report of Accomplishments and Results

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I. Report Overview

1. Executive Summary

Ohio State University Extension (OSU Extension) and Ohio Agricultural Research and Development Center (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 2010. In 2004, a targeted effort was launched to expand the economic impact of Ohio's agbioscience economy. That successful venture contributed to the 2010 designation of The Ohio State University as the Ohio Center of Excellence in Agriculture, Food Production, and Bioproducts by the Ohio Board of Regents and the University System of Ohio. It is the only such designated center to be housed solely within a single university. OARDC and OSU Extension programs are far ranging and very different from even a decade ago. Our programs range from LowTech to HighTech to BioTech to GreenTech. Our programs build cumulative knowledge overtime. For example, OARDC, OSU Extension, 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, and now, those lines of research have resulted in a significant portion of the Ohio State University (OSU) Wooster campus' energy needs being met from biogas generated onsite. A business research partner in the BioHio Research Park on the Wooster campus signed a contract in late 2010 and has potential to supply up to 25% of the Wooster campus' energy needs from 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 OSU Extension 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 2010 the BioHio Research Park has culminated the move from a plan on paper to a reality on the ground with the main site enhanced with an improved access road, job-ready site preparation, and utilities. Tenants are moving into a newly remodeled building, and a company is already operating a clean energy plant on the premises. Water, sewer, gas, electric and road access improvements were made on the Park's main 95-acre site, thanks to a $3.1 million grant from the Ohio Department of Development and $3.4 million in matching funds from utilities and the City of Wooster. U.S. Department of Commerce provided a $744,000 grant and $1.2 million in local matches were provided. The Park is model of federal, state, and local collaboration to demonstrate how to move science into society to advance economic and social well-being. OARDC and OSU Extension are using the Park, which saw the installation of its first Board of Directors this year, as a catalyst for local and regional development in agbioscience. OSU's agbioscience program underpins Ohio's $100 plus billion agricultural industry.

In 2010 CFAES joined with law, engineering, business, and health sciences at OSU creating a strategy for more rapidly commercializing university research that is determined to have great promise. A Proof of Concept Center has been established 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. This new effort is intended to build on CFAES' history of inventions and commercialization with its 123 invention reports and 40 patents awarded over the years. Research and Extension programs throughout the year have been highly focused on leveraging our inputs into the agbiosciences for economic development and job growth. Agbioscience continues as the institution's program moniker and is defined as the inclusive term for the physical, biological, environmental, chemical, engineering, social, and economic sciences utilized in food, agricultural, and environmental research and Extension programming.

Throughout 2010 OARDC and OSU Extension have continued to adapt to tighter budgets, ever increasing demand for services, and Ohio's critical need for advancing job growth and economic development. Additionally, the Wooster Ohio campus that serves as the major OARDC research station and administration center, and houses OSU Extension's North East Regional offices, was struck by a devastating tornado in September 2010. Ten damaged structures have been or will be deconstructed, two major buildings, including the Food, Agricultural and Biological Engineering building, will be replaced or require major repair, and nine other buildings require significant remediation and repair. Over 33,000 square feet of storage space was lost to the storm. Likewise the Secrest Arboretum, a research and teaching arboretum with specimens dating from 1901, was heavily damaged. While much remediation and rebuilding still remains, the majority of the research programs have been brought back on line. These facilities and programs are critical as Ohio and the nation continue to face a severe economic downturn, pressures to become more energy independent, need for more sustainable systems are demanded, and as we seek approaches to lessen our impact on the 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 productivity from land grant research and Extension programs. To do address these issues requires new approaches in which land grant programs can play a major role as transformational leaders. 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 OSU Extension have directed resources in new and innovative ways to generate technology - based economic development, supported by human capital programs. For example, OSU Extension has long supported an OSU Leadership Center that is managed by small group of professionals dedicated to providing leadership-centered education and research to individuals, families, organizations, and communities. The Center provides high-quality practical programs to build and strengthen leadership capacities and offers an in-depth collection of leadership-related resources for loan. To improve our on-farm research and demonstration capacity, our working farm just west of the Columbus Ohio campus is being transformed into a learning laboratory for best management practices for water quality protection and whole-farm sustainability in cooperation with the Ohio EPA and the local soil and water conservation district.

Another example of innovation is OARDC's ground-breaking in 2010 for a new Plant and Animal Agrosecurity Research Facility (Biosecurity Lab Level 3) in Wooster Ohio designed to address risks imposed by the potential movement of diseases into the United States via accidental or deliberate (i.e., terrorist) means. This year, OARDC has fully brought on-line the previously reported $5.5 million Feedstock Processing Research Facility, a state of the art facility for processing biomass ranging from custom animal feeds to meet research needs to preparing materials for advanced energy and biobased product research. Three new outlying agricultural research stations received new buildings, an additional $2.5 million investment, in 2010. These research stations are placed throughout the state to provide very targeted research to meet regional stakeholder needs and support researcher needs for diverse research sites.

OSU Extension and OARDC are committed to maintaining our core programs and serving our traditional clients while at the same time, advancing new programs such as biobased products/sustainable energy. This 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 product research - development - marketing sector where we research new value added products 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. An example related to traditional needs is OSU Extension's weekly Crop Observation and Recommendation Network (C.O.R.N.) newsletter, estimated to save farmers upwards of ten million dollars annually by providing them the latest research based information on their crops. Visitors to our Wooster campus can hear the latest updates on the use of wind, solar, and biomass for energy production in Ohio, learn about the latest in green vehicles and biofuels, or visit a state-of-the-art anaerobic digestion facility. Each year from 600 - 900 enthusiastic beekeepers from a dozen states swarm the Wooster Ohio campus for what has become the largest single-

day beekeeping workshop in the United States. We continue to personally reach upwards of 140,000 visitors from all over the US and Canada via our annual Farm Science Review, who come for three days to peruse 4,000 product lines from 600 commercial exhibitors, and learn about the latest in agricultural research, conservation, family and nutrition, and gardening, and landscape.

OSU Extension has continued in 2010 to respond to immediate social needs such as those of military families by hosting its fifth annual military kids program at two of its 4-H camps. Web-based outreach is also critical. One can log on to an OARDC website to review agricultural and bioscience asset inventory maps that are being generated as a result of our project for the Fund for Our Economic Future, "Catalyzing and Agricultural and Bioscience Industry Cluster in Northeast Ohio". Or one could have linked into "Potential Impacts of Climate Change on Great Lakes Farms and Forests -2010" as part of the OSU Climate Change Outreach Team's webinar series. To assist our students and others in our profession with job searches, users can go to the CFAES jobline, HIREABUCKEYE, where over the last decade 3000 employers have posted over 6500 jobs related to the agbiosciences. These efforts are required to support the agbioscience sector in Ohio that is valued at $100 billion annually, employing nearly one million people. Given that is 11% of Ohio's economy with 1 in 7 Ohio jobs being agriculture related, the continued efforts of OARDC and OSU Extension are critical. A recent paper, 'Investing in a Better Future through Public Agricultural Research', coauthored by a CFAES faculty member, Luther Tweeten, provides an excellent presentation of data related to the value of investments in agricultural experiment stations such as OARDC. These efforts range from sponsoring urban gardening research on old paved parking lots to looking for pesticide resistant genes in bedbugs to state of the art gene sequencing research.
Today, OSU Extension and OARDC are focusing 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. OARDC and OSU Extension also provided major input into APLU/ESCOP Science Roadmap for Food and Agriculture and have begun assessing 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. OARDC and OSU Extension work closely on all CFAES agbioscience programs. Eighty (80) faculty members hold joint appointments in OARDC and OSU Extension. Particular focus is and will continue to be on the CFAES signature areas. For example, to further build on the impact of OARDC's research program in advanced energy and biobased products, and compliment the Ohio Biobased Innovation Center, OSU Extension is expanding their leadership in education, outreach, and human capital development in this area. The Extension Advanced Energy Network (Network) has been created and serves as an organizing structure to maximize the contributions of Ohio State University Extension to Advanced Bioenergy and Bioproducts programming. Within the Network there are seven areas of interest that Extension professionals maintain an area of specialization: Biomass, Biodigesters, Climate Change, STEM Science, Solar, Wind and Energy Efficiency. The Extension Sustainable Development Initiative provides clientele and Extension professionals access to research materials, curriculum, conference and community presentations, events and news through the energy section of their website. The Network provides outreach education and engagement to Ohio residents, businesses, and public officials through workshops, community presentations, research plots, partnerships with private and government based organizations, webinars, and eXtension resources. Materials are available to each of Extension's county offices and nine regional areas electronically for adaption and support in delivering local programming.

According to the Battelle Technology Partnership Practice assessment report (2009) the foremost in-state driver of agbioscience research and development is OARDC with OSU Extension 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. 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 post doctoral 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. Fifty six (56) high school age and undergraduate students participated in the 2010 OARDC Research Internship Program (ORIP). STEM concepts were taught in laboratory and field settings and included seminars, project reports, and symposia. OARDC research faculty members also participated in the national 2010 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. 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 23.2% between 2004 and 2008, increasing from $19 million in 2004 to $23.4 million in 2008. (2) Achieving a 64% growth rate in funding in the applied and commercially oriented non-federal research funding category between 2004 and 2008. (3) Producing innovations that generated 57 invention reports and 22 patent applications since 2004. Each of these endeavors is supported by OSU Extension that further grows these numbers and impacts with an equally robust program. Battelle (2005) reported that OSU Extension 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 OSU Extension 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.

Both OARDC and OSU Extension work hard to leverage local, state, and federal funds through creative programs. For example, OARDC data show that the $11.5 million provided over the last decade through an internal seed grant program (SEEDS) to faculty members has leveraged an additional $43 million in competitive grants and industrial matches yielding a $4 return for every $1 invested in SEEDS by OARDC. SEEDS funded research programs have engaged over 150 companies in partnering on research with OARDC researchers, has worked in 15 different countries, three patents have been granted as of 2010 (9 filed), three licenses issued, and almost 700 peer -reviewed publications have resulted. SEEDS - supported graduate students have produced 42 dissertations and 72 masters thesis. In another approach to leveraging funds, OSU Extension received approximately $60 million of volunteer and in-kind support in 2010, as it has done in past years. For 2010, 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. Programs range from internationally recognized research such as in soybean rust to a community based watershed phosphorus trading program that is improving watershed aquatic health while growing an industry that was once seen as a major environmental management problem. These are collaborative efforts involve both OARDC and OSU Extension, as well as multiple business and industry partners, and multiple federal, state, local agencies and non- government organizations. OARDC and OSU Extension 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. Heath and wellness, energy and environment, sustainable societies, and biobased - advanced materials are among the problem areas that were addressed in 2010 in collaboration with both internal and external partners.

We use every opportunity to focus on our signature and high priority areas. For example, our OARDC 2010 Annual Research Conference, attracting both internal and external audiences, was entitled Food Safety. OSU Extension conveyed this food safety research information statewide. Additionally OSU Extension maintains a Food Safety Hotline with both telephone and email access. These collaborative ventures are providing leadership and output/impacts that are relevant to multiple sectors of our society and contribute to food, economic, environmental, and national security. In 2010 OARDC managed a $120 plus million of on-going 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 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 other biologically active ingredients in a more economical and environmental friendly manner. All 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 OSU Extension.

The primary goal in 2010 has been to grow human capital as a means of economic recovery, job growth, and advancements in societal well-being. OSU Extension 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. OSU Extension works with farmers to strengthen their businesses, adopt new technologies, and improve efficiency while protecting the environment. Their educators and specialists teach nutrition, food safety, and other life choice skills to help Ohioans live healthy lives. OSU Extension works to help build strong families by offering programs and information to all Ohioans on childcare, parenting, family life, adult development and aging, and balancing life, jobs, and families. They also teach people to manage money and prepare for retirement. 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 OSU Extension effort through clubs, camps, and after-school programs in urban, suburban, and rural communities statewide. 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 OSU Extension efforts. Job readiness training to improve the skill level of potential employees is important in attracting new businesses and encourage retention and expansion among current employers. OSU Extension 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, OSU Extension protects Ohio's natural environment by working with landowners in managing woodlands and preserving streams and other water resources, such as Lake Erie. For nearly 1,200 FFA Organization members, their experiences at summer camp might be a deciding factor for the jobs they will assume in Ohio some day. Collectively these 2010 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. We are committed to a broad array of support ranging from introducing new cultivars, to obesity and diabetes education programs in urban settings to on-farm field days, to soil fertility research and outreach in Africa and India, as well as in the U.S. The Ohio Agricultural Research and Development Center and Ohio State University Extension have worked throughout 2010 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 OSU Extension leverage federal base funding provided through NIFA to conduct both basic and applied research, and to

manage a comprehensive statewide extension effort in program development, delivery, and evaluation. While OARDC and OSU Extension focus heavily on our applied impacts, OARDC conducts and reports a substantial amount of basic research impacts in that other researchers and business and industry worldwide depend on our scientific breakthroughs. Likewise OSU Extension 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 in kind and volunteer support, to make the Ohio program truly stakeholder-based. Stakeholders though are not limited to Ohio. Both entities 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: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	215.0	0.0	83.2	0.0
Actual	210.0	0.0	92.4	0.0

II. Merit Review Process

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

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

2. Brief Explanation

OARDC and OSU Extension, and the College of Food Agricultural, and Environmental Sciences, are well into their strategic plan that was adopted in 2009. Advisory committees and multiple internal and external stakeholder groups are now providing feedback on plan implementation. Likewise these groups have been used throughout 2010 for input on multiple matters including annual reports and fact sheets. 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. 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 provided 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 2010 internal competitive grants program (SEEDS) was 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. The more relevant information is placed before stakeholders the greater the chances that the feedback loop with be complete.

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.

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 2010. Each year, 2010 included, 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. 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 has provided 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. Out of these visits 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 collaboratories 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 2010, electronic messaging, social media, and blogging, as well as interactive group meeting/messaging systems have expanded rapidly. OARDC, OSU Extension, and most academic departments/schools within the College of Food, Agricultural and Environmental Sciences more effectively use their external advisory committees and stakeholder groups as a forum to discuss current programs and gather their input for future direction, e.g. strategic planning. More people can 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. 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 2010 OSU Extension and OARDC have worked 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.

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 served the organization well in 2010. 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 to expand this institution's clientele list and knowledge of needs. 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.

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 techniques noted above have all been are utilized in 2010 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 to identify how core competencies can be translated into sources of innovative technologies and products for development. CFAES used similar techniques in preparing our 2009 CFAES Strategic Plan as did OSU Extension when they prepared their strategic plan in 2008-09. Now all of these stakeholders are 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.

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 2010, 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 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 society's needs and contributes to national wellbeing. 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. 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, and consumers have and will continue to redirect both extension and research programs. It is such issues that provide the 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 and services concepts to the suppliers, and ultimately assess impact. 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. 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 2010: Budget request to the state; relations with elected officials; personnel hires; Ohio Third Frontier funding; remediation of the Wooster campus tornado damage, new facilities planned for, e.g. new agricultural biosecurity laboratory on the Wooster campus, and 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 2010 annual reports; research grants and awards; program content and delivery strategies within OSU Extension; and membership, structure, and role of advisory committees. The primary information learned in these interactions during 2010 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
10761420	0	6759372	0

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	10761420	0	6759372	0
Actual Matching	10761420	0	11618307	0
Actual All Other	0	0	0	0
Total Actual Expended	21522840	0	18377679	0

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous				
Carryover	1550641	0	0	0

V. Planned Program Table of Content

S. No.	PROGRAM NAME
1	Climate Change
2	Sustainable Energy
3	Childhood Obesity
4	Food Safety
5	Global Food Security and Hunger
6	Soil, Water and Air Systems-OARDC Led
7	Natural Resources and Environmental Systems-OARDC Led
8	Plant Systems-OARDC Led
9	Animal Systems-OARDC Led
10	Food, Agricultural, and Biological Engineering Systems-OARDC Led
11	Food Systems-OARDC will not report in this area in 2010 but under the new NIFA titles
12	Bio-based Non-Food Value Chains-OARDC will not report under this for2010- See
13	Human Health and Safety-OARDC Led
14	Agricultural, Environmental, and Development Economics-OARDC Led
15	Human and Community Resource Development-OARDC Led
16	Business Retention and Expansion Initiative (Extension)
17	Dining with Diabetes (Extension)
18	Increasing Profitable Crop Yields Above Trendline-2014 (Extension)
19	New Start for Financial Success (Extension)
20	Real Money, Real World (Extension)
21	Why Trees Matter: Next STEP (Extension)
22	Advancing Employment and Income Opportunities (Extension)
23	Enhancing Agriculture and the Environment (Extension)
24	Preparing Youth for Success (Extension)
25	Strengthening Families & Communities (Extension)

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	80%		40%	
133	Pollution Prevention and Mitigation	10%		50%	
605	Natural Resource and Environmental Economics	10%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Actual	6.0	0.0	1.4	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
307469	0	105703	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
307469	0	136777	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. CFAES faculty manage in college centers such as the Carbon Sequestration Center and are also members of multi college groups such the University's Climate, Air and Water Target Investment group that has received university funding for research in the Planned Program. 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, and develop human capital. OARDC and OSU Extension faculty and staff engage in appropriate levels of outreach, engagement, and consultation, with both internal and external stakeholders. OSU Extension Educators and Specialists conduct programs and relate climate change policy and economic issues; give presentations on climate change to interested groups; participation of the OSU Extension Climate Change Team. The primary method of workshops and presentations is via Webinars.

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. Ohio citizens; state agency personnel (Ohio Department of Natural Resources, Ohio Environmental Protections Agency, Ohio Department of Agriculture, Ohio Department of Development, Ohio Department of Transportation); environmental groups and NGO's; Ohio businesses; Ohio farmers.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	1500	100	0	0

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

Patent Applications Submitted

Year: 2010

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	2	8	10

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

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

Year	Actual
2010	1500

Output #2

Output Measure

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

Year	Actual
2010	5

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Create strategies/technologies within our program mission to reduce atmospheric pollution that can contribute to global climate change. climate change.

Outcome #1

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
ENHANCED DEEP SOIL CARBON STORAGE - Storing or sequestering carbon in the soil is one way to mitigate climate change. No-till farming aids in carbon sequestration by minimizing soil disturbance and slowing the release of carbon dioxide into the atmosphere. No - till is practiced on 35% of Ohio farmlands, with 20% of the Ohio corn and 80% of Ohio soybean and wheat in no - till. Carbon dioxide has been linked to climate variability. Soil carbon is stored both in the soil surface and in the deeper soils, those below eight (8) inches.

What has been done
OARDC researchers are finding that carbon stored on the soil surface (first 8 inches) degrades more rapidly than carbon at deeper depths (up to 3 feet). Some reasons - higher microbial biomass, more soil surface activity, and fewer soil minerals. Lignin and cellulosic plant materials in the soil surface area are not stable, so carbon will be lost when plant litter decomposes. But organic carbon associated with soil minerals at deeper depths will last a long time, maybe thousands of years. Methods to promote deep carbon storage include: manure application, which supports earthworm activity; practices supporting stable soil structure with conduits for moving carbon deeper; and growing plants with deep roots.

Results
Maintaining healthy soil carbon levels is critical to supporting Ohio's more than $100 billion agbioscience industry. Likewise, sequestering carbon in the soil helps to slow climate change. This research focuses on the impacts that changes in climate and carbon have on the environment, and how we can respond through scientific and policy-oriented solutions. The

Intergovernmental Panel on ClimateChange estimates that roughly 100 billion metric tons of carbon over the next 50 years could be sequestered with beneficial land management practices, offsetting 10 - 20% of the worlds projected carbon emissions from fossil fuels.

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
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

Evaluation Results

Developed and helped implement five webinars on topics focused on and relating to climate change: Climate Change and Water Resources Impacts in the Great Lakes Region; Climate Change and Public Health Impacts in the Great Lakes Region;Effects of Climate Change on Species Interactions in Natural and Agricultural Ecosystems; Potential Impacts of Climate Change on Great Lakes Farms and Forests; Climate Change and Water Quality in the Great Lakes. The series will continue in 2011.

Key Items of Evaluation

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	30%		90%	
608	Community Resource Planning and Development	70%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Actual	2.0	0.0	3.9	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**
102490	0	259375	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
102490	0	239666	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 deparents/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. The capacity of this program has been greatly expanded by the addition of Dr.Katrina Cornish, an internationally recognized expert on alternative natural rubber, who was selected as Endowed Chair in Bio-based Emergent Materials in Ohio State University's College of Food, Agricultural, and Environmental Sciences (CFAES). The Endowed Chair in Bio-based Emergent Materials is one of several positions funded by the Ohio Research Scholars Program (ORSP) -- an effort created by the state of the Ohio to promote collaborations between public and private universities and industry partners throughout the state to build and sustain commercially promising lines of research. This position is part of an ORSP research cluster on technology-enabling and emergent materials that brings together Ohio State University, the University of Akron and the University of Dayton. In her new position, Cornish will lead a multidisciplinary team in the creation of innovative industrial materials from plant-based sources and associated biological, chemical, and physical processes. She will also be charged with training new scientists and engineers for the emerging global bio-based economy.

2. Brief description of the target audience

Targeted audiences include, but are not limited to: business, industry, and residents that have expressed a need for sustainable energy and advanced materials information that is derived through new research, extracted from on-going research, or is derived from scientific literature; other stakeholders, with particular focus on consumers; fellow academic units that partner with program scientists to create systems and processes needed to support not only the research, but also the adoption of the research findings by industrial partners; fellow agencies or support organizations who will not only use the information but will also be brokers of that information, including embedding it into groups to encourage change; populations who have not requested the information but will likely benefit from that information, e.g. community leaders, general public; other scientists and scientific groups; political entities; other education, outreach, and extension personnel; students from elementary school to post doctorate studies; and news organizations.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	887	10313	486	77

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

Patent Applications Submitted

Year: 2010

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	12	12	24

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Educational Workshops and Seminars

Year	Actual
2010	17

Output #2

Output Measure

- Research based assessments of energy project sites

Year	Actual
2010	3

Output #3

Output Measure

- Community energy project assistance & planning

Year	Actual
2010	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	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.
5	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.
6	Increased understanding of energy alternatives, resources and project support
7	Implement change in energy usage by workshop participants
8	Complete installation of alternative energy activity
9	Complete plan for community or business energy activity
10	STEM Science Education in Energy

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 Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
BUILDING INSTITUTIONAL CAPACITY - To grow biobased non-food and sustainable energy related research and development, OSU, the State of Ohio, and multiple business partners established the Ohio Bioproducts Innovation Center (OBIC) in 2005 to study how feedstocks, such as crops, wood residue, manure, solid or food industry waste, can be processed using mechanical, chemical, bioconversion, hydroloysis, gasification, or pryolysis to create food, fuel/energy, and biobased materials, all with the idea of finding value added substitutes for petroleum based goods.

What has been done
A 2010 assessment found that OBIC has led in the biobased program receiving $11.5 million in Ohio Third Frontier Grants in the past 6 years, with a 2 to 1 match by OBIC alliance members, with $71 million leveraged by Wright Center(a state funded center designation) Initiatives. OBIC has assisted alliance members and other partners in the development of 77 proposal for $150 million in requests; $79 million in client grant awards were made for biobased chemicals and advanced materials.

Results
Institutional capacity has been established, creating a multi partner center, OBIC, that now serves to leverage research capacity, feedstock potential, and manufacturing capacity to meet business and societal needs. OBIC is a characterized as a partnership among participants primarily from, but not restricted to, Ohio's two largest industries, agriculture at an annual value of $100+ billion, and polymers at $50+ billion annually. Programs in this area have met the five year goal of developing strategies to engage producers, industrial partners, and consumers groups in seeking biobased solutions, and have resulted in a highly effective leadership-oriented partnership.

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 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
BIODIGESTERS - Small farm and ranch operations often have limited opportunity to effectively utilize animal waste either as fertilizers or for biofuel. Even when used as a direct application fertilizer, especially in lesser developed countries, runoff often causes water pollution. Lack of low cost technologies impact biofuel production from animal waste streams.

What has been done
OARDC scientists have completed studies on methane production, electricity production, and wastewater transformations for a digestion system that combines biogas from a swine digester and dairy digester on small farm operations in Costa Rica. This project improves the environment of watersheds, streams, and rivers, and improves the economic viability of small and medium farms by using waste streams to produce energy. This tropical assessment replicates a somewhat larger scale ongoing research project in Ohio.

Results
A dairy digester fed by five (5) dairy cows produced 27.5 m3/day of biogas with 62.6% methane and reduced organic matter (COD) by 86%. The swine digester (40 pigs) produced 6.0 m3/day of biogas with 76.4% methane and reduced COD by 92%. The low-cost, plug-flow digesters were not heated and were operated in the lower portion of the mesophilic range (25-27 C). The project proves that small-scale, affordable and variable temperature digesters can be viable in tropical climates. The OARDC project showed variable temperature (25-27 C) small-scale anaerobic

digesters can produce renewable energy at rates of 5.5 m3/day/mature cow and 0.15 m3/day/growing pig. Such a digester also reduces COD in animal manure from farm by 86-92%. Information is now available for adoption of this technology in small farm operations in tropical countries.

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.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
DISTILLER GRAINS in Ohio are a byproduct of fuel ethanol production. The tremendous growth in fuel ethanol production has greatly increased the supply of distillers grains, resulting in increased interest in feeding it to animals. Annual production of distillers grains (on a dry basis) is currently estimated at 16 million tons. In the United States most of the ethanol produced currently is made from corn but other grains can be used. This residue is called wet distillers grains and usually has 30 to 35% dry matter (DM) and contains most of the fiber, fat, protein, and minerals found in the original grain used to make the ethanol. For the ethanol industry to be profitable the dried distiller grain must be a source of profit for the industry.

What has been done
OSU researchers have discovered strategies to increase utilization of distillery grains co-products (DGS) in cattle and sheep diets, to reduce production costs, reduce manure output, and potentially improve meat quality (palatability and human nutritional characteristics). These

discoveries benefit producers, the biofuels industry, Ohio corn growers, and consumers. For ethanol production to be sustainable, DGS must generate revenue. Both the biofuels and livestock industries are jeopardized unless discoveries are made to allow increased use of DGS in cattle rations as a viable and cost effective substitute for corn grain.

Results
The program has found that pregnant beef cows and sheep can be fed DGS at up to 80% of the diet utilizing the Prescription Intake Nutrition Strategy developed by OARDC. This more than doubles the potential use of this co-product. Utilizing DGS instead of hay or corn to meet calorie requirements reduced daily feed costs by 20 to 50% and resulted in a 50% reduction in manure output. OARDC scientists have also discovered that DGS can be used at up to 70% of the diet for growing heifers and feedlot steers if our Prescription Intake Program is utilized. Grazing lambs supplemented with DGS nearly eliminates the need for anthelmentic treatment for internal parasites. This new feeding regime can reduce traditional corn and hay feed requirements by 20 - 50% while decreasing the manure output by upwards of 50%, lessening the environmental impacts of animal agriculture. In Ohio, these strategies have the potential to save cattle producers over $100 annually per cow ($20 million total). DGS is a highly valued co-product with a market value of $180 million in Ohio alone.

4. Associated Knowledge Areas

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

Outcome #4

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 Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
POLYURETHANE FOAMS - Dependency on petroleum for production of non- fuel products continues to negatively impact the United States quest for energy independence. One area of

promise is development of a liquefaction process to produce polyurethane foams from locally derived biomaterial , rather than from crude oil. The large polyurethane foam in the United States is worth over $13 billion, has a demand for 2.8 million tons of the product, and heavily depends on petroleum-based sources.

What has been done
OARDC project personnel working with three companies, one a Fortune 500 company, have successfully scaled up the liquefaction system to a 50 gallon/batch system. A much larger, 500-gallon reactor has been ordered to boost production in the near future. The produced polyols have been successfully used for the production of both rigid and flexible foams for various kinds of applications. The bio-polyols were characterized in terms of hydroxyl number, acid number, and viscosity. The foam has been characterized as to density, compression strength, and resilience and meets industry standards.

Results
The developed environmentally friendly liquefaction process produced biopolyols and polyurethane foams from the waste stream (crude glycerin) of the biodiesel process and lignocellulosic biomass. The U.S. biodiesel industry alone is producing about 70 million gallons of crude glycerin byproduct annually. Compared to the petroleum and vegetable oil based polyurethane products, this polyurethane foam technology is more cost effective by 5 -10%. This process will also increase the profit of biodiesel plant by increasing the value of its byproduct. A Mansfield Ohio company is now in the production phase and expects to produce of the bio-polyol at the rate of one million gallons per year for the first two years, and five million gallons per year by the fifth year. Within the next two years the company will grow from three employees currently to between 20-30 employees.

4. Associated Knowledge Areas

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

Outcome #5

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	Quantitative Target	Actual
2010	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
MANURE AS A BIOFUEL - Livestock manure often exceeds agricultural capacity to recycle, becoming both an economic liability to dispose of or an environmental hazard. Approximately 87 million dry tons of livestock manure are available in the US each 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 87 million dry tons of livestock manure.

What has been done
The central objective an OARDC study was to develop a temperature-phased anaerobic digestion (TPAD) process that can enhance biogas production from livestock manure. The TPAD system was fed once daily in a fed-batch mode. The diary manure slurry fed to the TPAD system contained a high total solid content. After the process reached steady state, the thermophilic and mesophilic digester produced 1.1 and 2.3 liters of biogas/liter digester/day, respectively. The methane content of the biogas was relatively low, about 54%. The overall removal of volatile suspended was less than 40%.

Results
One single-staged thermophilic digester and one two-staged mesophilic digesters were then operated at the same operational conditions as the aforementioned TPAD process. The purpose of these "control" processes was to compare to and evaluate the TPAD process. The single-staged thermophilic digester produced 2.9 liters of biogas/liter digester/day, while the two-staged mesophilic digesters yielded 2.4 liters of biogas/liter digester/day biogas. The methane content was 61% and 58%, respectively, for the biogas produced from the single-staged thermophilic digester and the two-staged mesophilic digesters. As the control process out-performed the TPAD process, OARDC scientists repeated the TPAD process with modification of operation. The biogas yield increased by at least 20% over the first TPAD experiment yielding a major breakthough in biofuel production from animal manures. This increase can potentially translate to at 3.5 billion m3 methane/year in the US livestock industry. Pilot production has been established in Wooster, Ohio with an industrial partner.

4. Associated Knowledge Areas

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

Outcome #6

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	Quantitative Target	Actual
2010	{No Data Entered}	438

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Residents, businesses, public officials, educators and ag producers are seeking knowledge regarding renewable energy to address cost saving and reliable energy initiatives. Opportunities for creating new income streams through supplying biomass materials for energy and biobased products are evolving ag industry alternatives.Finally, aggregators, utilities and energy companies are developing projects within rural areas. Informed decisions require increased knowledge.

What has been done
Workshops are held on a regional bases, tours of energy applications are delivered, publications were created, demonstration applied research projects regarding biomass crops were established and community planning processes were piloted.

Results
Participants, especially ag producers, forestry and public officials increased their knowledge regarding biomass applications in electric energy production from crops and forest products, waste streams especially animal and food industry for digesters, potential alternative use of farm land for solar and wind farms and liquid biofuels production. Regional biomass working groups were created with participation by developers, aggregators, public officials, utilities, growers, businesses and residents. Topics addressed included price points, types of crops to grow, market opportunities, various models of operation and collaborations needed to address issues.

4. Associated Knowledge Areas

KA Code	Knowledge Area

608 Community Resource Planning and Development

Outcome #7

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	Quantitative Target	Actual
2010	{No Data Entered}	635

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Energy costs are a major item in budget operating costs for both residents and businesses. State agencies, public officials and utilities collaborate to seek reduction in energy demand as a critical component of a balanced state and national energy policy. Reduction in demand also improves environmental quality both locally and globally.

What has been done
Workshops have been delivered, materials created and distributed, applied research in consumer behavior, a searchable website was implemented and partnerships with state agencies, federal agencies and utility companies established.

Results
89% of participants in workshops indicate increased knowledge in energy efficiency methods. 33% of participants indicate they will apply for energy saving incentives offered by government and utility companies.Additional workshops and publications are planned for 2011 as a result of new partnerships.An energy certified building was constructed for educational activities and demonstration.

4. Associated Knowledge Areas

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

608 Community Resource Planning and Development

Outcome #8

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	Quantitative Target	Actual
2010	{No Data Entered}	23

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Residents and businesses are beginning to construct renewable energy electric generation facilities for personal use. People interested in establishing such a project seek information on incentives, best type of renewable for their location, operational and construction costs and process of completing a project.

What has been done
Workshops were held to increase participants knowledge of energy generation types, costs, incentives and best practices. In addition collaboration with utility firms, local governments and private firms increase access to solution providers.

Results
Three 50 kw home solar projects were completed and five additional people applied for energy project incentives.

4. Associated Knowledge Areas

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

Outcome #9

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	Quantitative Target	Actual
2010	{No Data Entered}	4

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Community leaders, residents and businesses including ag producers are seeking unbiased expertize to assist their assessment of particular energy projects. Community leaders see value in increasing job base and tax base through industrial scale energy projects.

What has been done
Clientele interested in four separate energy projects were assisted in evaluating the appropriateness of their activity. Assistance included deliver of research based information, site assessment, educational materials and public meetings.

Results
Three of the four projects are still in development. Two have applied for permits. One project reached construction and is now producing renewable energy. The project is an 85 acre 12 megawatt solar facility.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

Outcome #10

1. Outcome Measures

STEM Science Education in Energy

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	431

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Educators, parents and youth are interested in increasing the knowledge of youth regarding energy applications. Materials are needed that foster applied research activities as learning models for youth.

What has been done
Working with local libraries in the summer reading program Eco-Quest a demonstration activity through the 4-H Eco-Adventures activity was delivered.

Results
Youth gained knowledge regarding environmental impacts regarding water pollution and renewable energy solutions. Youth created posters and displayed them at county fair to increase knowledge of adults and youth on the topic.

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

- Public Policy changes
- Government Regulations

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

Evaluation Results

Key Items of Evaluation

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	70%		10%	
724	Healthy Lifestyle	20%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Actual	24.0	0.0	2.0	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
1229877	0	195421	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1229877	0	133015	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Obesity research includes food science, plant sciences, and consumer research related to human health and obesity. Parallel extension programs that address health and wellness, life styles, and

consumer choice are included in this Planned Program as well. Given the complex nature of obesity as a subject, the areas is broadly supported in scientific areas ranging from genetics for breeding plants and animals that can be processed into healthier food products, to education of school children about eating healthy. Thus not all impacts relating to obesity, per se, are found in this Planned Program. OARDC and OSU Extension 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, or where there are latent needs, for related research and extension information that is to be derived through new research, extracted from on-going research, or is derived from scientific literature; fellow academic units that partner with OARDC and OSU Extension to support not only the research, but also the adoption of the research findings by stakeholders; fellow agencies or support organizations who will not only use the information but will also be brokers of that information, including embedding it into groups to encourage change; populations who have not requested the information but will likely benefit from that information, e.g. obese children; other scientists and scientific groups; political entities; school administrators; students from pre-school to post doctorate studies; news organizations; and business and industrial groups concerned about obesity in their workforce or who are producers of foods and food additives that can help reduce obesity and its side effects.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	16229	326412	0	0

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

Patent Applications Submitted

Year: 2010

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	2	16	18

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of volunteers participating in the planning and implementation of this program.

Year	Actual
2010	170

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	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	Number of participants who learned new information from this program.
3	Number of participants who plan to increase their level of daily physical activity.
4	Number of participants who plan to increase their consumption of fruits and vegetables.

Outcome #1

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 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
CHILDHOOD OBESITY is a chronic national problem as is adult obesity.

What has been done
Data on 8,550 children from the Early Childhood Longitudinal Study, Birth Cohort, a study conducted by the National Center for Education Statistics, were analyzed. The researchers examined the association of childhood obesity among preschool-aged children with three household routines: eating the evening meal as a family more than five times per week; obtaining at least 10½ hours of sleep per night; and watching less than two hours per day of TV on weekdays ? referred to as ?screen-viewing time.? The researchers calculated the body mass index (BMI) of the children using the measured heights and weights of the children.

Results
A national study was funded by the USDA - Food Assistance and Nutrition Research Program suggests that preschool-aged children are likely to have a lower risk for obesity if they regularly engage in one or more of three specific household routines: eating dinner as a family, getting adequate sleep, and limiting their weekday television viewing time. In a large sample of the U.S. population, the study showed that 4-year-olds living in homes with all three routines had an almost 40 percent lower prevalence of obesity than did children living in homes that practiced none of these routines. The researchers suggested that adopting these three household routines could be an attractive obesity-prevention strategy for all families with young children, especially because these routines may benefit children?s overall development.

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 #2

1. Outcome Measures

Number of participants who learned new information from this program.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	8993

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The rate of childhood obesity has tripled in the last 30 years, to almost 29% of Ohio children coming in obese in 2008. 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
Choose It! Use It! a program for kids to become healthier by choosing fruits and vegetables and using their bodies to exercise was developed and delivered.

Results
Over 92% of the 3rd graders who participated in Choose It, Use It reported learning how much food they should eat at each meal and the importance of eating healthy foods every day; while over 97% learned why it is important to exercise every day.

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

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	8553

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The rate of childhood obesity has tripled in the last 30 years, to almost 29% of Ohio children coming in obese in 2008. 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
Choose It! Use It! a program for kids to become healthier by choosing fruits and vegetables and using their bodies to exercise was developed and delivered

Results
Over 97% of the 3rd graders who participated in Choose It, Use It reported learning why it is important to exercise every day. 177 persons who chose to weigh out lost 1486 pounds. Of those weighing out, 14% lowered their blood pressure, 10% lowered cholesterol, 6% lowered blood sugar and 3% reduced or were taken off various medications.

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle

Outcome #4

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	5192

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The rate of childhood obesity has tripled in the last 30 years, to almost 29% of Ohio children coming in obese in 2008. 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
Choose It! Use It! a program for kids to become healthier by choosing fruits and vegetables and using their bodies to exercise was developed and delivered

Results
82% of the 3rd graders who participated in Choose It, Use It reported that they will eat more fruits and vegetables each day and share what they learned with their families.

4. Associated Knowledge Areas

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

V(H). Planned Program (External Factors)

External factors which affected outcomes

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

Evaluation Results

Examples of evaluation results from a few childhood obesity-related OSU Extension programs:Over 92% of the 3rd graders who participated in Choose It, Use It reported learning how much food they should eat at each meal and the importance of eating healthy foods every day; while over 97% learned why it is important to exercise every day. 82% reported that they will eat more fruits and vegetables each day and share what they learned with their families. A third grade teacher that offered the Choose It, Use It program to her students reported that she has altered the behavior awards she is using to be healthier and that the class served only healthy snacks at their recent holiday party.213 youth were observed making healthy food choices when presented with four snack food choices. 2 choices were over 5 grams of sugar or fat and 2 choices were less than 5 grams of sugar or fat. Youth were observed reading the Nutrition panel and then making a snack choice. 80% of youth selected the less sugar or fat snack.524 adults participated on 90 teams. 571 adults attended 12 weekly educational sessions. 400+ attended the Kickoff (health fair, cooking demonstrations, fitness activities, motivational program). 100 attended the Celebration of Winners. 67 participated in the Walk at the county fair. 26 participated in the ZERO Holiday Weight Gain program. 177 persons who chose to weigh out lost 1486 pounds. Of those weighing out, 14% lowered their blood pressure, 10% lowered cholesterol, 6% lowered blood sugar and 3% reduced or were taken off various medications.

Key Items of Evaluation

Examples of evaluation results from a few childhood obesity-related OSU Extension programs:Over 92% of the 3rd graders who participated in Choose It, Use It reported learning how much food they should eat at each meal and the importance of eating healthy foods every day; while over 97% learned why it is important to exercise every day. 82% reported that they will eat more fruits and vegetables each day and share what they learned with their families. A third grade teacher that offered the Choose It, Use It program to her students reported that she has altered the behavior awards she is using to be healthier and that the class served only healthy snacks at their recent holiday party.213 youth were observed making healthy food choices when presented with four snack food choices. 2 choices were over 5 grams of sugar or fat and 2 choices were less than 5 grams of sugar or fat. Youth were observed reading the Nutrition panel and then making a snack choice. 80% of youth selected the less sugar or fat snack.524 adults participated on 90 teams. 571 adults attended 12 weekly educational sessions. 400+ attended the Kickoff (health fair, cooking demonstrations, fitness activities, motivational program). 100 attended the Celebration of Winners. 67 participated in the Walk at the county fair. 26 participated in the ZERO Holiday Weight Gain program. 177 persons who chose to weigh out lost 1486

pounds. Of those weighing out, 14% lowered their blood pressure, 10% lowered cholesterol, 6% lowered blood sugar and 3% reduced or were taken off various medications.

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 professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Actual	8.0	0.0	2.5	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
409959	0	165550	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
409959	0	282210	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 needs warrant. Parallel OSU Extension programs are developed based on client demand and food safety standards set by both the industry and regulators. Food safety programs to reduce the incidence of foodborne illness and provide a safer food supply by addressing and eliminating causes is a primary program goal of OSU Extension and OARDC. Specific activities for the food safety education for consumers include: 1) Conduct food safety education classes with participants in the FNP and EFNEP program; 2) Conduct ServSafe classes with food establishment managers and employees; 3) Conduct Safe Food Handling for Occasional Quantity Cooks classes with volunteer food preparers; and 4) Provide research-based information to consumers through various forms of media, phone calls, fact sheets, and web pages. The capacity of this Planned Program was enhanced by the creation of the College of Food, Agricultural, and Environmental Sciences' Center for Food Safety and Ag Security that is also a participant in Public Health Preparedness for Infectious Diseases (http://phpid.osu.edu/) -- one of several interdisciplinary programs that Ohio State University recently funded through the university's Targeted Investment in Excellence (TIE) program.

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 (other formal or informal education).

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	16121	234249	14115	0

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

Patent Applications Submitted

Year: 2010

Actual: 15

Patents listed
Awarded: 272327 - Method and Apparatus for Peeling Produce
2004247115 -Method and Apparatus for Peeling Produce
1,028,653 - High Voltage Pulsed Electric Field Treatment Chambers for the Preservation of Liquid Food Products (licensed and patented in 13 other countries)

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	6	16	22

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of single-contact educational sessions held

Year	Actual
2010	5662

Output #2

Output Measure

- Number of multiple-contact programs offered

Year	Actual
2010	7805

Output #3

Output Measure

- Number of participants completing evaluation forms

Year	Actual
2010	16121

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	Number of participants who plan to adopt one or more recommended practices. (OSUE)
3	Number of youth and adults who indicate they adopted one or more recommended safe food handling practices. (OSUE)

Outcome #1

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
REDUCING SALMONELLA THREATS IN EGGS - Of the 70 billion eggs produced each year in the US, about 2.3 million are contaminated internally with Salmonella, resulting in an average of 174,000 illnesses, 1,400 hospitalizations, and 75 deaths. Medical and productivity costs, at the national level, are 2.65 billion annually. Ohio annually produces 7 billion eggs valued at $585 million, second in the nation. The Ohio poultry industry employs 17,000 people and has a payroll exceeding $50 million annually.

What has been done
OARDC researchers have developed a system that utilizes ozone and thermal treatment to kill Salmonella inside shell eggs while protecting the quality of the egg.

Results
A partnership of three major Ohio egg farmers holds the exclusive commercial license for the technology. It is anticipated that by 2011, commercial equipment based on OARDC research will be operating in Ohio and used to pasteurize nearly 11,000 eggs at a time using the 'Process for ozone-based decontamination of shell eggs' - US Patent # 7,491,417 B2.

4. Associated Knowledge Areas

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

Outcome #2

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	7254

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, quality of life, and work productivity costs, emphasizing the need for food safety education.

What has been done
Numerous food safety education opportunities, from ServSaf, home food preservation, to 4-H projects, EFNEP & FNP programs. Extension staff and volunteers complete a Safe Food Handling class.

Results
There were 16,121 participant in all types of food safety education programs in 2010. Nearly half (45%) of those reported on end of program evaluations that they intend to adopt 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 #3

1. Outcome Measures

Number of youth and adults who indicate they adopted one or more recommended safe food handling practices. (OSUE)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	3933

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, quality of life, and work productivity costs, emphasizing the need for food safety education.

What has been done
Numerous food safety education opportunities, from ServSaf, home food preservation, to 4-H projects, EFNEP & FNP programs. Extension staff and volunteers complete a Safe Food Handling class.

Results
There were 16,121 participant in all types of food safety education programs in 2010. Nearly a quarter (24%) of those reported on end of program evaluations that they actually adopted one or more recommended safe food handling skills.

4. Associated Knowledge Areas

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

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

Evaluation Results

Poor food handling and preparation are the main reasons for food-borne illnesses. Every 1% reduction in foode -borne illness in Ohio saves up to 5.3 million. There were 16,121 participants in all types of food safety education programs in 2010. Nearly half (45%) of those reported on end of program evaluations that they intend to adopt one or more recommended safe food handling skills. Nearly a quarter (24%) of those reported on end of program evaluations that they actually adopted one or more recommended safe food handling skills. A few comments made by program participants include: "I check my sanitizer temperature on a regular basis.""I now have regular food safety talks with my employees and it has made a huge difference in everything we do!"

Key Items of Evaluation

Poor food handling and preparation are the main reasons for food-borne illnesses. Every 1% reduction in foode -borne illness in Ohio saves up to 5.3 million. There were 16,121 participants in all types of food safety education programs in 2010. Nearly half (45%) of those reported on end of program evaluations that they intend to adopt one or more recommended safe food handling skills. Nearly a quarter (24%) of those reported on end of program evaluations that they actually adopted one or more recommended safe food handling skills. A few comments made by program participants include: "I check my sanitizer temperature on a regular basis.""I now have regular food safety talks with my employees and it has made a huge difference in everything we do!"

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	25%		20%	
502	New and Improved Food Products	20%		15%	
503	Quality Maintenance in Storing and Marketing Food Products	5%		20%	
607	Consumer Economics	10%		10%	
703	Nutrition Education and Behavior	10%		0%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	10%		15%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	20%		20%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Actual	26.0	0.0	9.1	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**
1332366	0	749237	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1332366	0	1113903	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

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

2. Brief description of the target audience

Targeted audiences include, but are not limited to: specific individuals or groups who have expressed a need for food-related information that is to be derived through new research, extracted from on-going research, or is derived from scientific literature; fellow academic units that partner with food scientists to create systems and processes needed to support not only the research, but also the adoption of the research findings by stakeholders; fellow agencies or support organizations who will not only use the information but will also be brokers of that information, including embedding it into groups to encourage change; populations who have not requested the information but will likely benefit from that information, e.g. persons who engage in home canning of food; other scientists and scientific groups; political entities; other extension personnel; students from pre-school to post doctorate studies; news organizations; and business and industrial groups.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	2000	100	100	1000

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

Patent Applications Submitted

Year: 2010
Actual: 2

Patents listed
Awarded: 7,638,682 Soybean Cultivar HFPR - 5 and
7,592,028 Composition and Process for Making High Soy Protein- Containing Bakery Products

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	1	32	33

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

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

Year	Actual
2010	1327

Output #2

Output Measure

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

Year	Actual
2010	19

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Ohio Market Maker results will indicate food preferences and number of farmers/retailers networks established (measured in number of networks established).
2	Advance new plant varieties or plant qualities that yield new and more desirable foodstuffs.

Outcome #1

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	Quantitative Target	Actual
2010	{No Data Entered}	679

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 is what MarketMaker is all about.

What has been done
MarketMaker is an interactive mapping system that locates 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
MarketMaker is an interactive mapping system that locates 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,& other demographic information. 679 producers registered with Ohio MarketMaker as of the end of 2010. More that 5000 people have visited the Ohio MarketMaker site to locate farmers, farmers markets, food retailers, eating places, and agritainment.

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
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 #2

1. Outcome Measures

Advance new plant varieties or plant qualities that yield new and more desirable foodstuffs.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

STRONG GLUTEN WHEAT - Ohio is the number one producer of soft red winter wheat (SRWW) in the US. SRWW is used for many products from cakes to cereals to breads. Until recently, all SRWW was bred to have the same quality parameters: high flour yield, low water absorption, weak gluten. Other classes of wheat are blended with SRWW to make a particular product such as blending strong-gluten hard wheat with SRWW for cracker making. The inclusion of the hard wheat has the detrimental side effect of raising water absorption. A food processor in Toledo Ohio is the second largest flour mill in the US and produces cracker flour using hard wheat imported from the Great Plains at considerable expense.

What has been done

The OSU wheat breeding program released a new wheat cultivar called OH04-264-58. This cultivar has competitive yield in Ohio, good resistance to prevailing Ohio diseases, and has strong gluten. Like the original strong gluten SRWW that the Toledo mill preferred, OH04-264-58 has a unique gene that imparts strong gluten and stable gluten strength. Thus OH04-264-58 appears suited to the needs of the Ohio miller.

Results
The Toledo plant used nearly 1,500,000 bushel of strong gluten wheat SRWW in 2010 with plans to expand the program to approximately 3,000,000 bushels annually with the right cultivar. Assuming a premium of $0.40 per bushel, then a strong gluten SRWW like OH04-264-58 is worth $600,000 to $1,200,000 annually to Midwest growers, primarily in Ohio. In addition sourcing the strong gluten wheat locally will save the mill millions of dollars annually in freight charges.

4. Associated Knowledge Areas

KA Code	Knowledge Area
502	New and Improved Food Products
607	Consumer Economics

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Soil, Water and Air 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
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 professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	7.9	0.0
Actual	0.0	0.0	8.2	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	700645	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	743636	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

Activities within this planned program for 2010 were: 1) in print and electronic media/social media communicating research-based information targeted to: (a) specific stakeholder groups, (b) support publics such as fellow agencies, political entities, (c) targeted populations, and (d) the broader general public, including mass media releases; 2) peer-reviewed journal articles; 3) commercialized techniques; 4) non-commericalized techniques e.g. wetland construction techniques; 5) intellectual properties; 6) consultation services such as carbon management in soils; 7) meetings with stakeholders and supporters; 8) facilitation of training programs/workshops for other scientists and for specific groups of stakeholders, including international visitors; and 9) planning meetings with advisory groups to communicate findings and plan new research.

2. Brief description of the target audience

Targeted audiences were 1) Specific individuals or groups who 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 such US NRCS; 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.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	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: 2010
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	0	46	46

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Peer-reviewed publications will be tracked in terms of name and tier of journal

Year	Actual
2010	0

Output #2

Output Measure

- Patents by number and who partnered/purchased/commercialized

Year	Actual
2010	0

Output #3

Output Measure

- Number of graduate students completed

Year	Actual
2010	0

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 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	Support the mapping of county level soils with a target of three new counties per year
7	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.
8	Advance carbon sequestration research to the point that Ohio farmers can enter the carbon trading market.

Outcome #1

1. **Outcome Measures**

   Continue to advance soil, water, nutrient, and plant research to 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	Quantitative Target	Actual
2010	2	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
CLONING GENES FROM MAGNETOTACTIC BACTERIA - Deindustrialization of urban areas in the past several decades has resulted in a large amount of vacant land. Several cities in Ohio and elsewhere have established stabilization projects to facilitate the redevelopment of vacant urban land. Vacant land reuse opportunities include (1) urban agriculture/gardening, that improves the availability of healthy, fresh foods, and can improve nutrition and health of residents, and (2) the creation of parks, playgrounds, and other commons. Soil contamination with metal(loid)s,i.e., lead, arsenic, and organic chemical contaminants, i.e., polyaromatic hydrocarbons, presents the greatest challenge to vacant land reuse.

What has been done
A new novel method was developed for cloning genes from magnetotactic bacteria. The researchers successfully cloned genes from a magnetotactic bacteria. The bacteria are beneficial in removing, via bioremediation, contaminants.

Results
A new novel method was developed for cloning genes from magnetotactic bacteria. OARDC scinetists successfully cloned three genes (mms5, mms7, and mms13) from a magnetotactic bacteria. This will enable other scientists who are studying mineral biomineralization to use this technique to clone genes for their research. The magnetotactic bacteria was isolated from the Olentangy River in Columbus, Ohio. This discovery demonstrates that these microbes inhabit freshwater ecosystems in Ohio and encourages the exploration for other species of magnetotactic bacteria in other Ohio watersheds.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
131	Alternative Uses of Land
133	Pollution Prevention and Mitigation

Outcome #6

1. **Outcome Measures**

Support the mapping of county level soils with a target of three new counties per year

Not Reporting on this Outcome Measure

Outcome #7

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

Outcome #8

1. **Outcome Measures**

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

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

For 2010 all planned programs in the CFAES were impacted by multiple factors. Perhaps the greatest factor has been the overall decline in base financial support over the past decade resulting in a significant reduction in research faculty and staff. While a portion of the research funds have been made up by increased extramural support, rehiring lost tenure-line research faculty members on those funds is not possible. Also as we commit more personnel time to meet research obligations associated with extramural contracts, less

personnel time is available to address day to day science and consultation needs of our traditional stakeholders, as well as less time to address growing needs of new populations moving into the state and the underserved. Further reductions in base budgets, either in real dollars or in losses due to not keeping up with inflation, will reduce our capacity to compete for extramural support and further erode our capacity to respond to day-to-day stakeholder needs. The tornado that struck the Wooster Ohio campus in 2010 will have long lasting impacts even though remediation has been rapid and rebuilding was moving well at the end of 2010. Loss of facilities and even experiments, per se, disruption of the research process, and demands to redirect funds for remediation and reconstruction beyond insurance payments, collectively, did and will continue affect our productivity.

V(I). Planned Program (Evaluation Studies and Data Collection)

Evaluation Results

Key Items of Evaluation

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 professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	3.4	0.0
Actual	0.0	0.0	2.8	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	193007	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	354419	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

Activities this year were : (1) printed, electronic media and social media that communicated research-based information to targeted to (a) specific stakeholder groups, (b) support publics such as fellow agencies, political entities, e.g. US FWS, (c) targeted populations, and (d) the broader general public, including mass media releases; (2) peer-reviewed journal articles; (3)non-commercialized techniques such as wildlife depredation mitigation techniques; (4) consultation services and meetings with agencies/organizations, stakeholders and supporters; (5) facilitation of training programs/workshops for other scientists, support organizations such as ODNR and for specific groups of stakeholders, including international visitors, usually working with OSU Extension; and (6) planning meeting with advisory groups to communicate findings and to plan new research.

2. Brief description of the target audience

Audiences targeted in 2010 were: (1) 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; (2) 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; (3) populations who have not requested the information but will likely benefit from that information, e.g. people who fish for recreation; (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 Ohio Farm Bureau and community collations such as watershed collations.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	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: 2010
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	0	45	45

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Peer-reviewed publications will be tracked

Year	Actual
2010	0

Output #2

Output Measure

- Number of graduate students completed

Year	Actual
2010	0

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 (a) best management practices on private forest land in Ohio with an incremental gain of 5% of lands each year
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 (a) best management practices on private forest land in Ohio with an incremental gain of 5% of lands each year

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	Quantitative Target	Actual
2010	1	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
RIPARIAN FORESTS IN URBANIZING LANDSCAPES - States such as Ohio have highly manipulated landscapes. These landscapes, even though fragmented, are expected to produce a variety of environmental goods and services. The health and vitality of forest reserves are critical for wildlife habitat. Wildlife studies, in particular birds, provide excellent models for informing as to the health and continued utilization of these urbanizing landscapes.

What has been done
OARDC scientists have assessed bird communities at 28 riparian-forest sites in central Ohio along an urbanization gradient ranging from primarily agricultural matrices to urbanizing matrices. The study includes bird communities in breeding and non-breeding seasons, monitored nests, banded and monitored site fidelity, annual survival, and measured habitat characteristics including vegetation structure, manipulation of exotic plants, and floristics at stand and nest-patch scales, food resources, and microclimate conditions, as well as predator-prey interactions.

Results
The 10-year project provides among the world's most detailed studies that can inform as to the amount and type of development that can occur near forest reserves to ensure continued quality habitat for forest wildlife. The amount of urban development surrounding riparian forests is the most important determinant of the bird community. Thus, the dominant management paradigm for conserving riparian forests (i.e., maximizing forest width) is not sufficient to ensure that forests serve the ecological roles often intended by managers. The results suggest that even wide riparian forests are vulnerable to influences from surrounding land uses, and efforts should aim to establish low-development buffers around riparian forests, including farm preservation lands. This requires complex 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 (Laws)

Brief Explanation

For 2010 all planned programs in the CFAES were impacted by multiple factors. Perhaps the greatest factor has been the overall decline in base financial support over the past decade resulting in a significant reduction in research faculty and staff. While a portion of the research funds have been made up by increased extramural support, rehiring lost tenure-line research faculty members on those funds is not possible. Also as we commit more personnel time to meet research obligations associated with extramural contracts, less personnel time is available to address day to day science and consultation needs of our traditional stakeholders, as well as less time to address growing needs of new populations moving into the state and the underserved. Further reductions in base budgets, either in real dollars or in losses due to not keeping up with inflation, will reduce our capacity to compete for extramural support and further erode our capacity to respond to day-to-day stakeholder needs. The tornado that struck the Wooster Ohio campus in 2010 will have long lasting impacts even though remediation has been rapid and rebuilding was moving well at the end of 2010. Loss of facilities and even experiments, per se, disruption of the research process, and demands to redirect funds for remediation and reconstruction beyond insurance payments, collectively, did and will continue affect our productivity.

V(I). Planned Program (Evaluation Studies and Data Collection)

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 8

1. Name of the Planned Program

Plant 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%		15%	
202	Plant Genetic Resources	0%		5%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		20%	
204	Plant Product Quality and Utility (Preharvest)	0%		10%	
205	Plant Management Systems	0%		5%	
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%		15%	
216	Integrated Pest Management Systems	0%		10%	
	Total	0%		100%	

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	29.8	0.0
Actual	0.0	0.0	27.7	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	1916865	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	4045502	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

Activities within this 2010 planned program generated publications, printed, electronic, and social media, targeted to (a) specific stakeholder groups, (b) support publics such as fellow agencies, political entities, (c) targeted populations, and d) the broader general public, including mass media releases. Also generated were peer-reviewed journal articles. Non-commericalized techniques, such as improved greenhouse management techniques, were distributed to those in need, typically without costs. Faculty members and staff provided consultation services and meetings with stakeholders and supporters across the full array of plant system programs and worked with OSU Extension and others to facilitate training programs/workshops for other scientists and for specific groups of stakeholders, including international visitors. Program activity also included planning meeting with advisory groups business/industry partners to communicate findings and plan new research.

2. Brief description of the target audience

Targeted audiences in 2010 included specific individuals or groups, such as commodity 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. Also targeted were fellow agencies or support organizations who not only use the information but 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 were targeted, as were other scientists and scientific groups, political entities,extension personnel, and students for pre-school through post doctorate studies. News media and public affairs organizations were also targeted..

V(E). Planned Program (Outputs)

1. Standard output measures

2010	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: 2010
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	0	138	138

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- peer-reviewed publications will be tracked

Year	Actual
2010	0

Output #2

Output Measure

- patents by number and who partnered/purchased/commercialized;

Year	Actual
2010	0

Output #3

Output Measure

- Number of graduate students completed

Year	Actual
2010	0

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 at minimum one new contribution annually 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 needs, with incremental needs fulfillment by stakeholders in at least 25% of the areas annually-turf needs for nutrient uptake efficient materials, turf with greater traction, etc.
5	Enrich the gene pool and knowledge thereof in at least 25% of the areas annually for -greater disease/pest resistance, e.g. rust, ash borer, develop glyphosate ready material, increase quantity and quality yield in crops such as soybeans
6	Enrich the gene pool and knowledge thereof in at least 25% of the areas annually for - disease resistance of rootstocks such as for apple trees and green industry
7	Enrich the gene pool and knowledge thereof in at least 25% of the areas annually for resistance to plant stresses, e.g. discoloration in products such as tomatoes reducing a $60 million loss annually in tomato industry
8	Enrich the gene pool and knowledge thereof in at least 25% of the areas annually for molecular studies to better understand how immune systems in plants in inhibit diseases and how bacteria perturb the immune system
9	Enrich the gene pool and knowledge thereof in at least 25% of the areas annually for gene recombination and interaction studies to inform decisions on importing new genetic stock, e.g. soybeans from northern China
10	Enrich the gene pool and knowledge thereof in at least 25% of the areas annually for - developing longer lasting cultivars in terms of disease resistance such as in alfalfa
11	Annually provide adequate preharvest research findings, including field trial data, to support Ohio's status as a top soybean and corn producer
12	Release or support release by others of one special cultivar annually, e.g. grapes to replace tobacco in southeastern Ohio, low maintenance turf grass, nitrogen uptake efficient crops including foliar based fertilization, field crop cultivars
13	Promote and participate annually in at least one type of stakeholder participatory research initiative, e.g. sentinel plots on farms for soybean rust
14	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
15	Continually promote the full integration of all plant and animal pests, including microbes, into IPM planning and execution
16	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

17	Advance the knowledge of the benefits of plants beyond food and fiber, thus adding value and expanding their benefits to society.
18	Contribute to a healthier population by developing and releasing food plant varieties that have enhanced medical and nutrient qualities.
19	Improve options for replacing pesticides and herbicides with more environmentally sensitive alternatives.
20	Continue to advance the study of foods that have cancer preventive properties.

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 at minimum one new contribution annually 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

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	1	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Issue (Who cares and Why)6 -8
WINTER HARDINESS and malting quality are complex traits that are essential for the production of barley. Greater working knowledge of the genetic basis underlying winter hardiness provide tools enabling the development of modern barleys possessing superior winter hardiness

alongside superior malting quality characteristics. There is immense interest by growers and end-users to have winter barleys that can be used for malting and brewing because of increased demand and decreased supplies; the latter due in part to new disease pressures and spring barley crop failures that are blamed on changing climatic patterns.

What has been done

OARDC researchers have discovered the molecular mechanisms that confer superior winter hardiness to wheat and barley. Plants differ in their winter hardiness. Two key genetic loci are now known to affect winter hardiness, Frost Resistance- (FR-1) and FR-2. The FR-1 locus is tightly linked to VRN-1, a gene that determines whether these cereal plants require an extended period of low, nonfreezing temperatures to induce flowering. Recent studies also indicate that VRN-1/FR-1 is a negative regulator of the CBF genes at FR-2 suggesting that an important aspect of winter hardiness is mediated not only by these two loci but through interactions between them.

Results

These studies have provided the genetic tools that allow the reliable identification of individuals having superior winter hardiness. Winter barleys produce significantly higher yields than spring barleys, yield significantly higher returns for growers, are more water-use efficient, avoid disease pressures faced by spring barleys because of earlier maturation, and earlier maturation occurs during conditions highly favorable for grain filling. High-quality winter barleys that can be used for malting and brewing have the potential to fill an important agricultural niche, increase economic growth, and diversify agricultural land use in Ohio and in other regions of the US.

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 #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 needs, with incremental needs fulfillment by stakeholders in at least 25% of the areas annually-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 at least 25% of the areas annually for -greater disease/pest resistance, e.g. rust, ash borer, develop glyphosate ready material, increase quantity and quality yield in crops such as soybeans

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	1	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
GREEN FUNGICIDE - Fusarium head blight (FHB), or scab, caused by the fungus Fusarium graminearum, is the most economically important disease of wheat and barley, with yield losses of more than 45% in severe cases. Fusarium head blight was responsible for an estimated $1 billion in losses during a catastrophic 1993 Midwest epidemic. For every dollar lost due to Fusarium head blight, it has been estimated that there is an additional $2 lost elsewhere in the wheat industry. In addition to lowering yield, the fungi that cause this disease also produce toxin, known as vomitoxin, that is harmful to humans and livestock. Vomitoxin contamination will result in price discounts or grain rejection at the time of sale.

What has been done
A team of OARDC and USDA/ARS plant pathologists has been working on the development of biological-control strategies to manage FHB. Numerous yeast and bacterial biological control organisms have been identified and patented that significantly reduce FHB symptoms by as much as 50% under some circumstances.

Results

Growers will soon have another weapon, slated for release in 2014, in the fight against FHB in the form of a green fungicide containing a naturally occurring yeast isolated from Ohio fields and developed by OARDC scientists. OARDC has licensed the technology. The fungicide has potential to lower impact from outbreaks by 50% with an estimated savings to producers, millers, and bakers of upwards to $1 billion per year from crop losses. The company has licensed additional OARDC technology related to head scab -- a variant strain of the yeast organism that is tolerant to additional fungicides. The breakthrough may provide dual protection for wheat, both before and after flowering. These new interventions, combined with OARDC's FHB Risk Assessment Tool, having an 80% accuracy in forecasting potential outbreaks, provide a substantial front against FHB.

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
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
214	Vertebrates, Mollusks, and Other Pests Affecting Plants
216	Integrated Pest Management Systems

Outcome #6

1. Outcome Measures

Enrich the gene pool and knowledge thereof in at least 25% of the areas annually for - disease resistance of rootstocks such as for apple trees and green industry

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Enrich the gene pool and knowledge thereof in at least 25% of the areas annually for resistance to plant stresses, e.g. discoloration in products such as tomatoes reducing a $60 million loss annually in tomato industry

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	1	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
GENETIC AND MOLECULAR MARKER STRATEGIES - World food security depends in great part on advancing state of the art sciences in plant production. The identification of the molecular markers linked to genes for resistance to multiple pathogens will allow plant breeders to use newly developed marker-technology in their breeding programs. Discovery and dissemination of these technologies is a major trust of the OARDC research program.

What has been done
OSU breeding lines showing resistance to multiple foliar pathogens of maize were rescreened for resistance to various other pathogens using molecular marker technology. OSU breeding lines with resistance to maize streak virus, northern corn leaf blight, and gray leaf-spot were rescreened for resistance to these pathogens in Ohio and for maize streak virus resistance in Uganda. Studies of testcross seeds from Ohio Corn Belt parental inbreds, as well as from Puerto Rico, will continue to expand this new global knowledge.

Results
Findings demonstrated that OARDC scientists can successfully identify maize breeding lines with genes for resistance to multiple foliar pathogens (gene pyramiding) using a molecular marker assisted (MAS) breeding strategy. Verification was provided by an additional cycle of phenotypic screening in fields in Ohio and in Uganda. Scientists were also able to confirm that the majority of resistance genes were observed in two different populations. A range of susceptible to resistant host responses were observed in the lines and the most resistant lines were selected for further development (VPCM-078, VPCM-368, VPCM-396). This will extend the impact of the findings beyond the OARDC breeding programs. These findings enabled field breeding to be performed, and enabled cooperation across international boundaries, thus expanding the impact to both advanced and subsistence production systems.

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 #8

1. Outcome Measures

Enrich the gene pool and knowledge thereof in at least 25% of the areas annually for molecular studies to better understand how immune systems in plants in inhibit diseases and how bacteria perturb the immune system

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	1	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
EVALUATION OF PLANT GENETIC RESOURCES at OARDC supports breeding efforts for multiple food crops. As complete genome sequences become available for crops, evaluation and plant breeding methodologies are being modified to take advantage of new resources. The translation of plant genome sequences into applied outcomes requires population development, tools for inexpensive and high throughput genetic analysis, and rapid and accurate analysis of phenotypes. OARDC has a long history of tomato research addressing the full value chain from genotyping to processing and packaging. These efforts are critical to meeting world food security, and contribute job growth within Ohio.

What has been done
In 2010, evaluation focused on quantifying genetic variation in a collection of cultivated tomato (Solanum lycopersicum L.); developing tomato varieties with resistance to Xanthomonas sp. (bacterial spot), tomato spotted wilt (TSWV), and Phytophthora infestans (late blight); and assessing the stability of tomato carotenoids for nutritional quality. Tomato spotted wilt virus (TSWV) and Phytophthora infestans (late blight) have a worldwide distribution and cause substantial crop damage. DNA-based molecular markers were developed and used to genotype a collection representing wild species, landraces, vintage cultivars, and contemporary varieties.

Results

Discovery of molecular markers reveal variation within and between cultivated lineages providing tools for fundamental and applied studies. Genetic characterization of tomato germplasm demonstrate that breeding has created distinct genetic populations, and increased genetic variation relative to older "heirloom" tomato varieties. Specific outcomes include: DNA-based markers used to combine genetic resistance to late blight and tomato spotted wilt and directly confirming resistance in recombinant plants. DNA-based markers were used to characterize genetic loci that contribute to bacterial spot resistance. Research on the interaction of plant genetics and processing technology is leading to the development of foods optimized for compounds of interest to human nutrition and health, the stability during processing of lycopene from various cultivars, breeding lines that differ in carotenoid content, as well as lipid oxidation, and carotenoid isomerization.

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 #9

1. Outcome Measures

Enrich the gene pool and knowledge thereof in at least 25% of the areas annually for gene recombination and interaction studies to inform decisions on importing new genetic stock, e.g. soybeans from northern China

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	1	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

TRANSGENETICS IN SOYBEAN - The understaning of transgenes for modulating gene expression, soybean promoter isolation, and characterization thereof are critical for advancement of the food soybean as a contributor to world food security. OARDC is seeking to provide significant and continued contributions in the area of soybean promoter isolation and characterization.

What has been done
Thematic families of soybean promoters were isolated based on either expression profile or characteristics of a protein family. Of these 80 promoters, 10 Glycine max Ethylene Response Factor (GmERF) and 10 ubiquitin (Gmubi) promoters were more extensively characterized. Five of the ten GmERF promoters were stronger than the standard CaMV35S promoter while nine of the ten Gmubi promoters showed higher expression than the 35S promoter. The Gmubi3 promoter, that was extensively characterized in transgenic plants, was the strongest of these 20 promoters.

Results
Generation of over 80 different soybean promoters has provided the soybean biotechnology community with a first set of promoters to be used in the construction of different transgenes for modulating gene expression. Most laboratories are interested in the constitutive Gmubi3 promoter, that has been distributed to nine laboratories, either as a promoter construct or in transgenic soybean, that expresses high levels of the GFP gene in many different tissues. Transgenic soybean expressing high levels of GFP has been invaluable for gene silencing studies in soybean. Data on soybean promoter strength is available from <http://www.oardc.ohio-state.edu/SURE/> to assist in making these native soybean promoters available to the soybean scientific community.

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
212	Pathogens and Nematodes Affecting Plants
216	Integrated Pest Management Systems

Outcome #10

1. Outcome Measures

Enrich the gene pool and knowledge thereof in at least 25% of the areas annually for - developing longer lasting cultivars in terms of disease resistance such as in alfalfa

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	1	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
DISEASE RESISTANCE IN SOYBEAN - the technology of soybean metabolomics has potential to substantial improve the quality and quantity of the US soybean crop valued at over 31 billion dollars annually, with over half of the dollar value exported.

What has been done
OARDC scientists made very substantial strides in the development of state-of-the-art chemical methods for the investigation of soybean metabolism as it relates to disease resistance. Specifically developed were chromatographic methodologies (liquid chromatography-mass spectral or LC-MS) to allow the separation and analysis of the full range of soluble metabolites produced by soybean under different conditions. More importantly, the scientists also evaluated a series of different software packages to allow for the comparison of control and treated soybean tissues to determine which changes in metabolites are most central to disease resistance.

Results
OARDC scientists have discovered over ten new metabolites induced in soybean by treatment by the disease resistance inducing herbicide, lactofen. While some of these are still being characterized fully, a major finding was the presence of several isoflavones never before reported in soybean and the presence of prenylated derivatives of these and the known isoflavones. Of these, none were previously reported in soybean and two are novel compounds never before reported in plants. The studies have further shown that these various new metabolites are not only induced by lactofen, but also by a whole series of other defense inducing treatments. Moreover, they are major metabolic changes up regulated in resistance responses to Phytophthora, Sclerotinia, and soybean rust.

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
212	Pathogens and Nematodes Affecting Plants

216 Integrated Pest Management Systems

Outcome #11

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	1	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
FIELD TRIALS for various food crops is a client expectation of OARDC and OSU Extension stakeholders and contributes to substantial economic return/savings statewide, and in some cases nationally. These efforts, supported primary from base funding, provide a tangible result to a large number of stakeholders as to the critical role that NIFA and agriculture experiment and extension stations play nationwide.

What has been done
Each year OSU scientists conduct field trials on major food crops such as corn, wheat, and soybean providing stakeholders with yield results under varying conditions as well as companion research on resistance of varieties to various pests, pathogens, and treatments.
OSU scientists conducted field trials on one hundred eighty four soybean varieties in 2010 for yield, lodging, seed size, oil, and protein content at six locations throughout Ohio. The Ohio Wheat Performance Trial was planted in the five Ohio major wheat growing regions. Parallel corn field trials were conducted. These efforts allow growers to select above average yielding cultivars and those with superior disease resistance and quality.

Results
The 2010 Ohio Soybean Performance Trials are estimated to help producers select a variety that yields about 5% more than on average. The economic impact should be about $80/ha or $151 million over 1.89 million soybean hectares in Ohio. Wheat field trails are estimated to likely increase production by at least 5 bu/ac in Ohio. Given that Ohio planted 930,000 acres of wheat

in the fall of 2010 that translates into an extra 4.65 million bushels with a value of about $27,900,000 for Ohio wheat growers, with the assumption of $6 per bushel market price. Conservative estimates from corn field trails show that a 0.5% in yield translates into over $12 million increase for Ohio corn growers. In addition the growers will save money by planting resistant varieties that need less fungicides and the milling and manufacturing industries receive increased profits by purchasing grains with better quality.

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
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
214	Vertebrates, Mollusks, and Other Pests Affecting Plants
216	Integrated Pest Management Systems

Outcome #12

1. Outcome Measures

Release or support release by others of one special cultivar annually, 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 Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	1	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

NEW CULTIVAR OF SOFT RED WINTER WHEAT RELEASED - A need existed in Ohio for production of a gluten strong soft red winter wheat (SRWW) that was disease resistant. The second largest flour mill in the US, located in Ohio, produces cracker flour using gluten strong hard wheat imported from the Great Plains at considerable expense. Until recently, all SRWW was bred to have the same quality parameters that are suited for most SRWW uses - high flour yield, low water absorption, weak gluten. Cracker flour should have low water absorption and strong gluten and can be attained by blending strong-gluten hard wheat with SRWW. Inclusion of the hard wheat has the detrimental effect of raising water absorption.

What has been done
The OARDC wheat breeding program released a new wheat cultivar called OH04-264-58 . This cultivar has competitive yield in Ohio, good resistance to prevailing Ohio diseases, and has strong gluten. Like the original strong gluten SRWW that mill required, OH04-264-58 has a unique gene that imparts strong gluten and stable gluten strengtht. Thus OH04-264-58 appears suited to the Ohio miller.

Results
The Ohio based miller used nearly 1,500,000 bushel of strong gluten SRWW in 2010 with plans to expand the program to approximately 3,000,000 bushels annually with the right cultivar. Assuming a premium of $0.40 per bushel, then a strong gluten SRWW like OH04-264-58 is worth $600,000 to $1,200,000 annually to Midwest growers, primarily in Ohio. In addition, sourcing the strong gluten wheat locally will save the Ohio based miller millions of dollars annually in freight charges.

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)
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants

Outcome #13

1. Outcome Measures

Promote and participate annually in at least one type of stakeholder participatory research initiative, e.g. sentinel plots on farms for soybean rust

Not Reporting on this Outcome Measure

Outcome #14

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 #15

1. Outcome Measures

Continually promote the full integration of all plant and animal pests, including microbes, into IPM planning and execution

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	2	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
GENOME SEQUENCING OF BENEFICIAL NEMATODE AND BIOLOGICAL CONTROL OF KEY PESTS -
Entomopathogenic nematodes (EPNs) have emerged as excellent biological control agents of insect pests. Progress in research and development during the past three decades have made EPNs available for pest control in citrus groves, strawberry plantations, cranberry bogs, ornamentals and turf. To realize their full potential, particularly in large acreage field crops, improvements are needed in the infective juvenile longevity, bacterial retention, tolerance to environmental extremes, resistance to encapsulation in the hemocoel of some key insect pests, trait stability during mass-production, and field persistence.

What has been done
The first complete genome of an entomopathogenic nematode sequenced by the OARDC scientists revolutionizes research around the world. OARDC scientists, in collaboration with scientists from Washington University in St Louis, California Technology Institute, Michigan State University, Brigham Young University, and Rutgers University, completed the entire genome sequence of the first entomopathogenic nematode Heterorhabditis bacteriophora.

Results
The genome sequence data (1) revolutionizes research in over 100 academic and industrial laboratories developing entomopathogenic nematode and their symbiotic bacteria as biological control agents worldwide; (2) facilitates functional genomic research geared towards the enhancement of infective juvenile longevity, stress tolerance, and virulence that will result in improved efficacy and wider use of nematode in biocontrol, leading to reduced reliance on chemical insecticides; (3) Establishes Heterorhabditis bacteriophora as a tractable model for the study of parasitism, mutualism, and pathogenicity; and (4) enables investigations of the obligate tripartite interactions among H. bacteriophora, P. luminescens and insect larvae, including recognition and signaling, leading to immediate and direct applications in agriculture (e.g., targets for pharmacological intervention and genetic manipulation).

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources
205	Plant Management Systems
206	Basic Plant Biology
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
214	Vertebrates, Mollusks, and Other Pests Affecting Plants
216	Integrated Pest Management Systems

Outcome #16

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

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	1	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

NOVEL VISUAL REPRESENTATION OF A DISEASE PROCESS - Clavibacter michiganensis (Cmm), a bacteria, causes canker and wilt in tomato and is a most destructive and economically significant diseases of this crop. Epidemics can cause up to 80% yield loss. Plant wounds facilitate infection by Cmm. Infections during late stages of plant development result in production of contaminated seeds, a major source of Cmm infections in tomato production. Cmm has been included under international quarantine regulation especially since traditional bacterial disease control measures, including using antibiotics and copper bactericides, and selective breeding of resistant tomato cultivars have not been very successful.

What has been done

OARDC scientists have developed a novel approach using bioluminescent Cmm to study movement in tomato seed and grafted plants. Bioluminescent Cmm has allowed monitoring infection temporally. The study revealed: 1) colonization dynamics of Cmm infection of hypocotyls and cotyledons of the seedlings that promote onset of future infections, and 2) visualization of translocation of Cmm in grafted plants, which may have a significant impact on development of grafting procedures to limit transmission of Cmm. This effort has resulted in a patent application - U.S. Provisional Patent Application No. 61/083,783, Title: METHODS AND COMPOSITIONS RELATING TO BIOLUMINESCENT MICROORGANISMS.

Results

This visual representation of the disease process has accelerated understanding of Cmm ecology. The bioluminescent Cmm will have a wide scope of application, including determining plant factors that affect Cmm growth and metabolism, and screening antibiotics and bactericides for canker control in an effective real-time approach. In addition, the Tn1409-lux transposon developed by OARDC can be used in other economically important Clavibacter subsp such as C. michiganensis subsp. nebraskensis (wilt and leaf blight in maize), subsp. insidiosus (causes wilt and stunt on alfalfa), and subsp. sepedonicus (causes ring rot on potato), to generate bioluminescent strains facilitating real time transmission, control, and plant interaction studies.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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 #17

1. Outcome Measures

Advance the knowledge of the benefits of plants beyond food and fiber, thus adding value and expanding their benefits to society.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
NEW PLANT COMPOUNDS - Natural plant compounds help crops protect themselves against diseases and insects. They are also the source of more than 70% of human medicines and health-promoting foods. In the past, they have been hard to find and usually scarce.

NOTE TO REMOVE TERRY Graham

What has been done
OARDC scientists are using a process called metabolite mining to identify new compounds never before seen in plants, specifically in soybeans. Using a soybean as a model, OARDC scientists discovered that plants make the majority of previously unknown natural products during periods of stress or when defending against attacking pests. The scientists used a herbicide to attack soybean plants and stimulate their disease- resistance mechanisms.

Results
These compounds have potential play a critical role in plant defense against pests and have potential to provide novel chemicals for pharmaceutical research. As a result, the plants produced more than 30 new natural products, five never before reported in soybeans and two never found in any other plant. All of these natural products have potential to grow new Ohio businesses. OARDC scientists are collaborating with the OSU College of Pharmacy, using the same process to evaluate a wide range of plants for valuable natural products that could be used as herbicides, insecticides, and anti-cancer drugs.This new knowledge provides the basis for multiple lines of inquiry from agriculture to medicine.

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)
206	Basic Plant Biology

Outcome #18

1. Outcome Measures

Contribute to a healthier population by developing and releasing food plant varieties that have enhanced medical and nutrient qualities.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
IMPROVING TOMATO MEDICAL AND NUTRIENT QUALITY - Natural genetic variation exists within tomato for the pigments that color fruit. These pigments are from a class of plant compounds called carotenoids, and are responsible for tomatoes that range in color from yellow to red. The carotenoids include pro-vitamin A and lycopene, compounds that are of nutritional and health interest. Measuring carotenoids can be time consuming and expensive, making it difficult to select for improved varieties. Developing tomato varieties with increased nutritional value will help provide consumers with healthy food choices.

What has been done
Tomatoes varieties with diverse carotenoid profiles have been developed.

Results
OARDC scientists have developed new tomato varieties that will help supply foods tailored to address specific nutritional or health issues whether they be vitamin A deficiency or food-based cancer intervention. New resistant varieties provide Ohio producers with a competitive market advantage and improves the quantity, quality, and nutritional value of tomato products for consumers.

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 #19

1. Outcome Measures

Improve options for replacing pesticides and herbicides with more environmentally sensitive alternatives.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
SAFE ALTERNATIVE TO PESTICIDES - Nematodes offer a safe, effective alternative to highly toxic pesticides.The global biopsesticide market is expected to a $350 -400 million market by 2015, a 50% increase since 2005. Nematodes can replace pesticides in many cases.

What has been done
OARDC scientists have developed a new, non-toxic pest-control product. They have been working over the past several years to discover and study new nematode strains, learn how the nematodes work and what they target, and recently has been analyzing certain nematode strains, and the entire genome, i.e., their hereditary information, and then licensing the strains to companies for commercializing.

Results
A new OARDC nematode strain, licensed by the world's largest producer of beneficial nematodes (350 employees worldwide and annual sales most recently estimated at $100-plus million), targets the lawn care industry's biggest problem, white grubs. The GPS 11 stain of nematode took about five years of research to develop, from basic lab studies through applied field testing.

4. Associated Knowledge Areas

KA Code	Knowledge Area
204	Plant Product Quality and Utility (Preharvest)

205	Plant Management Systems
212	Pathogens and Nematodes Affecting Plants
214	Vertebrates, Mollusks, and Other Pests Affecting Plants
216	Integrated Pest Management Systems

Outcome #20

1. Outcome Measures

Continue to advance the study of foods that have cancer preventive properties.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
BERRIES AND CANCER - OARDC and College of Medicine scientists at Ohio State University have long studied the potency of black raspberries in preventing cancer. Researchers have shown that anthocyanins, responsible for the dark purple-black color of the berries, share the credit for much of their cancer preventive potential. Other chemopreventive compounds in black raspberries include ellagitannins and other phenols. The question is are other berries with similar compounds also effective in preventing cancer.

What has been done
The scientists studied other berries to determine if they might be effective. Because the other berry types generally contain lower levels of anthocyanins and ellagitannins than black raspberries, researchers initially thought they would be considerably less active than black raspberries in preventing carcinogen-induced esophagus cancer in rats. After turning the berries into freeze-dried powder and mixing them into rodent diets, they found that all seven berry types were effective, irrespective of their contents of anthocyanins and ellagitannins. Apparently, each type of berry contains unique compounds that are responsible for their cancer preventive effects.

Results
New research shows that a variety of other types of berries, including more readily available and affordable blueberries, strawberries and red raspberries, along with more exotic and expensive varieties like noni, acaí, and wolfberries. can prevent cancer about as well as previously studied black raspberries.

4. Associated Knowledge Areas

KA Code	Knowledge Area
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
206	Basic Plant Biology

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

For 2010 all planned programs in the CFAES were impacted by multiple factors. Perhaps the greatest factor has been the overall decline in base financial support over the past decade resulting in a significant reduction in research faculty and staff. While a portion of the research funds have been made up by increased extramural support, rehiring lost tenure-line research faculty members on those funds is not possible. Also as we commit more personnel time to meet research obligations associated with extramural contracts, less personnel time is available to address day to day science and consultation needs of our traditional stakeholders, as well as less time to address growing needs of new populations moving into the state and the underserved. Further reductions in base budgets, either in real dollars or in losses due to not keeping up with inflation, will reduce our capacity to compete for extramural support and further erode our capacity to respond to day-to-day stakeholder needs. The tornado that struck the Wooster Ohio campus in 2010 will have long lasting impacts even though remediation has been rapid and rebuilding was moving well at the end of 2010. Loss of facilities and even experiments, per se, disruption of the research process, and demands to redirect funds for remediation and reconstruction beyond insurance payments, collectively, did and will continue affect our productivity.

V(I). Planned Program (Evaluation Studies and Data Collection)

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 9

1. Name of the Planned Program

Animal 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 professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	14.8	0.0
Actual	0.0	0.0	20.5	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	1182341	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	3507233	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

Animal systems research activities in 2010 resulted in a wide variety of publications using all the various media from print to social to communicate its research findings to (a) specific stakeholder groups, (b) support publics such as fellow agencies, political entities, (c) targeted populations, and (d) the broader general public, including mass media releases. Publications also included peer-reviewed journal articles and trade journal articles. Commercialized techniques as well as non-commericalized techniques were part of the program activity this year as were consultation services and meetings with stakeholders and supporters. Researchers in this program worked with OSU Extension to facilitate training programs/workshops for other scientist and for specific groups of stakeholders, including international visitors. They also held planning meetings with advisory groups and business and industry partners to communicate findings and plan new research.

2. Brief description of the target audience

Targeted audiences included individuals or groups who have expressed a need for food animal systems information that was derived through new research, extracted from on-going research, or was 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, partnered with the animal scientists. Also targeted were populations who did requested science - based information but will likely benefit from that information, e.g. small or recreational farmers. Other scientists and scientific groups at OSU and elsewhere as well as political entities, extension personnel, students for pre-school to post doctorate studies, news organizations and business groups such as Farm Bureau or commodity groups represented targets in 2010.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	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: 2010
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	0	100	100

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- peer-reviewed publications will be tracked

Year	Actual
2010	0

Output #2

Output Measure

- patents by number and who partnered/purchased/commercialized;

Year	Actual
2010	0

Output #3

Output Measure

- Number of graduate students completed.

Year	Actual
2010	0

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	Provide research finding within ten years that are needed to reverse the fertility decline in animal populations such as dairy
3	Increase nutrition utilization for the purpose of increased growth and quality of products commensurate with consumer demand
4	Improve nutritional utilization, performance, and efficiency to the point that savings will off-set increases in costs of animal feed stocks
5	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
6	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
7	Provide at minimum one new contribution annually 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
8	Improve management for multiple animal farm types, including organics, that will produce higher yields for and lower costs to the producer and consumer and will allow the farmer to profit within a reasonable business plan
9	Annually advance modeling, decision-making, & alternative strategies to provide greater flow of needed information to food animal farmers to ensure business stability, including forage based cattle and niche market demands
10	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.
11	Animal disease researchers will continue to serve on first responder teams when stakeholders have an immediate disease problem
12	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
13	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

Provide research finding within ten years that are needed to reverse the fertility decline in animal populations such as dairy

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
REPRODUCTIVE PERFORMANCE IN DOMESTIC RUMINANTS - Enhanced reproductive performance is critical if the food animal industry is to remain profitable and meet increasing demand for beef that is priced within consumer reach.

What has been done
Recent experiments have, with the more effective estrous synchronization program developed at OARDC, improved the convenience of this program for producers and will further accelerate its adoption by beef producers. Furthermore, this research has continued to stimulate work by scientists at other universities with the aim of adapting this program for use in dairy heifers, lactating dairy cows, and beef heifers. This program is listed as a recommended program by the AI industry.

Results
The new technology developed for reproductive cycle control resulted in an approximately 12.5% increase in fertility in postpartum beef cows and heifers, i.e. 12.5% of cows would become pregnant 21 days earlier than with the traditional approach. If this approach was implemented

with 10% of the 500,000 beef and dairy cows in Ohio on an annual basis, the reduction in days open would be 131,250 days (500,000 cows x 10% adoption x 12.5% increase in pregnancy rate x 21 days). Each day that a beef or dairy cow remains non-pregnant incurs a loss of greater than $3/cow. A second impact of adoption of this technology would be the reduction in replacement costs. An annual reduction in replacement rate of 1% for 500,000 cows would require 5000 fewer replacements in Ohio at a conservative replacement cost of $1000 per replacement, or $5,000,000.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
305	Animal Physiological Processes
307	Animal Management Systems

Outcome #3

1. Outcome Measures

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

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Improve nutritional utilization, performance, and efficiency to the point that savings will off-set increases in costs of animal feed stocks

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
REDUCING THE ENVIRONMENTAL IMPACT AND INCREASING PROFITABILITY OF DAIRY FARMING - Rumen protozoa in dairy herds promote emission of ammonia and methane,

reflecting inefficient use of dietary protein and energy. Because those nutrients represent 80% to 90% of feed costs, an improved ration evaluation system will reduce environmental impact while improving feed efficiency and dairy farm profitability. Inefficiencies result in 71% of national ammonia emissions, which can promote eutrophication of surface waters and and acidification of soils. Ammonia accumulation can be detrimental to both farm workers and animals. Also, methane is 25 times more potent than carbon dioxide in enhaning global climate change.

What has been done
OARDC scientists have documented conditions that improve protozoal growth rate and outflow from rumens in dairy herds. Thus, the most desirable way to reduce ammonia and methane emissions is to improve efficiency of microbial fermentation to trap N into bacteria and protozoa that flow to the small intestine. This USDA regional project offers a software based equations in ration formulation. Ultimately, improving these models will increase willingness of dairy farmers to adapt dietary recommendations that improve feed efficiency to decrease ammonia and methane emissions per unit of milk produced because of reduced risk for increased feed costs and for decreased profitability resulting from dietary changes.

Results
Proper prediction of microbial protein synthesis will allow dairy farmers to reduce dietary protein by 0.5 units. At current prices of corn and soybean meal, this saves nearly $15/cow per year, or $135 million per year for the national dairy herd. Second, improving digestibility of forage fiber by 5% (the typical depression observed when researchers use dietary means to suppress protozoa) also saves nearly $15/cow per year. Finally, if inhibition of protozoa increases risk of milk fat depression, maintenance of milk fat production adds another $15 to $58/cow per year. If the combined effects of optimizing dietary conditions to only partially suppress rumen protozoa while maintaining benefits, improved income over feed costs of $55/cow per year enhances profitability in Ohio herds by $15.4 million, and is amplified 5 to 7 fold through the various industries allied with dairy farming. Thus, the total economic benefit should exceed $50 million per year for Ohio alone, all while reducing ammonia and methane emissions from dairy farms.

4. Associated Knowledge Areas

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

Outcome #5

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 #6

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 #7

1. **Outcome Measures**

Provide at minimum one new contribution annually 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 #8

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 and will allow the farmer to profit within a reasonable business plan

Not Reporting on this Outcome Measure

Outcome #9

1. **Outcome Measures**

Annually advance modeling, decision-making, & alternative strategies to provide greater flow of needed information to food animal farmers to ensure business stability, including forage based cattle and niche market demands

Not Reporting on this Outcome Measure

Outcome #10

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

Outcome #11

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

Outcome #12

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

Outcome #13

1. **Outcome Measures**

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

2. **Associated Institution Types**

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	1	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
ADVANCES IN UNDERSTANDING INTERSPECIES TRANSMISSION OF INFLUENZA VIRUS - Identifying molecular determinants contributing to interspecies transmission of influenza viruses will help in improving surveillance strategies for early detection of variant strains that can cross species barriers.

What has been done
OARDC developed a new system to generate NS gene variants of influenza virus with potential use as live attenuated vaccines. The delNS1 variants are unique in that they differ in both the

length and nature of amino acid residues at the C-terminus of the NS1 they express. Furthermore, in collaboration with the University of Conn., the scientists found that understanding the nature of virus particle subpopulations in candidate vaccines can be used to predict the effectiveness of live attenuated influenza vaccine candidates, and also as a basis for enhancing the performance of vaccines.

Results

Protective efficacy of those vaccines has been demonstrated both in chickens and turkeys. Protection of poultry by effective control and prevention of influenza are critical in order to maintain wholesome poultry. Such efforts will also make a significant contribution toward national food security. In addition, the novel concept of modulating the nature of virus particle subpopulations in candidate vaccines should be broadly applicable to different species and for evaluating and enhancing the efficacy of vaccines in general.

4. Associated Knowledge Areas

KA Code	Knowledge Area
305	Animal Physiological Processes
307	Animal Management Systems
311	Animal Diseases

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

For 2010 all planned programs in the CFAES were impacted by multiple factors. Perhaps the greatest factor has been the overall decline in base financial support over the past decade resulting in a significant reduction in research faculty and staff. While a portion of the research funds have been made up by increased extramural support, rehiring lost tenure-line research faculty members on those funds is not possible. Also as we commit more personnel time to meet research obligations associated with extramural contracts, less personnel time is available to address day to day science and consultation needs of our traditional stakeholders, as well as less time to address growing needs of new populations moving into the state and the underserved. Further reductions in base budgets, either in real dollars or in losses due to not keeping up with inflation, will reduce our capacity to compete for extramural support and further erode our capacity to respond to day-to-day stakeholder needs. The tornado that struck the Wooster Ohio campus in 2010 will have long lasting impacts even though remediation has been rapid and rebuilding was moving well at the end of 2010. Loss of facilities and even experiments, per se, disruption of the

research process, and demands to redirect funds for remediation and reconstruction beyond insurance payments, collectively, did and will continue affect our productivity.

V(I). Planned Program (Evaluation Studies and Data Collection)

Evaluation Results

Key Items of Evaluation

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%		15%	
405	Drainage and Irrigation Systems and Facilities	0%		15%	
	Total	0%		100%	

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	2.3	0.0
Actual	0.0	0.0	3.5	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	217491	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	326396	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

Scientific findings from this engineering group resulted in the full range of publications targeted to (a) specific stakeholder groups, (b) support publics such as fellow agencies, political entities, (c) the broader general public, including mass media releases, and (d) peer-reviewed journal articles. Commercialized techniques such as improved farm equipment and non-commericalized techniques such as improved construction techniques) were shared. The nature of engineering research resulted in extensive consultation services and meetings with stakeholders and supporters as well as participation in training programs/workshops for other scientist and for specific groups of stakeholders, including international visitors. To advance their 2010 research agenda large numbers of planning meeting with advisory groups, supporters, and business and industry partners, as well as with other colleges and departments, both within and external to OSU, were held. The department housing a large portion of the faculty members contributing to this program, the Department of Food, Agricultural and Biological Engineering, is ranked in the top ten in the nation for biological/agricultural engineering programs in the recent U.S. News & World Report's 2011 edition of America's Best Colleges. This ranking is indicative of the knowledge and skills these faculty members bring to OARDC and OSU Extension programs.

2. Brief description of the target audience

Targeted audiences for this group included stakeholders 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. Most important are fellow academic units that rely on engineers to create systems and processes needed to support not only their research, but also the adoption of their research findings by stakeholders, e.g. food scientists need for machines that can employ their findings related to ozone treatment of eggs. Fellow agencies and support organizations are targeted in that they not only use the information but brokers of that information to others, including embedding it into groups to encourage change. there are the populations who have not requested the information but will likely benefit from that information, e.g. recreational animal owners, as well as other scientists and scientific groups, political entities, extension personnel, students for pre-school to post doctorate studies. Also targeted as users of engineering research are news organizations, commodity groups, trade groups such as the construction industry, agribusiness groups, city administrators, and county commissioners.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	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: 2010

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	0	18	18

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- number of graduate students completed

Year	Actual
2010	0

Output #2

Output Measure

- peer-reviewed publications will be tracked in terms of name and tier of journal, as well as record of citations of the article

Year	Actual
2010	0

Output #3

Output Measure

- patents by number and who partnered/purchased/commercialized;

Year	Actual
2010	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	- provide appropriate facilities and engineering processes commensurate with stakeholders demand to the extent that they have all the information necessary for making adoption decisions
2	- provide appropriate facilities and engineering processes commensurate with fellow research units demands necessary to inform their research efforts in a timely manner
3	- develop enhanced systems to support integrated plant growth systems that will annually result in increased productivity at reduced costs for the industry
4	- improve systems to that will permit small farmers to take advantage of alternatives to traditional commodity crops at a rate commensurate with demand, with an expectation of at least three economically successful adoptions per year
5	- improve mechanical devices and instrumentation needed by stakeholders to the extent that no less than one patent is awarded within each five year period
6	- develop improved systems to aid in meeting new or yet to emerge or novel needs and annually demonstrate progress to at least one stakeholder group or publish a peer-reviewed journal article of the results
7	- 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
8	- advance the knowledge of ecological based engineered systems for waste management to the extent within five years that, where cost effective and appropriate, they will be adopted over mechanical systems
9	- aid rural stakeholders through research and extension with onsite waste disposal systems to the extent that within ten years 95% of all rural Ohio onsite waste management systems meet state standards -

Outcome #1

1. **Outcome Measures**

- provide appropriate facilities and engineering processes commensurate with stakeholders demand 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**

- provide appropriate facilities and engineering processes commensurate with fellow research units demands necessary to inform their research efforts in a timely manner

Not Reporting on this Outcome Measure

Outcome #3

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 #4

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, with an expectation of at least three economically successful adoptions per year

Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

- improve mechanical devices and instrumentation needed by stakeholders to the extent that no less than one patent is awarded within each five year period

Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

- develop improved systems to aid in meeting new or yet to emerge or novel needs and annually demonstrate progress to at least one stakeholder group or publish a peer-reviewed journal article of the results

Not Reporting on this Outcome Measure

Outcome #7

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 #8

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

Outcome #9

1. **Outcome Measures**

- aid rural stakeholders through research and extension with onsite waste disposal systems to the extent that within ten years 95% of all rural Ohio onsite waste management systems meet state standards -

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

For 2010 all planned programs in the CFAES were impacted by multiple factors. Perhaps the greatest factor has been the overall decline in base financial support over the past decade resulting in a significant reduction in research faculty and staff. While a portion of the research funds have been made up by increased extramural support, rehiring lost tenure-line research faculty members on those funds is not possible. Also as we commit more personnel time to meet research obligations associated with extramural contracts, less personnel time is available to address day to day science and consultation needs of our traditional stakeholders, as well as less time to address growing needs of new populations moving into the state and the underserved. Further reductions in base budgets, either in real dollars or in losses due to not keeping up with inflation, will reduce our capacity to compete for extramural support and further erode our capacity to respond to day-to-day stakeholder needs. The tornado that struck the Wooster Ohio campus in 2010 will have long lasting impacts even though remediation has been rapid and rebuilding was moving well at the end of 2010. Loss of facilities and even experiments, per se, disruption of the research process, and demands to redirect funds for remediation and reconstruction beyond insurance payments, collectively, did and will continue affect our productivity. This group in particular was hardest hit in that their Wooster -based facilities were destroyed.

V(I). Planned Program (Evaluation Studies and Data Collection)

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 11

1. Name of the Planned Program

Food Systems-OARDC will not report in this area in 2010 but under the new NIFA titles

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%		100%	
	Total	0%		100%	

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	11.2	0.0
Actual	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

will not report in this area in 2010 but under the new NIFA titles

2. Brief description of the target audience

will not report in this area in 2010 but under the new NIFA titles

V(E). Planned Program (Outputs)

1. Standard output measures

2010	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: 2010
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- peer-reviewed publications will be tracked
  Not reporting on this Output for this Annual Report

Output #2

Output Measure

- patents by number and who partnered/purchased/commercialized;
  Not reporting on this Output for this Annual Report

Output #3

Output Measure

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

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Advance 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	Contribute to the advancement of 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.
3	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
4	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.
5	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.
6	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.
7	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.
8	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 sciencebased choices.
9	Annually document a contribution regarding how to reduce food borne pathogens in the food supply chain.
10	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.
11	- 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 annually
12	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 annually.
13	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.
14	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.

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**

Contribute to the advancement of 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 #3

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 #4

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 #5

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 #6

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 #7

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 #8

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 sciencebased choices.

Not Reporting on this Outcome Measure

Outcome #9

1. **Outcome Measures**

Annually document a contribution regarding how to reduce food borne pathogens in the food supply chain.

Not Reporting on this Outcome Measure

Outcome #10

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 #11

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 annually

   Not Reporting on this Outcome Measure

Outcome #12

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 annually.

   Not Reporting on this Outcome Measure

Outcome #13

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 #14

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

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

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 12

1. Name of the Planned Program

Bio-based Non-Food Value Chains-OARDC will not report under this for2010- See 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%		100%	
	Total	0%		100%	

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	1.5	0.0
Actual	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

OARDC will not report under this for2010- See Sustainable Energy

2. Brief description of the target audience

OARDC will not report under this for2010- See Sustainable Energy

V(E). Planned Program (Outputs)

1. Standard output measures

2010	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: 2010
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of patents will be tracked
  Not reporting on this Output for this Annual Report

Output #2

Output Measure

- Number of peer-reviewed journal articles will be tracked
  Not reporting on this Output for this Annual Report

Output #3

Output Measure

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

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Programs in this area will develop strategies to engage and include 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 2011,and one each five years thereafter, 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 2011, utilizes Ohio and the region's plentiful supply of biomass, including waste steam materials in such manner as to improve the economy.
7	Support, though research, the building of biobased development that annually, beginning in 2011, effectively utilizes agriculture's production capacity to produce plants that have the desired attributes for manufacturing.

Outcome #1

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

By 2011,and one each five years thereafter, 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.

Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

   Support, though research, the building of biobased development that annually, beginning in 2011, utilizes Ohio and the region's plentiful supply of biomass, including waste steam materials in such manner as to improve the economy.

   Not Reporting on this Outcome Measure

Outcome #7

1. **Outcome Measures**

   Support, though research, the building of biobased development that annually, beginning in 2011, effectively utilizes agriculture's production capacity to produce plants that have the desired attributes for manufacturing.

   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.)
- null

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 13

1. Name of the Planned Program

Human Health and Safety-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
721	Insects and Other Pests Affecting Humans	0%		20%	
722	Zoonotic Diseases and Parasites Affecting Humans	0%		60%	
723	Hazards to Human Health and Safety	0%		10%	
724	Healthy Lifestyle	0%		10%	
	Total	0%		100%	

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	1.8	0.0
Actual	0.0	0.0	2.0	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	76475	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	189599	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

Activities within Human Health and Safety Planned Program yield peer review publications, other in print research based publications, a variety of electronic media including social and educational media, all targeted to specific stakeholders including industrial partners, support publics such as fellow agencies, and to the broader general public and schools. Because of the nature of this program extensive consultation services and meetings with stakeholders and supporters, the facilitation of training programs/workshops for other scientist and for specific groups of stakeholders, including international visitors and planning meeting with advisory groups to communicate findings and plan new research are always part of the activities of this group. The social nature of the planned program has and will continue to focus heavily not only on new findings but moving those findings into society to improve the human condition. OSU Extension and other outreach and education organizations are critical to this component.

2. Brief description of the target audience

Targeted audiences are stakeholder groups who have expressed a need for health and safety information that is to be derived through new research, extracted from on-going research, or is derived from scientific literature as well as fellow academic units and others that depend on scientists in this program for support information and for new health and safety technologies and approaches. These fellow agencies and support organizations not only use the information but also extend that information, often to populations who have not requested the information but will likely benefit from that information. Other scientists and scientific groups, political entities, extension and outreach personnel, students from pre-school to post doctorate studies, news organization, and business and industrial groups were targeted in 2010.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	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: 2010

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	0	14	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Peer-reviewed publications will be tracked

Year	Actual
2010	0

Output #2

Output Measure

- Patents by number and who partnered/purchased/commercialized will be documented.

Year	Actual
2010	0

Output #3

Output Measure

- Number of graduate students completed

Year	Actual
2010	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Annually 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 negative impact of farm-, recreation-, or industry-related accidents within agriculture and natural resources.
4	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.
5	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.
6	Reduce safety risk by releasing at least one major study to either manufacturers and/ or consumers that will reduce or prevent work or play related accidents every three years.
7	create a growing base of knowledge that supports improving human health as it relates to food, environment, and lifestyle

Outcome #1

1. Outcome Measures

Annually 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. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	1	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
BEDBUG DNA - In recent years, the bedbug, Climex lectularius, has made a substantial come back growing its populations by nearly 500 percent in North America. Pesticide resistance is key. Even multiple sprayings are often do not wipe out established infestations. Beginning in the 1940s bedbugs became resistant to strong pesticides including DDT and have continued building resistance to newer pesticides. The social and economic costs are staggering, impacting everything from daily quality of home life to tourism.

What has been done
OARDC entomologists conducted the first genetic study of bedbugs, paving the road to the identification of potential genes associated with pesticide resistance and possible new control methods. They compared the DNA of locally Ohio sampled bedbugs with that of "pesticide-susceptible" bedbugs in research labs with particular attention to proteins produced by the DNA that help the insect survive pesticide bombings. While many proteins were similar to those already identified in other insects, about 45 percent of the proteins appear unique to bedbugs.

Results
The bedbug analysis produced a database of 35,646 DNA-produced proteins. OSU scientists found that the central Ohio bedbugs had one such protein, called cytochrome P450, at levels as much as four times higher than those detected in the laboratory bedbugs. This protein allows bedbugs to bond poisonous compounds with water and safely excrete them. The scientists found that the mode of resistance could be attributed to a combination of changes in bedbug genetic makeup (such as mutations), as well as in transcriptomic adjustments leading to differential gene expression. With this major finding, the strategy is to identify proteins to "turn off" the genes that produce proteins that aid in bedbug survival.

4. Associated Knowledge Areas

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

Outcome #2

1. Outcome Measures

Advance the understanding of means and methods related to transmission of zoonotic diseases to humans, including prevention, that meets consumer demand/health threat, as or before such emerges.

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

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

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Reduce through research, development, and outreach the exposure to biohazards, pathogens, and similar to the extent that annually such are reduced per capita with an overall time and economic savings to those who may be affected.

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Reduce health risk by releasing at least one major study each five years demonstrating techniques, procedures, or products that lessen the chance of contacting, or the impact if contacted, zoonotic diseases.

Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

Reduce safety risk by releasing at least one major study to either manufacturers and/ or consumers that will reduce or prevent work or play related accidents every three years.

Not Reporting on this Outcome Measure

Outcome #7

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

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 (Equipment design)

Brief Explanation

For 2010 all planned programs in the CFAES were impacted by multiple factors. Perhaps the greatest factor has been the overall decline in base financial support over the past decade resulting in a significant reduction in research faculty and staff. While a portion of the research funds have been made up by increased extramural support, rehiring lost tenure-line research faculty members on those funds is not possible. Also as we commit more personnel time to meet research obligations associated with extramural contracts, less personnel time is available to address day to day science and consultation needs of our traditional stakeholders, as well as less time to address growing needs of new populations moving into the state and the underserved. Further reductions in base budgets, either in real dollars or in losses due to not keeping up with inflation, will reduce our capacity to compete for extramural support and further erode our capacity to respond to day-to-day stakeholder needs. The tornado that struck the Wooster Ohio campus in 2010 will have long lasting impacts even though remediation has been rapid and rebuilding was moving well at the end of 2010. Loss of facilities and even experiments, per se, disruption of the research process, and demands to redirect funds for remediation and reconstruction beyond insurance payments, collectively, did and will continue affect our productivity.

V(I). Planned Program (Evaluation Studies and Data Collection)

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 14

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 professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	7.2	0.0
Actual	0.0	0.0	6.1	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	726562	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	301363	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Food, Agricultural and Economics Development research activities in 2010 resulted in a wide variety of publications using all the various media from print to social to communicate its research findings to specific stakeholder groups, support publics such as fellow agencies, political entities, and the broader general public, including mass media/social releases. Publications also included peer-reviewed journal articles and trade journal articles. Their research informs those scientists developing commercialized techniques as well as non-commericalized techniques. The nature of the programs requires extensive consultation services and meetings with stakeholders and supporters. Researchers in this program worked with OSU Extension to facilitate training programs/workshops for other scientist and for specific groups of stakeholders, including international visitors. They also held planning meetings with advisory groups and business and industry partners to communicate findings and plan new research.

2. Brief description of the target audience

Targeted audiences are stakeholder groups who have expressed a need for economics and policy information that is to be derived through new research, extracted from on-going research, or is derived from scientific literature, as well as to fellow academic units and others that depend on scientists in this program for support information on economic related matters. These fellow agencies and support organizations not only use the information but also extend that information, often to populations who have not requested the information but will likely benefit from that information, such as rural communities and underserved populations. Other scientists and scientific groups, political entities, extension and outreach personnel, students from pre-school to post doctorate studies, news organization, and business and industrial groups are targeted. These groups are also often partners in research and development activities in that economic decision making is central to our social wellbeing.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	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: 2010

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	0	46	46

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Peer-reviewed publications will be tracked

Year	Actual
2010	0

Output #2

Output Measure

- Report number of graduate students completed

Year	Actual
2010	0

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 uncertainly.
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.
16	Build institutional capacity through research, development, and extension expertise to support business and job growth.

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.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	1	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
DAIRY FARM ECONOMICS - The mechanism defining the pricing of milk at the farm level in the United States was changed first in 1990 and then again in 2000. These changes have resulted in a more direct link between wholesale and international markets and dairy farmers incomes and expenses. One outcome of these changes has been an increased level of price and income variability over the past two decades, often with negative results for dairy farmers. Nationally the average dairy farms in 2009 lost $350 to $1,000 per cow in equity. Part of the losses were due to high feed and labor costs, and lower value of dairy animals as herd replacements.

What has been done
In 2009 many dairy farm operators either went bankrupt or suffered severe financial hardship as a direct result of falling milk prices and rising feed costs. In Ohio, the severity of the milk price collapse and the elimination of profitability followed by financial insolvency were dramatic. Both

small and large dairy farms were ruined financially. OARDC researchers and OSU Extension specialists began researching strategies to help mitigate such negative impacts.

Results
Ohio State University scientists found that losses could have been reduced with even a modest increase in the use of price risk management tools by dairy farm operators. In response to this continuing price uncertainty, futures markets, options markets, and insurance products have been developed at OSU to assist dairy farmers in managing the risk inherent in highly variable dairy markets. Also created were products to assisted dairy farm in gaining a more in-depth understanding of the benefit and cost associated with using
a) futures contracts, b) options contracts, and c) gross margin insurance contracts, to manage or mitigate output and input price risk in the milk market. Computer software and mathematical models, along with educational papers, were designed to assist Ohio milk producers, dairy product processors, and agricultural lenders in deepening their knowledge and enhance their application of futures, options and insurance products.

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
604	Marketing and Distribution Practices
606	International Trade and Development
610	Domestic Policy Analysis

Outcome #3

1. Outcome Measures

Business management knowledge in targeted areas, e.g. risk management, weather insurance, impacts of land use shifts, grant management that are necessary for and result in increased profitability for stakeholders.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	1	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

WILLING TO PAY TO PREVENT FOOD-BORNE ILLINESS - Food-borne illnesses, such as E. coli and salmonella, cost the United States $152 billion annually in health care and other losses. The U.S. Senate is considering legislation that would require more government inspections of food manufacturers and give the Food and Drug Administration new authority to order recalls. The House passed a similar bill in 2010. The U.S. government estimates 76 million people each year are sickened by food-borne illness, hundreds of thousands are hospitalized, and approximately 5,000 die.

What has been done

OARDC scientists explored consumers willingness to pay for added food processing costs to reduce contamination of retail products by food-borne bacteria.

Results

OARDC research shows the willingness to pay by U.S. consumers for reductions in the contamination of retail products by foodborne bacteria is substantially higher than previous estimates used by USDA and CDC. Analysis suggests that USDA is currently assigning too small of a value to reductions in foodborne pathogen levels in foods sold in grocery stores. The results also show that willingness to pay is sensitive to the pathogen reduction technology promised (irradiation versus ethyl gas), the pathogen targets (e. coli vs. listeria), and information provided to consumers about pathogens. The results concerning consumer willingness to pay for reductions in the probability of foodborne illness is being used by policy makers and analysts at the U.S. Department of Agriculture and the U.S. Centers for Disease Control and Prevention for policy planning purposes.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
603	Market Economics
604	Marketing and Distribution Practices
607	Consumer Economics
609	Economic Theory and Methods
610	Domestic Policy Analysis

Outcome #4

1. Outcome Measures

Research findings on novel programs such as pollution trading, carbon trading, conservation programs, cooperatives, etc. that results in enhanced profits, new sources of income, and/or prevention of loss of profits or loss of other resources, e.g. soil.

Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

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

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 Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	1	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

MITIGATING RISING FOOD COSTS - Preference for private-label food products are predicted to continue to grow in 2011 and will provide formidable competition for branded packaged foods. Growth in private label is thought to be driven by consumer-desire for value, the proliferation of higher quality private-label food choices, and the price increases that packaged food companies are likely to implement in 2011 to help offset rising commodity input costs.

What has been done

Price sensitivity measures are likely to play a major role in consumers' purchase decisions, as this concept measures the weight consumers place on price relative to other factors such as brand and product image. Most consumers have access to a large number of product brands in supermarkets and it is important to understand how price sensitivity for these brands guides their purchase decisions. This is especially relevant for current market conditions, as the lingering recession is forcing consumers to make tradeoffs in their product purchases. OARDC researchers addresses these issues.

Results

OARDC scientists reported that retailers are attempting to increase their share of private-label brands to increase profit margin. Consumers are purchasing more private-label brands to reduce their food expenditures. Such efforts are rooted in demand theory that suggests that consumers at all income levels have higher price-sensitivity for national brands than for private- label brands because of the higher prices for national brands. Findings from this research show that private-label products can have strong appeals to both higher- and lower-income shoppers. Policymakers are deeply concerned about food costs, especially changes in food prices that lead to higher costs. If consumers develop strong preferences for private-labels, this can serve to mediate rising food costs during inflationary periods and allow policymakers to focus more on meeting consumers' nutritional needs.

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
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.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	1	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
VALUING ENVIRONMENTAL SERVICES - Markets play an important role in creating incentives for environmental improvements and degradation. Understanding the interaction between environmental services and markets, and taking advantage of carefully designed market mechanisms, provide a means by which environmental improvements can be undertaken efficiently and effectively. The effective implementation of markets for environmental services requires the development of methods for environmental valuation and the application of those methods to local, national, and international situations.

What has been done
OARDC economists have developed an improved methods for pricing environmental services and designing market based policies that reflect these values at least cost to society. Work focused on developing estimates of the impact of fecal coliform counts and water clarity in Lake Erie and its tributaries and how that affects housing prices in shoreline communities.

Results
Failure of markets to fully measure and reflect the price of environmental services leads to the inefficient allocation of society's productive resources and under-representation of the value of environmental services in markets. OARDC researchers found that modest reductions in Lake Erie fecal coliform counts (from an average of 256 parts per 100ml to a maximum of 250 parts per 100ml) and improved water clarity from an average of 221 cm to a minimum of 230 cm) will generate over $500 million in benefits to Ohio through increased value in housing prices.

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

Outcome #10

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

Outcome #11

1. **Outcome Measures**

Increase profitability, reduce environmental impact, and/or improve quality of stakeholders' lives through bio-resource utilization efficiency and effectiveness research such as biomass to energy, nitrogen utilization, biocides, etc.

Not Reporting on this Outcome Measure

Outcome #12

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

Outcome #13

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

Outcome #14

1. Outcome Measures

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

Not Reporting on this Outcome Measure

Outcome #15

1. Outcome Measures

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

Not Reporting on this Outcome Measure

Outcome #16

1. Outcome Measures

Build institutional capacity through research, development, and extension expertise to support business and job growth.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Improving the Economy - The Applachian region of Ohio is beset by poverty and public pessimism. OARDC and OSU Extension's South Centers (Piketon, Ohio), a regionally focused research, development. and extension facility, responded to the need for business and job growth with the creation of the Endeavor Center.

What has been done

The five year old Endeavor Center is has a two-tiered mission: (1) assist new and emerging businesses, those that are ready to move out of a garage or a basement, or are poised to grow but need professional office space, help in hiring or marketing strategy, or just need access to office equipment and (2) to serve as a small business itself creating jobs and economic activity in the region.

Results
In just five years since its opening, the Endeavor Center has incubated and guided businesses that have created more than 300 new high-skill, high-wage jobs in economically challenged Appalachian region of Ohio, resulting in $50 million in positive economic impact.

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
604	Marketing and Distribution Practices
605	Natural Resource and Environmental Economics
607	Consumer Economics
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.)

Brief Explanation

For 2010 all planned programs in the CFAES were impacted by multiple factors. Perhaps the greatest factor has been the overall decline in base financial support over the past decade resulting in a significant reduction in research faculty and staff. While a portion of the research funds have been made up by increased extramural support, rehiring lost tenure-line research faculty members on those funds is not possible. Also as we commit more personnel time to meet research obligations associated with extramural contracts, less personnel time is available to address day to day science and consultation needs of our traditional stakeholders, as well as less time to address growing needs of new populations moving into the state and the underserved. Further reductions in base budgets, either in real dollars or in losses due to not keeping up with inflation, will reduce our capacity to compete for extramural support and further erode our capacity to respond to day-to-day stakeholder needs. The tornado that struck the Wooster Ohio campus in 2010 will have

long lasting impacts even though remediation has been rapid and rebuilding was moving well at the end of 2010. Loss of facilities and even experiments, per se, disruption of the research process, and demands to redirect funds for remediation and reconstruction beyond insurance payments, collectively, did and will continue affect our productivity.

V(I). Planned Program (Evaluation Studies and Data Collection)

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 15

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%		20%	
802	Human Development and Family Well-Being	0%		20%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	0%		15%	
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	0%		10%	
805	Community Institutions, Health, and Social Services	0%		10%	
901	Program and Project Design, and Statistics	0%		5%	
902	Administration of Projects and Programs	0%		10%	
903	Communication, Education, and Information Delivery	0%		10%	
	Total	0%		100%	

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	3.3	0.0
Actual	0.0	0.0	2.7	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	270700	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	244588	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 2010 resulted in peer review publications, other in print research based publications, a variety of electronic media including social and educational media, all targeted to specific stakeholders including industrial partners, support publics such as fellow agencies, and to the broader general public and schools. Schools in particular are a key activity area in that the scientists direct the CFAES agricultural education component of the college. Because of the nature of this program extensive consultation services and meetings with stakeholders and supporters, the facilitation of training programs/workshops for other scientist and for specific groups of stakeholders, including international visitors and planning meeting with advisory groups to communicate findings and plan new research are always part of the activities of this group. The social nature of the planned program has and will continue to focus heavily moving scientific findings into society to improve the human condition. OSU Extension and other outreach and education organizations are critical to this component.

2. Brief description of the target audience

Targeted audiences are stakeholder groups who have expressed a need for these scientists' social science information that is derived through new research, extracted from on-going research, or is derived from scientific literature as well as fellow academic units and others that depend on scientists in this program for support information and for new social science approaches. These fellow agencies and support organizations not only use the information but also extend that information, often to populations who have not requested the information but will likely benefit from that information. Other scientists and scientific groups, political entities, extension and outreach personnel, students from pre-school to post doctorate studies, news organization, and business and industrial groups are targeted. OSU Extension faculty are a key part of this Planned Program.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	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: 2010

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	0	10	10

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Peer-reviewed publications will be tracked

Year	Actual
2010	0

Output #2

Output Measure

- Number of gradaute students completed.

Year	Actual
2010	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Advance human capital and sociological studies that will inform strategies for expanding and strengthening the agricultural workforce leading to improved quality and quantity of jobs in rural areas yielding demonstrated economic growth.
2	Advance human capital and sociological studies that will inform strategies for strengthening individual and family well-being, and community stability, e.g. grandmother daycare in single head households.
3	Develop a more complete understanding of the relationship between learning style and cognitive abilities of Ohio agricultural students to inform teaching learning leading to gain score increases within and a better-educated workforce.
4	Conduct statewide survey research to better understand public attitudes, perceptions, opinions, and behaviors related to select topics in agriculture, annually documenting how those data impact decision-making, e.g. public policy, industrial decisions.
5	Investigate shifts in rural-urban interface, land use, immigration, and similar changes to determine if community policies and/or levels of social capital in the community can shape the future of agriculture in face of urbanization pressures.
6	Improve through research the understanding of and skill development for decision-making by local farmers that will result in improved farm viability and competitiveness at the rural-urban interface.
7	Develop a conceptual framework within five years that will inform programming for developing statewide leadership characteristics, skills, and attitudes in a core of present and future leaders in order to advance a more socially responsible industry.
8	Study rural educational systems relative to educational resources, curriculum, instructional delivery, and student learning to the extent necessary to inform decision-makers how to improve rural education systems as requested.
9	Investigate the social implications of structural changes in agriculture and their economic implications, documenting challenges and opportunities for rural individuals, families, groups and communities, including business and government.
10	Investigate project formulation and administration to the extent that the findings help the institution to document gains in creativity, productivity, partnerships, collaboration, and proficiency within five years.
11	Advance understanding of communication, education and information services to show gain scores in the teaching and learning process within related agriculture and natural resources programs.

Outcome #1

1. **Outcome Measures**

Advance human capital and sociological studies that will inform strategies for expanding and strengthening the agricultural workforce leading to improved quality and quantity of jobs in rural areas yielding demonstrated economic growth.

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

Investigate shifts in rural-urban interface, land use, immigration, and similar changes to determine if community policies and/or levels of social capital in the community can shape the future of agriculture in face of urbanization pressures.

Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

   Improve through research the understanding of and skill development for decision-making by local farmers that will result in improved farm viability and competitiveness at the rural-urban interface.

   Not Reporting on this Outcome Measure

Outcome #7

1. **Outcome Measures**

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

   Not Reporting on this Outcome Measure

Outcome #8

1. **Outcome Measures**

   Study rural educational systems relative to educational resources, curriculum, instructional delivery, and student learning to the extent necessary to inform decision-makers how to improve rural education systems as requested.

   Not Reporting on this Outcome Measure

Outcome #9

1. **Outcome Measures**

   Investigate the social implications of structural changes in agriculture and their economic implications, documenting challenges and opportunities for rural individuals, families, groups and communities, including business and government.

   Not Reporting on this Outcome Measure

Outcome #10

1. **Outcome Measures**

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

2. **Associated Institution Types**

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
RUARL COUNTY GOVERNMENTS play a critical role in the lives of their citizens. Understanding the determinants and impacts of counties' economic development and service activities on county residents, especially in the area of poverty, is critical, especially at this point in time when most counties nationwide are most economically challenged.

What has been done
This OARDC project, in cooperation with National Association of Counties, documents: 1) county governments' economic development and public service activities in the 2008 period; 2) changes in these activities since 2001; 3) the determinants (independent variables) that affect counties growth and service activities; and 4) the impacts of county activities on socioeconomic well-being outcomes. The project addresses social science and policy debates about decentralization of government and provides concrete information to county governments nationwide related to monitoring change and setting policy.

Results
OARDC scientists have provided the most generalizable nationwide assessment to date of the determinants and impacts of counties' economic development and service activities. The findings demonstrate that the size and quality of local government significantly influence populations' socioeconomic well-being net of control variables. These findings provide valuable information for planners, policy-makers, scholarly research, and county government officials for they demonstrate that local governments can be effective in reducing poverty. The study demonstrates the importance of our county governments for alleviating poverty across the nation.

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

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

For 2010 all planned programs in the CFAES were impacted by multiple factors. Perhaps the greatest factor has been the overall decline in base financial support over the past decade resulting in a significant reduction in research faculty and staff. While a portion of the research funds have been made up by increased extramural support, rehiring lost tenure-line research faculty members on those funds is not possible. Also as we commit more personnel time to meet research obligations associated with extramural contracts, less personnel time is available to address day to day science and consultation needs of our traditional stakeholders, as well as less time to address growing needs of new populations moving into the state and the underserved. Further reductions in base budgets, either in real dollars or in losses due to not keeping up with inflation, will reduce our capacity to compete for extramural support and further erode our capacity to respond to day-to-day stakeholder needs. The tornado that struck the Wooster Ohio campus in 2010 will have long lasting impacts even though remediation has been rapid and rebuilding was moving well at the end of 2010. Loss of facilities and even experiments, per se, disruption of the research process, and demands to redirect funds for remediation and reconstruction beyond insurance payments, collectively, did and will continue affect our productivity.

V(I). Planned Program (Evaluation Studies and Data Collection)

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 16

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 professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	3.0	0.0	0.0	0.0
Actual	4.0	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
204979	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
204979	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

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

2. Brief description of the target audience

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

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	2000	10000	0	0

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

Patent Applications Submitted

Year: 2010

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	5	5	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Formal training workshops

Year	Actual
2010	10

Output #2

Output Measure

- one-on-one consultations

Year	Actual

2010	250

Output #3

Output Measure

- formal community presentation of findings

Year	Actual
2010	4

Output #4

Output Measure

- web-based questionnaires

Year	Actual
2010	3

Output #5

Output Measure

- hard-copy questionnaires

Year	Actual
2010	200

Output #6

Output Measure

- Number of program planning and implementation volunteers

Year	Actual
2010	60

Output #7

Output Measure

- Number of program planning and implementation volunteer hours donated

Year	Actual
2010	2650

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

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

Outcome #1

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	200	85

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Local communities lack an understanding of issues related to their economy. Local officials lack knowledge of existing business needs and resulting expansion strategies. Relations among community stakeholders (businesses, residents, local leaders/officials) are fragmented.

What has been done
Engaged community stakeholders in a formal dialogue in order to empower local development officials and the community at large to act on community and economic development issues of strategic importance. Helped local communities learn how to systematically gather information critical to understanding local development needs.

Results
"Program participants reported that the BR&E program:1. enabled 85 local officials to use community data collected via the BR&E program to make better informed community decisions;2. enabled them to establish and/or cultivate relationships with an estimated 675 businesses;3. enabled their community to benefit from the donation of an estimated 2650 local community volunteer hours, and; 4. helped existing businesses in their community create at least 757 new jobs and retain another 1065."

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

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

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

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

Evaluation Results

"Program participants reported via web survey in fall 2010, that the BR&E program:1. enabled 85 local officials to use community data collected via the BR&E program to make better informed community decisions;2. enabled them to establish and/or cultivate relationships with an estimated 675 businesses;3. enabled their community to benefit from the donation of an estimated 2650 local community volunteer hours, and; 4. helped existing businesses in their community create at least 757 new jobs and retain another 1065."

Key Items of Evaluation

"Program participants reported via web survey in fall 2010, that the BR&E program:1. enabled 85 local officials to use community data collected via the BR&E program to make better informed community decisions;2. enabled them to establish and/or cultivate relationships with an estimated 675 businesses;3. enabled their community to benefit from the donation of an estimated 2650 local community volunteer hours, and; 4. helped existing businesses in their community create at least 757 new jobs and retain another 1065."

V(A). Planned Program (Summary)

Program # 17

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 professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	20.0	0.0	0.0	0.0
Actual	2.0	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
102490	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
102490	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

Series of classes offered in participating counties

Newsletter

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

Curriculum review and development by DWD Team

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

Media releases to promote programming

Partnerships with new organizations with funding sources to support county programming

2. Brief description of the target audience

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

A $20,000 gift from the Columbus Foundation seeded the development and delivery of a childhood obesity prevention effort, thus expanding the target audience to include youth in elementary school grades 3-5.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	4557	8500	2793	0

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

Patent Applications Submitted

Year: 2010

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	2	0	2

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Collaborations formed/maintained

Year	Actual
2010	5

Output #2

Output Measure

- Number of classes

Year	Actual
2010	125

Output #3

Output Measure

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

Year	Actual
2010	434

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.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	60	1918

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
According to 2007 statistics released by the CDC and a study done by the Ohio Department of Health, more than 830,000 adult Ohioans have been diagnosed with diabetes. An additional 200,000 are estimated to have diabetes, and don't know it. According to the American Diabetes Association, the direct and indirect costs of diabetes total an estimated $5.9 billion dollars in Ohio. It is estimated that $3.9 billion are direct costs and $2 billion are indirect costs.

What has been done
Dining With Diabetes was designated an OSU Extension Signature Programs to educate people with diabetes and their family members about practices that help better manages the disease. A team of Extension, Ohio Department of Health and local health care professionals develop and improve program curriculum and provide direct education to clientele thru a series of classes/follow-up reunion activities. Food demonstrations increase the likelihood of behavior change

Results
Participants indicated they learned new skills and would be implementing them in their daily food plans. The participants indicated that during the course of the program they made wiser food choices and were able to maintain their diabetic guidelines more effectively than before the program. The participants indicated they would recommend the program to other residents and friends.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

Outcome #2

1. Outcome Measures

Number of participants who understand the plate method.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	80	1599

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
According to 2007 statistics released by the CDC and a study done by the Ohio Department of Health, more than 830,000 adult Ohioans have been diagnosed with diabetes. An additional 200,000 are estimated to have diabetes, and don't know it. According to the American Diabetes Association, the direct and indirect costs of diabetes total an estimated $5.9 billion dollars in Ohio. It is estimated that $3.9 billion are direct costs and $2 billion are indirect costs.

What has been done
Dining With Diabetes was designated an OSU Extension Signature Programs to educate people with diabetes and their family members about practices that help better manages the disease. A team of Extension, Ohio Department of Health and local health care professionals develop and improve program curriculum and provide direct education to clientele thru a series of classes/follow-up reunion activities. Food demonstrations increase the likelihood of behavior change.

Results
Participants indicated they learned new skills and would be implementing the plate method- an easy way to ensure the right amount of the right foods. Eating the right foods in the right amounts is an essential component for effective diabetes self-management. The participants indicated that during the course of the program they made wiser food choices and were able to maintain their diabetic guidelines more effectively than before the program. The participants indicated they would recommend the program to other residents and friends.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

Outcome #3

1. Outcome Measures

Number of participants who are able to count carbohydrates.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	57	936

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
According to 2007 statistics released by the CDC and a study done by the Ohio Department of Health, more than 830,000 adult Ohioans have been diagnosed with diabetes. An additional 200,000 are estimated to have diabetes, and don't know it. According to the American Diabetes Association, the direct and indirect costs of diabetes total an estimated $5.9 billion dollars in Ohio. It is estimated that $3.9 billion are direct costs and $2 billion are indirect costs.

What has been done
Dining With Diabetes was designated an OSU Extension Signature Programs to educate people with diabetes and their family members about practices that help better manages the disease. A team of Extension, Ohio Department of Health and local health care professionals develop and improve program curriculum and provide direct education to clientele thru a series of classes/follow-up reunion activities. Food demonstrations increase the likelihood of behavior change.

Results
Participants indicated they learned new skills and are able to count carbohydrates. Carbs increase blood glucose levels. When participants know how much carbohydrates theyâ??ve eaten, they will be better able to mange their blood glucose level, an essential component for effective diabetes self-management. The participants indicated that during the course of the

program they made wiser food choices and were able to maintain their diabetic guidelines more effectively than before the program. The participants indicated they would recommend the program to other residents and friends.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

Outcome #4

1. Outcome Measures

Number of participants who are eating smaller portion sizes.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	35	1199

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
According to 2007 statistics released by the CDC and a study done by the Ohio Department of Health, more than 830,000 adult Ohioans have been diagnosed with diabetes. An additional 200,000 are estimated to have diabetes, and don't know it. According to the American Diabetes Association, the direct and indirect costs of diabetes total an estimated $5.9 billion dollars in Ohio. It is estimated that $3.9 billion are direct costs and $2 billion are indirect costs.

What has been done
Dining With Diabetes was designated an OSU Extension Signature Programs to educate people with diabetes and their family members about practices that help better manages the disease. A team of Extension, Ohio Department of Health and local health care professionals develop and improve program curriculum and provide direct education to clientele thru a series of classes/follow-up reunion activities. Food demonstrations increase the likelihood of behavior change.

Results

Participants indicated they learned new skills and are eating smaller portions by the end of the program series. Smaller portions ensure the right amount of the right foods. Eating the right foods in the right amounts is an essential component for effective diabetes self-management. The participants indicated that during the course of the program they made wiser food choices and were able to maintain their diabetic guidelines more effectively than before the program. The participants indicated they would recommend the program to other residents and friends.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

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.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	641

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
According to 2007 statistics released by the CDC and a study done by the Ohio Department of Health, more than 830,000 adult Ohioans have been diagnosed with diabetes. An additional 200,000 are estimated to have diabetes, and don't know it. According to the American Diabetes Association, the direct and indirect costs of diabetes total an estimated $5.9 billion dollars in Ohio. It is estimated that $3.9 billion are direct costs and $2 billion are indirect costs.

What has been done

Dining With Diabetes was designated an OSU Extension Signature Programs to educate people with diabetes and their family members about practices that help better manages the disease. A team of Extension, Ohio Department of Health and local health care professionals develop and improve program curriculum and provide direct education to clientele thru a series of classes/follow-up reunion activities. Food demonstrations increase the likelihood of behavior change.

Results

Participants indicated they have lowered their blood sugar levels at the end of the program series. Diabetics who are better able to mange their blood glucose levels reduce their risk of developing diabetes-related complications (retinopathy, nephropathy, neuropathy, cardiovascular disease, such as heart attack, hypertension, heart failure, stroke and problems caused by poor circulation, eg gangrene in the worst cases). The participants indicated that during the course of the program they made wiser food choices and were able to maintain their diabetic guidelines more effectively than before the program. The participants indicated they would recommend the program to other residents and friends.

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
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

Evaluation Results

Written evaluations included steps participants plan to take in improve their diets and get the diabetes under control. One person wrote that she now feels she can make better choices and enjoy her food more. They report using less sugar, different cooking oils, modifying recipes paying more attention to how they cook, and learning to adjust normal foods. At the reunion, participants reported using the recipes from the class and incorporating healthier choices into their diets. One participant said that she and her

husband are personally encouraged now about their health and weight loss possibility. The most often cited changes that participants report implementing included counting carbohydrates, reading food labels, trying healthy recipes, and controlling portion sizes. Participants reported that "I am so much more aware of the positive change that counting carbs has had on my health" and I"m trying the new recipes and cooking techniques got me excited about meal planning again."

Key Items of Evaluation

Written evaluations included steps participants plan to take in improve their diets and get the diabetes under control. One person wrote that she now feels she can make better choices and enjoy her food more. They report using less sugar, different cooking oils, modifying recipes paying more attention to how they cook, and learning to adjust normal foods. At the reunion, participants reported using the recipes from the class and incorporating healthier choices into their diets. One participant said that she and her husband are personally encouraged now about their health and weight loss possibility. The most often cited changes that participants report implementing included counting carbohydrates, reading food labels, trying healthy recipes, and controlling portion sizes. Participants reported that "I am so much more aware of the positive change that counting carbs has had on my health" and I"m trying the new recipes and cooking techniques got me excited about meal planning again."

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%		0%	
133	Pollution Prevention and Mitigation	5%		0%	
204	Plant Product Quality and Utility (Preharvest)	5%		0%	
205	Plant Management Systems	20%		0%	
211	Insects, Mites, and Other Arthropods Affecting Plants	15%		0%	
212	Pathogens and Nematodes Affecting Plants	13%		0%	
213	Weeds Affecting Plants	20%		0%	
402	Engineering Systems and Equipment	7%		0%	
601	Economics of Agricultural Production and Farm Management	5%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	17.0	0.0	0.0	0.0
Actual	4.0	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**
204979	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
204979	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

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

Increasing field crop yields through technology adoption.

Producing high-value crops on small tracts of land.

Growing alternative crops for bioenergy.

Crop Observation and Recommendation Network Newsletter

Crop Production Conference

Crop Profit

Multiple Regional/Local Agronomy Meeting/Workshops

Website

Local/On-Farm Research

Field Days

Bulletins/Fact Sheets/Publications

Work with Media and OSU Communications Technology

Building relationships with commodity organizations and agencies

Build relationships across other teams in OSU Extension.

Computer training on technologies for agronomic applications

Precision ag data management analysis and decision workshops

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

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

2. Brief description of the target audience

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

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

Certified Crop Advisors

Non-agronomic specialized educators

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

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	17816	187218	0	650

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

Patent Applications Submitted

Year: 2010

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	16	0	16

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Crop Observation and Recommendation Network Newsletter to be published 40 times per year, and to be distributed to 5,000 farmers and professionals.

Year	Actual
2010	7200

Output #2

Output Measure

- Multiple Regional/Local Agronomy Meeting totaling 40 which reaches 2500 people with agronomic information.

Year	Actual
2010	3800

Output #3

Output Measure

- Production and Issues Workshops totaling 15 reaching 300 people

  Not reporting on this Output for this Annual Report

Output #4

Output Measure

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

Year	Actual
2010	3300000

Output #5

Output Measure

- Local/On-Farm Research project sites.

Year	Actual
2010	16

Output #6

Output Measure

- Field Days totaling 5 location and reaching 500 people

Year	Actual
2010	650

Output #7

Output Measure

- Weed Control Guide for Ohio and Indiana 4000 distributed annually

Year	Actual
2010	5500

Output #8

Output Measure

- Tri-State Fertilizer Recommendations for Corn, Soybean, Wheat and Alfalfa 250 distributed annually.

Year	Actual
2010	178

Output #9

Output Measure

- Field Crop Insects of Ohio distribution
  Not reporting on this Output for this Annual Report

Output #10

Output Measure

- Corn, Soybean, Wheat and Alfalfa Field Guide 1000 distributed annually

Year	Actual
2010	2200

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 500 distributed annually
  Not reporting on this Output for this Annual Report

Output #13

Output Measure

- Wheat Disease Management in Ohio 250 distributed annually
  Not reporting on this Output for this Annual Report

Output #14

Output Measure

- Seed Treatment for Ohio Agronomic Crops 150 distributed annually
  Not reporting on this Output for this Annual Report

Output #15

Output Measure

- Ohio Agronomy Guide 700 distributed annually

Year	Actual
2010	380

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	25% of meeting participants will indicate they will implement new management practices based on information received at the meetings.
3	25% of Ohio's Corn acres will implement a nitrogen efficiency model for their farm.
4	25% of crop production acres will implement weed resistance management strategies.
5	Utilization of appropriate IPM practices for disease and insect will occur on 15% of Ohio crop acres.
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.
13	Crop Observation and Recommendation Network Newsletter as an effective delivery tool for agronomic crop information.
14	Understanding the role of Phosphorous in Ohio's Waters for 2010 and BMP's.

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

25% of meeting participants will indicate they will implement new management practices based on information received at the meetings.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	25	80

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Increasing productivity to meet multiple demands of crop commodity utilization in food security and manufacturing is a critical goal with world wide implications. Tight supplies of commodities has caused price spikes in recent years and average price levels substantially above long term trends. With growing world populations, filling world grain needs is a critical issue. The public also demands that this production happen with minimal harmful effects on the environment.

What has been done
Twenty eight meetings were held across Ohio focused on agronomic production issues and increasing productivity from an economic and environmental concern. The programs give farmers and crop consultants access to extension specialist and educators doing research in different aspects of crops production resulting in BMP development. Topics include genetic selection, pest management, resistance management, tillage, water management and on-farm research.

Results
Programs attracted 5600 participants represent over 2.5 million acres of crop production.

Participants indicated through anecdotal comments and random survey that the found information presented would be used to make management decisions on their operation 80% of the time. The topics represented new information 15% of the time and information that added to what they knew 70% of the time. Participants reported an economic value of $3.9 million dollars.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
133	Pollution Prevention and Mitigation
204	Plant Product Quality and Utility (Preharvest)
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 #3

1. Outcome Measures

25% of Ohio's Corn acres will implement a nitrogen efficiency model for their farm.

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

25% of crop production acres will implement weed resistance management strategies.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	25	15

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Adaptation of herbaceous plants to herbicide has been a occurrence throughout modern crop production. Species with resistance to ALS chemistry products was found in the early 1990's. The quick adaption of glyphosate weed control systems in the late 90's has lead to multiple species of confirmed resistant species. In fact species with resistance population to both ALS and glyphosate are known. The problem is more predominate in southern Ohio but northwest Ohio started identifying pockets in 2010.

What has been done
Research and educational programs have focused on weed management systems that incorporate integrated weed management concepts, better selection of burndown products, increased use of preemergence products to introduction alternative modes of action and alternative production systems have been suggested.

Results
Anecdotal evidence suggest an increased use of preemergence products and better selection of burndown herbicides is being adopted by farmer in the areas of concern with resistance.

4. Associated Knowledge Areas

KA Code	Knowledge Area
213	Weeds Affecting Plants

Outcome #5

1. Outcome Measures

Utilization of appropriate IPM practices for disease and insect will occur on 15% of Ohio crop acres.

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.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	2294

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Understanding proper identification and scouting is the foundation of IPM utilization.

What has been done
Training session, programs and newsletters have provided information on identification and proper scouting to farmers and ag industry.

Results
A total of 2294 individuals participated in these sessions which covered disease insects and weeds in corn, soybean and wheat production. Of the participants, 972 reported a positive change in management or profitability accounting for $450,000 worth of value.

4. Associated Knowledge Areas

KA Code	Knowledge Area
204	Plant Product Quality and Utility (Preharvest)
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants

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

Outcome #13

1. Outcome Measures

Crop Observation and Recommendation Network Newsletter as an effective delivery tool for agronomic crop information.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	122968

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Utilization of Extension Agronomic information is often questioned in its value. The Crop Observation and Recommendation Network Newsletter is product original developed in 1996. The news letter deliveries timely agronomic production, pest management news and relevant recommendation form university research on those best management practices to agriculture industry, farmers, government agencies, media outlets and other interested individuals.

What has been done
Product is produced 40 times per year and delivered in a variety of electronic formats, e-mail, web, and mobile web. The newsletter is linked through multiple industry and media sites. The information from articles is reproduced in multiple print media in the state as well.

Results
Direct user subscriptions for the news letter are 2415 who receive issue upon publication immediately via e-mail. The newsletter is access annually by 115,768 unique visitors via the website. The bi-monthly publication Ohio's Country Journal regular publishes multiple articles from the newsletter and is sent to 21,000 Ohio crop producers plus are added to their website.

4. Associated Knowledge Areas

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

204	Plant Product Quality and Utility (Preharvest)
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 #14

1. Outcome Measures

Understanding the role of Phosphorous in Ohio's Waters for 2010 and BMP's.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	693

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
During 2010 several watersheds in Ohio had reports of cyano-bacteria blooms leading to beach closures causing much public concern particularly in the Grand Lake Saints Mary's and Lake Erie watersheds. Research and educational programs have been on going related to BMP's for phosphorous, sediment and other nutrients. The events provided a teachable moment to focus on BMP's to improve water quality.

What has been done
Extension programming has included educational programs and demonstration projects on use of cover crops, alternatives to land application of nutrients, setbacks in manure and nutrient application and soil testing nutrient management. Inter agency in-services were held to explore the science behind phosphorous and understanding of the 2010 water issues. Other education programs were aimed at nutrient planners both TSP's and NRCS/SWCD.

Results
Ninety-five nutrient planners attended a two-day session on nutrient planning tools for CNMP and

commercial fertilizer. The program tied the users with the software developers and was indicated to be very useful based on after meeting comments. Educational programs on use of a paper nutrient management planning workbook for non computer users was held for 328 farmers and SWCD personnel. Cover crop workshops were held at multiple events reaching 450 with information on the practice. A one day interagency workshop with participation from 75 individuals form EPA, Watershed groups, SWCD, NRCS, Extension and Farm Bureau. Phosphorous in Ohio's Waters workshop was highly rated and helped provide a basis of understanding of issues and BMP's.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
133	Pollution Prevention and Mitigation
205	Plant Management Systems
402	Engineering Systems and Equipment
601	Economics of Agricultural Production and Farm Management

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

Evaluation Results

Below are generalized answers to a line of questioning used at 4 locations across the state where focus groups related to agronomic crops was held. **What is the most valuable agronomic information provided to you by the Agronomic Crops Team?** CORN newsletter (listed at least 5 times); corn performance trials; custom rates; SCN research; **Having an extension educator to contact to contact when your crop is in jeopardy;Describe the value of CORN newsletter to your farm or business.** The following represent different farmer, ag dealer quotes about CORN: Huge,Comprehensive and timely; It is just very valuable information; It is to the point and valuable, it doesn't get thrown to the bottom of the pile; go to as soon as it comes out; The newsletter is definitely a hit. **How do you access agronomic information? (web, newsletters, company representatives, OSU Agronomy Programs, Extension Educator other)** Internet; email **Explain the value**

of non-biased agronomic information to your operation? I think it is huge; Extension is only non-biased source we have; Weed Control Guide is kind of like the bible when you are looking at different chemicals; I think it is very valuable to have a separate third party, OSUE is not selling anything

Key Items of Evaluation

OSU Extension is a valued source of unbiased information on a variety of issues related to crop production. The delivery of electronic information is a valued resource for clientele and has been practiced in Ohio for 14 years. Extension fills a hole in information from the private sector which is focused on selling products and helps to incorporate that private information with production systems that are not a focus of that private sector. Extension also puts an environmental impact focus on production systems.

V(A). Planned Program (Summary)

Program # 19

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 professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	16.0	0.0	0.0	0.0
Actual	1.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
51245	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
51245	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

Two-hour course approved by the Department of Justice.
The subjects covered are budget development, money management, wise credit use and consumer information.

2. Brief description of the target audience

Bankruptcy filers

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	786	0	0	0

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

Patent Applications Submitted

Year: 2010

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	1	0	1

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of educational sessions

Year	Actual
2010	30

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.)

Year	Actual

2010 8

Output #3

Output Measure

- Total number of multi-state partnerships associated with this program
  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 the learning materials were helpful.
2	Number of participants indicating they learned something they can use.
3	Number of participants indicating they will use a budget at home.
4	Number of participants indicating they were more likely to set aside money for occasional expenses.
5	Number of participants indicating they were more likely to set aside money for unplanned expenses.
6	Number of participants indicating they were more likely to save money toward a goal.
7	Number of participants indicating they were more likely to keep debt below 20% of take-home pay.
8	Number of participants indicating they were more likely to adjust spending to match income.
9	Number of participants indicating they were more likely to know where their money goes.

Outcome #1

1. Outcome Measures

Number of participants indicating the learning materials were helpful.

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Number of participants indicating they learned something they can use.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	249

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Bankruptcy is a growing problem during the economic downturn and being able to manage personal finances is critical when income is lowered and or expenses go higher.

What has been done
Bankruptcy filers participated in a personal finance class aimed at helping them better understand money management practices.

Results
249 participants indicated they learned something that they can use from the New Start for Financial Success program.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #3

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	268

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Budgeting is a technique that helps a person or family plan their spending and stay within their income. In times of recession and job loss, often one can use budgeting to pare down spending and survive the crisis.

What has been done
Budgeting is a major focus of the personal finance class taken by bankruptcy filers to help them gain money management skills.

Results
268 persons bankruptcy filers reported that they planned to use a budget at home to help manage their money.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #4

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	203

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Occasional expenses are ones that come up on a recurring basis but less often than once per month. Many times people are focused on their monthly expenses and when the occasional expenses come along they do not have money to cover them.

What has been done
Participants take a personal finance course that include the topic of setting aside money for these occasional expenses.

Results
203 participants reported being more likely to set aside money for these recurring expenses after taking the class than they had done before taking it.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #5

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	200

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Unplanned expenses are often called emergencies, since they come up unexpectedly. The unplanned expenses may be large or small, with the large expenses often creating a financial crisis and possible bankruptcy.

What has been done
Participants take a personal finance course that include the topic of setting aside money for these unplanned (or emergency) expenses.

Results
200 participants indicated that they were more likely to set aside money for unplanned expenses after taking the class than they were before taking it.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #6

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	262

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Setting aside money for future expenses has been reduced in the last decade or two as consumer credit has become so widespread. Saving remains vital for most families, however, as large expenses may be required in the future.

What has been done
Setting goals and saving for those goal are an important part of the personal finance course that bankruptcy filers take.

Results
262 participants indicated that they were more likely to save money toward a goal after taking the personal finance class than they were before taking it.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #7

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	242

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Consumer debt has been touted as a major reason for families to be in financial crisis. Learning to manage one's spending without acquired too much debt is vital. Keeping one's debt below 20% of take home pay prevents most debt crises.

What has been done
Managing consumer debt is an important component of the personal finance course that is taken by bankruptcy filers.

Results
262 participants indicated that they were more likely to keep their debt below 20% after thanking the personal finance class than before taking it.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #8

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	223

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Many people get into financial trouble because they do not keep their spending in line with their income. That may be a general way of life or it may be a result of a job reduction or loss or some unexpectedly large expenses.

What has been done
Participants taking the New Start course learn ways to track their income and spending and techniques for reducing their spending to bring it into line with their income.

Results
223 participants in the New Start personal finance course indicated that they were more likely to adjust their spending to match their income after taking the class than before taking it.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #9

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	231

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
One critical part of managing one's money is knowing how it is being spent. Without being able to track where one's money is being spent, one cannot manage it well.

What has been done
Participants in new Start classes learn ways to track their spending as part of the overall money management course.

Results
231 participants in the New Start classes indicated that they were more likely to know where their money went after taking the class than before taking it.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

Evaluation Results

Evaluation results from a before and after test of money management behaviors of New Start participants showed that all eight behaviors showed significant increase.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 20

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	20%		0%	
806	Youth Development	80%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	20.0	0.0	0.0	0.0
Actual	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
153735	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
153735	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

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

and how to be smart in using checking accounts, savings, and credit.

2. Brief description of the target audience

Ohio Youth Grades 5 to 12.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	1961	0	19423	0

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

Patent Applications Submitted

Year: 2010
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

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

Year	Actual
2010	1961

Output #2

Output Measure

- total number of sessions

Year	Actual
2010	34

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. that includes both needs and wants.
6	Number of participants who increased feeling of importance about having a plan for spending that includes both needs and wants.
7	Number of participants who indicated their likeliness to make changes relative to getting more education or training after high school.
8	Number of participants who indicated their likeliness to make changes relative to learning how to make wise financial decisions.

Outcome #1

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	12661

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Parents -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
12661 school-age participants have a better understanding of the costs involved in running a household with children including taxes, retirement savings and medical insurance. In addition, they are more prepared to make better decisions 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 #2

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	12661

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 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 vs wants.

4. Associated Knowledge Areas

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

Outcome #3

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	11589

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 #4

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	11333

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 #5

1. Outcome Measures

Number of participants who increased feeling of importance about waiting to have children until financially ready. that includes both needs and wants.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	11676

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 free gratis 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 #6

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	11624

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
parents, teachers-students are still egotistical 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 non-essentials they were made to go back and re-do their plan to take care of needs before wants. In addition, sometimes their salaries didn't even cover all basic needs, so they had to have another job to get by.

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

4. Associated Knowledge Areas

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

Outcome #7

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	11333

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Parents, teachers-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 #8

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	11917

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Parents-Parent can talk and talk about making wise financial decisions but when their children are able to do hands on and 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
- Government Regulations
- Competing Public priorities

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

Evaluation Results

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

Participants in the "Real Money, Real World" 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 # 21

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 professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	10.0	0.0	0.0	0.0
Actual	2.0	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
102490	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
102490	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

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

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

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

2. Brief description of the target audience

Ohio citizens

Community Leaders/Officials

Master Volunteers

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	27138	200	250	0

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

Patent Applications Submitted

Year: 2010
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	5	0	5

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of programs presented.

Year	Actual
2010	60

Output #2

Output Measure

- Number of volunteers participating in WTM educational programs.

Year	Actual
2010	425

Output #3

Output Measure

- Number of volunteer hours committed to WTM programs.

Year	Actual
2010	1550

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	Number of local communities demonstrating improved tree selection skills.
4	Dollar value of energy savings to Ohioans documented from WTM studies in local communities.
5	Dollar value of storm water remediation savings documented from WTM studies in local communities.
6	Dollar value of air quality benefits documented from WTM studies in local communities.

Outcome #1

1. Outcome Measures

Number of participants that appreciate the value of community forests.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	1275

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. Developed a pilot program for Harold Schnell Elementary School in West Carrolton and Cox Arboretum in Dayton for over 450 elementary-school students, utilizing 4-H volunteers, Master Gardener and Ohio Certified Volunteer Naturalists, teachers, Arboretum and school volunteers. Also provided input to the TreEAB program for youth environmental education. Part of overall youth education programs which exceeded programming for 1000 students in 2010.

Results
Participants were more aware of the benefits of trees and the importance of planting diverse species. 95% indicated an increased awareness of the importance of diversity in tree plantings.

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
141	Air Resource Protection and Management
605	Natural Resource and Environmental Economics

608 Community Resource Planning and Development

Outcome #2

1. Outcome Measures

Number of participants that have improved knowledge of tree identification.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	2500

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Communities need assistance in gathering information on the trees within the community. Data needed: Tree ID. location , and value."

What has been done
Tree Inventories for 6 cities and 5 villages, plus the OARDC Secrest Arboretum. Information is then entered into the iTREE software program and results provided to community leadership, and insurance claims adjusters in the Secrest Arboretum survey.

Results
Participants, community leaders and insurance companies became more aware of differences in structure of trees and leaf,importance, benefits and value of trees.

4. Associated Knowledge Areas

KA Code	Knowledge Area
124	Urban Forestry

Outcome #3

1. Outcome Measures

Number of local communities demonstrating improved tree selection skills.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Improved tree selection skills are needed for community leaders and city planners, landowners, homeowners, etc. to select tree varieties more suitable to their environment, disease and pest resistance, etc.

What has been done
One example is the Greene County Master Gardeners developed a program that has educated the county and city officials within Greene County on the aspects of dealing with the Emerald Ash Borer infestation that was detected in Greene County this year by a Master Gardener.The methods used have been shared via WEB X to Master Gardeners in 24 Counties across the state.

Results
Results from just the Greene County program is that county and govt. officials are making informed decisions on how to handle the EAB problem and where to find information on tree replacement for the doomed Ash Trees.The residents can make informed decisions on whether to treat or remove their trees and they are aware that Extension can help them make good choices for tree replacement.

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
141	Air Resource Protection and Management
605	Natural Resource and Environmental Economics
608	Community Resource Planning and Development

Outcome #4

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

Outcome #6

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

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

Brief Explanation

Inventories of Trees, small to large, from $11,000 - $15.1 mil. Also includes $1.4 million lost trees from tornado at OARDC Secrest Arboretum.

V(I). Planned Program (Evaluation Studies and Data Collection)

Evaluation Results

Evaluation results include:"$8,913: the average estimated amount of money that will be saved by each participant who specified (48%) that new knowledge gained from the Symposium will save them money. $587,307: the total estimated amount of money that will be saved by all participants who specified that new knowledge gained from the Symposium will save them money.The Landscape Architects earned a total of 60 CEU's that were approved by the Landscape Architecture Continuing Education System (LA CES)."

Key Items of Evaluation

Some key items of evaluation include: The handbook, manual, and our other inputs were cited by the Director of the MSD and representative of the County Commission as being key factors in obtaining a contract with the MSD for funding for our office in the amount of over $350,000/yr for 2008 through mid 2011. 99 individuals joined CAPGIN. Green Township in Hamilton County issued a letter attributing the adoption of landscape storm water management best management practices in the township to our programming. Storm water management programs were attended by 789 governmental officials, storm water management professionals, landscape installation professionals, plant growers, building contractors, real estate developers, soil and water conservation specialists, and homeowners. The Grand Marquee exhibit was awarded a silver medal and the "Hamilton County Storm Water District Award".

V(A). Planned Program (Summary)

Program # 22

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

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	17.0	0.0	0.0	0.0
Actual	22.0	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
1127387	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1127387	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;

2. Brief description of the target audience

Community Leaders, economic development professionals, citizens (families and individuals)

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	10000	300000	100	1000

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

Patent Applications Submitted

Year: 2010

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	10	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of volunteers who have participated

Year	Actual
2010	3827

Output #2

Output Measure

- # of volunteer hours

Year	Actual
2010	12143

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

Outcome #1

1. **Outcome Measures**

# of participants who increased their financial literacy

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

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	Quantitative Target	Actual
2010	0	85

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
Programs have been conducted to help local communities learn how to systematically gather information critical to understanding local development needs.

Results
These efforts enabled 85 local officials to use community data to make better informed community 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

Not Reporting on this Outcome Measure

Outcome #6

1. Outcome Measures

# of participants who reduced total debt

Not Reporting on this Outcome Measure

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	Quantitative Target	Actual
2010	0	1822

3c. Qualitative Outcome or Impact Statement

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

What has been done
Efforts were undertaken to engage community stakeholders in a formal dialogue in order to empower local development officials and the community at large to act on community and economic development issues of strategic importance.

Results
Efforts helped existing businesses in their community create at least 757 new jobs and retain another 1065.

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

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 and Data Collection)

Evaluation Results

Local elected officials have indicated that the BR&E program has helped them better do their jobs and helped them establish relationships with area employers that have enabled them to become more successful. "Program partners estimate 40 jobs were created by existing businesses, and more than 75 were retained. Additional short term results of the Wyandot County BR&E program include:""Workforce training grant for an estimated $180,000 to send employees to Japan for training.""A local employer enrolled 20 new employees in the project HIRE program, generating an estimated $120,000 in training grant dollars for the company.""Local business enrolled in the ODOD Job Creation Tax Credit Program and committed to expansion that includes the generation of 75 new jobs within the next three years. This will produce and estimated $2,184,000 in new payroll.""6 nurseries have adopted 50% or greater reduction in insect and disease applications. two golf courses have reduced application by 40% on insect and disease control . It is estimated that nurseries save between 240 and 400 dollars per acre per year. Golf courses are earlier in the process but they estimate the saving be be between 160 and 300 per acre per year. The nurseries involved are growers near 3000 acres and the golf courses are spraying 140 acres in the trial. Savings estimated for nurseries range 720,000 to 1,200,000 dollars to taking in account reduction in equipment and labor reduction. nurseries continue to turn to OSU for information on new pests. These pests have little information of life cycles and control options. Working with research in 2010 we have been black vine weevil, emerald ash borer, ambrosia beetle, pine shot beetle, foliar nematodes all are under study working with this group "

Key Items of Evaluation

"6 nurseries have adopted 50% or greater reduction in insect and disease applications. two golf courses have reduced application by 40% on insect and disease control . It is estimated that nurseries save between 240 and 400 dollars per acre per year. Golf courses are earlier in the process but they estimate the saving be be between 160 and 300 per acre per year. The nurseries involved are growers near 3000 acres and the golf courses are spraying 140 acres in the trial. Savings estimated for nurseries range 720,000 to 1,200,000dollars to taking in account reduction in equipment and labor reduction. nurseries continue to turn to OSU for information on new pests. These pests have little information of life cycles and control options. Working with research in 2010 we have been black vine weevil, emerald ash borer, ambrosia beetle, pine shot beetle, foliar nematodes all are under study working with this group "

V(A). Planned Program (Summary)

Program # 23

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
112	Watershed Protection and Management	5%		0%	
123	Management and Sustainability of Forest Resources	5%		0%	
133	Pollution Prevention and Mitigation	5%		0%	
205	Plant Management Systems	10%		0%	
216	Integrated Pest Management Systems	5%		0%	
307	Animal Management Systems	10%		0%	
308	Improved Animal Products (Before Harvest)	10%		0%	
315	Animal Welfare/Well-Being and Protection	10%		0%	
402	Engineering Systems and Equipment	10%		0%	
403	Waste Disposal, Recycling, and Reuse	10%		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 professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	58.0	0.0	0.0	0.0
Actual	19.0	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**
973652	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
973652	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 to increase application and utilization of bioenergy applications including waste digesters and cellulosic based technologies by directing energy team to develop and deliver educational programming.

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 emerging technologies.

2. Brief description of the target audience

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

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	121478	175000	3949	124101

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

Patent Applications Submitted

Year: 2010

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	0	30	30

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- number of volunteers involved in delivery and implementation of program.

Year	Actual
2010	3154

Output #2

Output Measure

- number of multi-state partnerships

Year	Actual
2010	215

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.

Outcome #1

1. Outcome Measures

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

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	779

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The average size of dairy farms in Ohio remains <100 cows accounting for approximately 85% of the dairy operation, 46% of the inventory & 35% of the total milk production (USDA-NASS 2008). Milk production is the 3rd economically most important agriculture-related commodity in Ohio (USDA-NASS 2008). However, the economic viability of dairy operations with <100 cows continues to be challenged. Educators play an important role in disseminating research-based knowledge to support the needs of the whole dairy industry.

What has been done
One example is the development of a comprehensive Extension & research program to assist a core of small dairy producers and their veterinarians to identify, implement and accomplish sustainable management goals. On-farm demonstrations were an important component of the learning process.

Results
Dairy producers (69 herds) & their veterinarians (from 5 practices)= 117 participants completed

the program in 2010. This program reached an estimated 13,075 dairy cattle over 69 herds. Participants reported that their knowledge increased on a variety of topics including: raising calves; DHI records and how they interpret them; managing the quality of colostrum; calculating pregnancy rates; the estrous cycle; different methods of treatment for Mastitis & when to treat effectively; handling of corn & silage; importance of planning for transition of the farm/business to the next generation; value of management of herd - repro, health & nutrition; transmission of Johne's disease & methods for testing for it.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
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
403	Waste Disposal, Recycling, and Reuse
601	Economics of Agricultural Production and Farm Management

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	Quantitative Target	Actual
2010	0	9000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Safe use of pesticides to insure the protection people, the environment, & our food chain is essential. OSU Extension's Pesticide Applicator Training helps assure the safe use of pesticides, proper disposal of pesticides, and helps prevent misuse & mishandling. Reducing the environmental, economic & social risk associated with managing pests - insect, disease or weed

is an constant issue and is the goal of the OSU Extension Integrated Pest Management (IPM) program.

What has been done
Private applicator recertification trainings were held in 2010 in 4 major cities in Ohio and residents of all 88 counties were invited to participate in trainings held at the county level as well. The IPM program provided training to approximately 4000 clients at multiple events Y sites on topics such as Agronomic IPM, Consumer/Urban (Master Gardener training), Specialty Crop IPM (Vegetable & Urban Ag.), Conservation Partnerships (IPM incentives), Pest Diagnostics, and Housing IPM (bedbugs).

Results
Pesticide Applicator Training is is essential to Ohio for job retention & procurement; to farmers & agribusinesses that must be certified in pesticide use; nearly 5000 private applicators received re-certification training; 10,838 clients participated in pesticide safety & risk management events; 807 farm workers, 7 food & nutrition staff, 85 health care professionals & over 220 master gardeners participated in a pesticide safety & risk management event. 239 new &/or updated IPM education & training materials were delivered to clientele for selected commodities &/or at select sites; 217 IPM clients were satisfied with results when utilizing IPM strategies & systems; 97 IPM strategies & systems were validated for use on selected commodities

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation
205	Plant Management Systems
216	Integrated Pest Management Systems
402	Engineering Systems and Equipment
601	Economics of Agricultural Production and Farm Management
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	Quantitative Target	Actual
2010	0	94

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Safe food, better livestock care, prevention of the outbreak of both 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 animals entering the food supply through the youth livestock program that exceeds 57,000. 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 + a Beef Quality Assurance Program for youth 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 57,000+ animals entering our food system each year by educating youth on food animal quality assurance. These programs may include, but not limited to topics such as animal welfare, illness & condition treatments, adequate housing, meat cuts, and 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.)

Not Reporting on this Outcome Measure

Outcome #6

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	25

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Grazing schools help farm managers increase forage production per acre, which helps managers 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
One example are the Grazing schools coordinated and taught by OSU Extension Educators & Specialists. These schools are designed to teach farm managers how to increase forage production. With an increase in forage production per acre, managers 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.

Results
25 farmers/producers representing 6269 acres of Ohio farmland in Belmont, Guernsey, Harrison, Monroe, Muskingum, & Noble counties with 1666 head of livestock attended a multi-county workshop in March 2010.

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
602	Business Management, Finance, and Taxation

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 24

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

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	63.0	0.0	0.0	0.0
Actual	55.0	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**
2818467	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
2818467	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

2. Brief description of the target audience

Youth - infant through 18 years of age

Parents of youth

Volunteers working with youth audiences

Teachers/Educators working with youth audiences

Youth (with a special focus on new and underserved audiences); Families; Volunteers; Youth Development Professional Staff; and Community Leaders involved in subject specific areas.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	20949	0	251387	0

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

Patent Applications Submitted

Year: 2010

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	1	0	1

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of youth enrolled/engaged in organized community 4-H clubs

Year	Actual
2010	77610

Output #2

Output Measure

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

Year	Actual
2010	831

Output #3

Output Measure

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

Year	Actual
2010	457

Output #4

Output Measure

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

Year	Actual
2010	128637

Output #5

Output Measure

- Number of youth participating in School Enrichment programs

Year	Actual
2010	82176

Output #6

Output Measure

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

Year	Actual
2010	18956

Output #7

Output Measure

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

Year	Actual
2010	4664

Output #8

Output Measure

- Number of adult volunteers

Year	Actual
2010	20949

Output #9

Output Measure

- Number of teen volunteers

Year	Actual
2010	11914

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

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	Quantitative Target	Actual
2010	48000	52640

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
Volunteers who responded 19% Male/ 81% Female; Average Tenure as 4-H Advisor - 11 years; Averaged 11 club meetings/ 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
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; 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	Quantitative Target	Actual
2010	60000	65829

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
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

Results
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.

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	Quantitative Target	Actual
2010	40000	52460

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
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.

Results
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%)

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #4

1. Outcome Measures

Practice improved basic life skills

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	32000	37865

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 2010 Ohio 4-H community club members.

Results

4-H Club Advisors were asked how many club members demonstrated transferable workforce skills, 92%-99% of the respondents stated that half or more of their members demonstrated such skills. The highest was, "Display positive attitudes" (99%); the lowest was, "Demonstrate self-motivation" (92%). Other workforce 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

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

Evaluation Results

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 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

Key Items of Evaluation

I. 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

II. 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.

III. 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%)

IV. 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

V. 92%-99% of the 4-H Advisors stated that half or more of their 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(A). Planned Program (Summary)

Program # 25

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 professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	20.0	0.0	0.0	0.0
Actual	32.0	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**
1639835	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1639835	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

• conduct formal and informal needs assessments

• develop programming materials and curricula

• conduct meetings, workshops and educational sessions

• conduct program evaluation and applied research

• form and sustain community partnerships

• train volunteers, paraprofessionals, and other community agency/organization professionals

2. Brief description of the target audience

Strengthening Families and Communities programming is tailored to meet the needs of the intended 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

• 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)

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	49493	380000	0	0

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

Year: 2010
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	5	0	5

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Educational sessions held with two or more participants

Year	Actual
2010	3720

Output #2

Output Measure

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

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	Quantitative Target	Actual
2010	50000	29521

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Improved knowledge is the first step in bringing about behavior change.

What has been done
Relevant programs designed and offered.

Results
29521 participants 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 Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	50000	20548

3c. Qualitative Outcome or Impact Statement

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

What has been done
Consubstantiation occurred.

Results
20548 participants indicate intent to change behavior.

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	Quantitative Target	Actual
2010	25000	5953

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Adopting new behaviors is one of the ultimate goals of the educational programs.

What has been done
Participants have internalized educational objectives.

Results
5953 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

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Competing Programmatic Challenges

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

Evaluation Results

Of those attending educational sessions intending to strengthen families and communities: 93% reported gaining knowledge; 53% reported an intention to adopt one or more recommended practices, and 22% reported they actually adopted more or more recommended practices.

Key Items of Evaluation

Of those attending educational sessions intending to strengthen families and communities: 93% reported gaining knowledge; 53% reported an intention to adopt one or more recommended practices, and 22% reported they actually adopted more or more recommended practices.