# 2009 Ohio State University Combined Research and Extension Annual Report of Accomplishments and Results

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## I. Report Overview

### 1. Executive Summary

Throughout 2009 OARDC and OSU Extension have continued to adapt to tighter budgets, greater demand for services, and continuing emphasis on advancing job growth and new initiatives that benefit both Ohio and the nation. For example, OSU Extension, as a means to better reflect their long standing programs to help society develop people, institutions, and business/industry, are working with both internal and external stakeholders to explore changing their name to include the term 'Development'. 'Development' in both organizations' name is intended to communicate that our missions call for using research and extension knowledge, from both our well-established programs and our new initiatives, to advance societal well-being. An example of preparing for new initiatives is OARDC's new state of the art feedstock processing facility, dedicated in 2009, that will not only replace an old feedmill that produces food for animal research, but also will process feedstocks for the emerging biobased/ sustainable energy and materials research programs. OSU Extension and OARDC have had long standing programs that address critical world issues such as world hunger and global climate change. In recognition of this institution's work in these areas Professor Lal from OARDC was awarded the M.S. Swaminathan Award from the Trust for the Advancement of Agricultural Sciences in 2009 in New Dehli, India for his work in 'increasing food production to feed the world's hungry while protecting our environment and staving off global warming through the management of soils'. Issues such as climate change are advanced by the institution as a local as well as a global issue. To that end a Climate Change Panel discussion was held at our 2009 Ohio Farm Science Review. The impacts of cap and trade legislation and impacts of climate change on the Ohio agriculture industry was the focus of an expert panel discussion. OSU Extension and OARDC are committed to maintaining our core programs and serving our traditional clients while at the same time of advancing new programs such as biobased products/sustainable energy. The nation continues to face severe economic downturns, pressures to become more energy independent, live more sustainably, and to have less impact on the environment. Issues such of obesity at home, world-wide climate change, world hunger abroad, and threats to a safe food supply demand greater productivity from land grant research and extension programs. To do this requires new approaches, approaches in which the 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, the Ohio Agricultural Research and Development Center (OARDC) and Ohio State University (OSU) Extension have directed resources in new and innovative ways to generate technology -based economic development, supported by new social and other human capital programs for Ohio, and for the nation. These efforts are required to support the agbioscience sector in Ohio that is valued at $93.8 billion (2009 annually and employs nearly one million people. Given that 11% of Ohio's economy and that 1 in 7 Ohio jobs are agriculture related, the continued efforts of OARDC and OSU Extension are critical. These efforts range from sponsoring a 2009 Renewable Energy Workshop to being actively in engaged in advancing STEM education for today's youth. Today, OSU Extension and OARDC are focusing on three signature areas in agricultural biosciences and biotechnologies, hereafter referred to as 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 are critical support for addressing the five new NIFA priority areas. Within these focal areas, multiple centers and collaborative programs have been established working to advances research from discovery to application and commercialization, truly operationalizing the concepts of GATE TO PLATE and CELL TO SELL. At the same time this institution has continued to serve traditional needs and stakeholders. For example the new feedstock facility will continue to prepare over 200 different feed rations per year to support the work of 50 faculty. The facility also supports researches engaged in biobased sustainable energy and materials research programs such as the Ohio Bioproducts Innovation Center. 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 FY2008 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. Each of these areas is supported by OSU Extension that further grows these numbers and impacts with an

equally robust program. Battelle reported in 2005 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 OSUE Extension support job creation and growth of the private sector. On average OARDC research supports 180 graduate students annually. OSU Extension continues to provide multiple services to all counties in Ohio. OSU Extension's weekly Crop Observation and Recommendation Network (C.O.R.N.) newsletter is estimated to save farmers upwards of ten million dollars annually by providing them the latest research based information on their crop. After a long planning and funding process, OARDC is nearing the beginning the construction of a biosecurity laboratory on the Wooster, Ohio campus that will permit plant and animal research requiring biosecurity level 3. Groundbreaking will be in 2010. All of the noted actions are intended to improve the human condition by advancing a 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 funding provided through an internal seed grant program to faculty (SEEDS) has been successful in achieving considerable leverage. OARDC funds have leveraged an additional $40 million in competitive grants yielding a $5 return for every $1 invested by OARDC. SEEDS funded research programs have engaged over 150 companies in partnering on research with OARDC researchers, three patents have been granted (9 filed), three licenses issued, and more than 570 publications have resulted. In another approach to leveraging funds, OSU Extension received approximately $60 million of volunteer and in-kind support in 2009. For 2009, OARDC and OSUE have reported an array of impacts and have added NIFA's five priority areas as Planned Programs for future years. 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. Reported research into soil, air, water, and natural resources are insuring that natural resources for future generations will not be further impacted by our industry. Findings regarding the value of carbon farming in relationship to climate change is reported. 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 involving both OARDC and OSU Extension. For example, Professor Dorrance, who is an internationally recognized research and extension soybean rust specialist received in 2009 the American Phytopathological Society Excellence in Extension Award, in part for furthering national educational efforts on soybean rust. OARDC supports research across five OSU colleges, entering into multi and interdisciplinary partnerships to address complex problems and issues that require broad thinking. OSU Extesnion is involved in multiple colleges as well. Heath and wellness, energy and environment, sustainable societies, and biobased advanced materials are among the problem areas being addressed in collaboration with both internal and external partners. These collaborative research ventures are providing leadership and research that is relevant to multiple sectors of our society and contributes to food, economic, environmental, and national security. All OARDC research findings are conveyed to stakeholders via strong outreach, engagement, and extension programs led by OSU Extension. Ohio State University Extension (OSU Extension) connects with people in all stages of life, from young children to older adults. OSU Extension works with families and children, farmers and business owners, community leaders and elected officials to build better lives, better businesses, and better communities to make Ohio great. They delivers targeted, relevant, research - backed information and programs to meet the needs of Ohioans at a local level and address emerging issues. 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 teaches people to manage money and prepare for retirement. The Ohio 4 - H Youth Development program is part of a community of young people across 300,000 Ohio youth, aged 5 to 19, experienced hands - on learning in this OSU Extension effort through clubs, camps, and after -school programs in urban, suburban, and rural communities statewide. Grow Ohio's important green industry by creating jobs, improving workforce skills, and enriching the knowledge of professionals in turfgrass management, landscaping, and nursery companies is part of OSU Extension efforts, as is job readiness training improves the skill level of potential employees and works with communities to attract 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 increase the knowledge base for individual and community decisions. 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. One of the summer camp leadership workshops, supported by OSU Extension, Univenture, and the Ohio Corn Growers Association, focused on the younger generation's responsibility to begin purchasing bioproducts to combat our oil dependence. OARDC and OSU Extension recognize if programs such as sustainable energy is to be a national goal that youth must be engaged now. To

help youth grow their research skills and better help them understand the science behind, and opportunities within, agbioscience, 35 students participated in OARDC's 2009 youth summer internship program. STEM concepts were taught in both laboratory and field settings and included seminars, project reports, and symposia. Students became researchers on real world OARDC projects. OSU Extension and OARDC manage numerous independent and joint projects and programs. Both organizations have created new websites that serve both internal and external audiences. A review of those sites illustrate the we are committed to a broad array of support ranging from intoducing new varieties of cultivars, to obesity and diabetes education programs, to soil fertility research and outreach in Africa. The Ohio Agricultural Research and Development Center and Ohio State University Extension have worked throughout 2009 to accomplish the land grant mission of The Ohio State University and 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 research, development, delivery, and evaluation. 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: 2009 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 235.0 | 0.0 | 68.4 | 0.0 |
| Actual | 0.0 | 0.0 | 92.5 | 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

In 2009, OARDC and OSU Extension, and the College of Food Agricultural, and Environmental Sciences began implementing their new strategic plans that were produced in 2008. Both utilized their advisory committees and multiple internal and external stakeholder groups to provide feedback on the plan implementation and provide input on matters as the 2009 annual reports. 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. 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 received additional training to remain on the cutting edge of their field. They continue to be encouraged to work with other educators in their region 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. 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. OARDC internal competitive grants program (SEEDS) were 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. Occassionly, faculty from outside the College are used a reviewers. Combined panels of academics and non academics are used to help define research programs that can more readily move into the marketplace. 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 been part of the business culture of OSU Extension and OARDC.

## 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. 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. Both formally and informally using all of the methods noted above, over time, OSU Extension and OARDC are constantly engaged at some level with stakeholders. One example is commentary that was gathered over a series of brown-bag lunch meetings at the Ohio State University during May, 2009. In attendance were faculty, staff, and stakeholders, particularly those participating in a number of interdisciplinary programs - The Agroecosystems Management Program, Urban Landscape Ecology Program, Organic Food and Farming Education and Research Program, and the Social Responsibility Initiative. Participants in the sessions and administrators of the College of Food, Agricultural and Environmental Sciences and the University were given a chance to comment on the USDA Roadmap and have their ideas submitted to the review panel. Another example is Buckeye Ladybug Blitz where 180 volunteers are engaged as citizen scientists to gather data regarding the status of native lady bug populations in relation to exotic lady bug populations. As an institution, new emphasis is being place on business and industry participation and creating collaborative efforts. To make the public - private collaboratories valued, there are stated expectations for: - determining its 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. Now using electronic messaging, social media, and blogging, as well as interactive group messaging systems, 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. OARDC gathers input in many one on one situations while it is working with a private business or industry on a project, 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.

**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.**

The approach that is most effective utilizes faculty and staff, and associates from support organizations and political leaders, to help identify 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. Formal needs assessments and targeted surveys, as well as an annual statewide telephone survey, help to identify individuals, groups, issues, and needs. One on one sessions at the state fair, local fairs, special events, and active participation by faculty and staff in community group processes and business/professional meetings expand the institution's clientele list and knowledge of needs. These contacts are logged and maintained. Local committee members are identified by the Extension personnel in that county. 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 a representative group of local citizens. Educators are encouraged to reach out to new and underserved target audiences to identify specific needs to be addressed. This occurs at the campus level as well.

**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 in this section are utilized at various levels of the organization to gather data from stakeholders. 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 the foundational membership list. In turn there are business and industrial partners, fellow research and extension institutions, and support organizations who are part of the list. Federal, state, regional and local governments and agencies, as well as advisory committees and friends groups, commodity groups, and special interest groups also add to the list of stakeholders from whom we seek input in the initial planning and execution phases of our programs, and who provide both formative and summative assessment of outputs and impacts. In a 2009 published study of OARDC by Battelle, Battelle reported using extensive field interviews to identify how core competencies can be translated into sources of innovative technologies and products for development.

**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.**

The institution advances both basic and applied research and builds and tests advance models for extension programming that meets client needs. To accomplish this requires close client/stakeholder/customer interaction. Throughout this reporting period, both OARDC and OSU Extension have continued stakeholder activities that reinforces that our organizational culture is customer - centered, customer - focused. 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. State, federal, and extramural supporters must see constituency benefits in order to justify funding decisions. It is the field level interactions among stakeholders and research and extension scientists 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 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 and 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. Most often stakeholders join with the organization to facilitate communication. The stakeholders voice 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 2009: Budget request to the state; relations with elected officials; personnel hires; Ohio Third Frontier funding; new facilities planned and retrofitting of existing facilities; strategic planning; organizational changes; program expansion and program reduction including development of new centers and closing of some facilities; content and format of publications; 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 each of these interactions is that the stakeholder perspective is not always as we might assume. 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 emerges an improved understanding among all parties as to realistic expectations. Illrustative of this shared understanding and recognition is OARDC being selected as winner of the Wayne Economic Development Council's (WEDC) 2009 Quality Growth Award-Wooster (Ohio) for its efforts to propel Wayne County into a technology-led economy.

## IV. Expenditure Summary

| 1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS) | | | |
|---|---|---|---|
| Extension | | Research | |
| Smith-Lever 3b & 3c | 1890 Extension | Hatch | Evans-Allen |
| 10336252 | 0 | 6522624 | 0 |

| 2. Totaled Actual dollars from Planned Programs Inputs | | | | |
|---|---|---|---|---|
| | Extension | | Research | |
| | Smith-Lever 3b & 3c | 1890 Extension | Hatch | Evans-Allen |
| Actual Formula | 10336252 | 0 | 6522625 | 0 |
| Actual Matching | 10336252 | 0 | 12171122 | 0 |
| Actual All Other | 0 | 0 | 0 | 0 |
| Total Actual Expended | 20672504 | 0 | 18693747 | 0 |

| 3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from | | | | |
|---|---|---|---|---|
| Carryover | 1255816 | 0 | 0 | 0 |

# V. Planned Program Table of Content

| | |
|---|---|
| 30 | Ohio Dairy Health and Management Certificate Program (Extension) |
| 31 | Livestock Environmental Assurance and Mortality Management (Extension) |
| 32 | Management & Sustainability of Forest Resources (Extension) |
| 33 | Food Safety |

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

**Program # 1**

**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: 2009 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 0.0 | 0.0 | 6.3 | 0.0 |
| Actual | 0.0 | 0.0 | 8.3 | 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 | 712236 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 0 | 0 | 769963 | 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

Faculty in this Planned Program have conducted numerous basic and applied research projects, as noted in the CRIS reports, and published in peer-reviewed journals, and in all types of other media from social networks to on-line trade journals and extension publications. As a matter of routine practice OARDC faculty, staff, and administrators in this, and all Planned Programs, work in partnership with business, industry, government, NGOs, commodity groups, and other stakeholders on a daily bases. They are as committed to development, as the are to the research element, insuring that research is moved into society to create new products and services, jobs, economic activity, and overall, improve social well-being. In addition to our research output in this Planned Program, OARDC has maintained unique facilities such as a United Nations recognized wetland research station, one of the longest no till research sites in the world, and a variety of state of the art research stations state - wide. The Ohio State University has recognized the work in this Planned Program by awarding them a one plus million dollar targeted investment grant. Found within is substantial leadership for the OSU's climate change research program. Where complementary extension activities occur they are reported within the appropriate sections.

### 2. Brief description of the target audience

Targeted audiences include, but are not limited to: 1) Specific individuals or groups who have expressed a need for certain information that is to be derived through new research, extracted from on-going research, or is derived from scientific literature. Often those requests are communicated to OARDC by an intermediary such as a staffer at Ohio Dept of Natural Resources or a county extension agent; 2) Fellow agencies or support organizations that will not only use the information but will also be brokers of that information, including embedding it into groups to encourage change; 3) Populations who have not requested the information but will likely benefit from that information, e.g. immigrant populations; 4) Other scientists and scientific groups; 5) Political entities; 6) Extension personnel; 7) Students from pre-school to post doctorate studies; 8) News organizations; and 9) Business groups such as chambers of commerce and community coalitions.

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

### 1. Standard output measures

| 2009 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Plan** | 0 | 0 | 0 | 0 |
| **Actual** | 0 | 0 | 0 | 0 |

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

**Patent Applications Submitted**

Year: 2009

Plan: 0

Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2009 | Extension | Research | Total |
|---|---|---|---|
| Plan | 0 | 40 | |
| Actual | 0 | 43 | 43 |

**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 | Target | Actual |
|---|---|---|
| 2009 | 40 | 43 |

**Output #2**

**Output Measure**

- Commercialized techniques will be tracked ;
  Not reporting on this Output for this Annual Report

**Output #3**

**Output Measure**

- Non - commercialized techniques will be tracked ;
  Not reporting on this Output for this Annual Report

**Output #4**

**Output Measure**

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

| Year | Target | Actual |
|---|---|---|
| 2009 | 0 | 0 |

**Output #5**

**Output Measure**

- Number of graduate students completed

| Year | Target | Actual |
|---|---|---|
| 2009 | 8 | 9 |

## Output #6

### Output Measure

- Total number of OARDC sponsored communication products/efforts,excluding peer reviewed publications, will be reported.
  Not reporting on this Output for this Annual Report

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

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | Continue to advance soil, water, nutrient, and plant research to 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.

### 2. Associated Institution Types

- 1862 Research

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 1 | 2000 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
BYPRODUCTS/ VALUE ADDED: As of 2007, of the 2,000 United States foundries, 93% produce ferrous or aluminum castings, generating 9.4 million tons of non-hazardous spent foundry sand (SFS) annually. Only 28% of the SFS is beneficially used. Diverting 1 million tons annually from landfills ($30/ton) to beneficial use would realize annual savings of $30,000,000 by the foundry industry. Beneficial use of SFS in soil blends could promote green technology (i.e., reuse of millions of tons of SFS beneficially and provide a badly needed natural resource of soil substitute), increase the competitiveness of our foundry industry, creating start-up business and jobs focused on production and marketing SFS as a soil substitute and in soil blends.

**What has been done**
OARDC scientists evaluated the risk posed by residual application of spent foundry sand or SFS to uncontaminated (e.g. baseline) soils. They also worked with a major landscape materials company and with the foundry industry to create a new blend of SFS and organic waste to generate a soil substitute that meets federal and state regulatory standards for soil application in residential settings. The sample sets included 43 foundries which cast iron, steel, aluminum, or non-leaded brass, and generated SFSs which contained low levels of potentially toxic elements and xenobiotics except for the brass SFS.

**Results**
The OARDC research shows SFS has can be used as a component of manufactured soils. This would allow Ohio foundries to become more competitive and create start-up industries and jobs in Ohio focused on production and marketing of SFS soil blend materials to the public. The chemical composition of the candidate feedstock (CF) for mulch met federal and state regulatory standards for soil application in residential settings. The CF contains many

plant nutrients and will help fertilize plants. The results of this research have been identified as critical by the partner company as part of a major initiative by them to develop a new value-added product utilizing industrial by-products as feedstocks to develop a sustainable landscape mulch product. The value of recycling organics into substitute soil has yet to be valued but the savings to the foundry industry in terms of landfill savings is $30 million dollars annually. As the result of risk assessment studies of using spent foundry sand as a beneficial material in soils, EPA is now developing the first regulatory guidelines for SFS.

**4. Associated Knowledge Areas**

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

**Outcome #3**

**1. Outcome Measures**

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

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 1 | 0 |

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

**Issue (Who cares and Why)**
POLLUTION MITIGATION: Heavy metals are a concern due to both their persistence in the environment and potentially adverse health effects. As water moves through a watershed, it collects and transports the pollutants present. In many areas, impervious surfaces are one of the leading sources of pollution of surface waters and can contaminate groundwater. Roadways, parking lots, buildings, and sidewalks create the need to manage runoff water. Rain gardens are proposed as a relatively new best management practice (BMP) to treat storm water runoff while additionally providing for an aesthetically pleasing landscape. The runoff can be treated in the rain garden before recharging the groundwater.

**What has been done**
Three replicated rain gardens were constructed by OARDC scientists using a design that consists of both an anaerobic (oxygen-deprived) and an aerobic (oxygen-rich) zones. Multiple rainfall events were applied to collect simulated stormwater runoff from a concrete pad. Water samples were collected at three sampling points: 1) the inlet to the rain garden, 2) the interface between the anaerobic and aerobic zone, and 3) at the discharge of the aerobic zone where it was analyzed for copper (Cu), chromium (Cr) and lead (Pb). Metals in the water entering the rain gardens were in excess of the legally enforceable EPA Maximum Contamination Level standards (MCL) by at least 7.5 times.

**Results**

OARDC scientists found that the rain gardens were effective in removing metals with results showing a decrease in the heavy metal concentrations at both sampling points 2 and 3; overall, the removal was a greater than 99%. Of the 36 samples analyzed from the aerobic (final) discharge pipe, all were also below the MCL. The main components of the rain garden include: a ponding area, a mulch layer, a soil layer, a gravel layer and, optionally, an under-drain. Plants, often species native to the area, promote evapotranspiration, biological activity, pollutant uptake and help maintain efficient infiltration.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 103 | Management of Saline and Sodic Soils and Salinity |
| 111 | Conservation and Efficient Use of Water |
| 112 | Watershed Protection and Management |
| 131 | Alternative Uses of Land |
| 133 | Pollution Prevention and Mitigation |

**Outcome #4**

**1. Outcome Measures**

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

Not Reporting on this Outcome Measure

**Outcome #5**

**1. Outcome Measures**

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

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 3 | 0 |

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

**Issue (Who cares and Why)**
REMOVAL OF TOXIC WASTE, especially that mixed in with soil and water, is a major concern worldwide. These waste can enter the food chain of plants, wildlife, and humans with tragic results. Researchers are constantly searching for alternatives to the expensive process of collecting and hauling the waste to a toxic dump site where is can be contained and sequestered.

**What has been done**

OARDC scientists have found a bacteria, Shewanella, that "inhales" toxic metals and "exhales" them in a non-toxic form. The mechanisms for how the process occurs has been described.

**Results**
OARDC researchers provided the first evidence that Shewanella maneuvers proteins within the bacterial cell into its outer membrane to contact metal directly. The proteins then bonds with metal oxides, that the bacteria utilize the same way humans use oxygen. Shewanella is naturally present in the soil. With this knowledge the bacterium's abilities, scientists can now engineer a Shewanella that will remediate waste more efficiently.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 112 | Watershed Protection and Management |
| 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.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 1 | 0 |

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

**Issue (Who cares and Why)**
CLIMATE CHANGE: Mining carbon has the same effect on global warming, whether it is through extractive farming (tillage) or through the burning of fossil fuels. Soils can be a source of carbon release into the atmosphere or a sink for carbon storage, depending on how the soil is managed. If used as a sink, the soil has the capacity to store three gigatons of carbon a year worldwide, translating into a reduction of 50 parts per million of carbon dioxide in the atmosphere over the next five decades. Globally, no-till is practiced on only six (6) percent of the total cropland and is mostly practiced in the United States, Canada, Brazil, Australia, Argentina, and Chile.

**What has been done**
OARDC's Carbon Management and Sequestration Center scientists measured carbon levels in no-till fields throughout seven states characterizing soil type, soil texture, moisture, temperature, and terrain parameters. They studied no-till fields in Ohio, Michigan, Indiana, Pennsylvania, Kentucky, West Virginia, and Maryland and identified situations where the practice was the most effective in storing carbon and where it was not.

**Results**
No-till is recognized globally as an ideal means of conserving soil and water while also storing soil carbon, but the agricultural practice may not be applicable under all environmental conditions. OARDC scientists found that soil texture, moisture, temperature, and terrain parameters affected the amount of carbon stored on the soil surface. Soil depth is the key factor to consider. If you compare carbon storage between no-till and plowed fields with the plow depth, or the first 8 inches of the soil, carbon storage is generally much greater in no-till fields than in plowed fields. If measured to a depth of 12 inches and deeper, one may find more carbon stored in plowed fields than in no-till. Soil carbon storage evaluation cannot be based on near - surface depth alone. OARDC scientists recommend measuring as much as one meter (3.25 feet) below the soil surface. In situations where no-till may not be ideal, there are pmultiple other carbon sequestration methods available, including mulching, cover crops, complex crop rotations, mixed farming systems, agroforestry, and biochar (a charcoal-like biomass material).

**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 |
| 132 | Weather and Climate |
| 141 | Air Resource Protection and Management |

**Outcome #8**

**1. Outcome Measures**

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

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 0 | 0 |

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

**Issue (Who cares and Why)**
CLIMATE CHANGE/NO-TILL/PATHOGENS/PRODUCTIVITY: Farmers use no-till, among other strategies, to

enhance soil carbon, enhance yield, reduce atmospheric carbon loading, and position themselves for potential carbon trading. No tilled soils have a tendency to transport excess water through the field more rapidly than tilled fields do. Excess water moving into waterways is problematic. Without mitigation, no -till practices could have a negative impact on water quality and in turn reduce the acreage for carbon storage/ trading. Also issues of soil compaction from heavy farm equipment on tilled and no-till is an issue.

**What has been done**
OARDC scientists studied the transport of Cryptosporidium (a parasite present in animal waste) through no-till and tilled fields. This parasite causes Cryptosporidiosis, a waterborne disease causing intestinal illness in humans. Researchers treated six undisturbed no-till and six no-till blocks, that were tilled on the surface, with liquid manure containing Cryptosporidium oocysts to test the effect of tillage and rainfall on parasite transport. They found that a greater amount of the parasite moved along with excess water through no-till fields and into tile drains than in tilled fields, especially during a rain event.

**Results**
As a mitigation strategy the OARDC scientists found if no-till growers can apply a small amount of light tillage directly over the drain tiles, it can have a tremendous impact on the movement of pathogens and nutrients from the soil surface to the field drain tiles, with potential decreases in the transport of oocysts up to 80 percent. Tilling disturbs the macropores and disrupts the direct linkage from the soil surface to the drain tiles. In addition to tillage, other factors impacting the transport of Cryptosporidium include rainfall timing and rainfall intensity. To lessen the impact, researchers recommend that farmers apply any manure at least 48 hours prior to an anticipated rainfall event. Additionally according to results from a six-year OARDC compaction study at the Northwest Agricultural Research Station near Hoytville, Ohio, land in continuous no-till showed less effect from intentional compaction by farming equipment than soil that was deep tilled (subsoiled) each fall. When using heavy machinery on cropland under potential compaction situations, farmers may get better yields by practicing continuous no-till than with annual deep tillage.

### 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 |
| 132 | Weather and Climate |
| 133 | Pollution Prevention and Mitigation |
| 141 | Air Resource Protection and Management |

### 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, federal/state base funding,  climate change agreements)

**Brief Explanation**

Climatic extremes, coupled with pest and diseases that are often climate related, do impact outcomes. As the food, fiber, and environmental economy adjust to the global marketplace, in conjunction with public policy shifts, regulations, and shifts in demand, outcomes will be continue to be impacted. Formative evaluation has lessened the burden by seeking feedback throughout the life of the program. Internal factors such as the availability of base funding to ensure a core faculty and staff, availability of extramural funds, availability of competitive funds, and programmatic demands that often exceed resources, continue to affect outcomes.

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

1.  Evaluation Studies Planned

**Evaluation Results**

**Key Items of Evaluation**

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

**Program # 2**

**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: 2009 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 0.0 | 0.0 | 3.6 | 0.0 |
| Actual | 0.0 | 0.0 | 3.7 | 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 | 306296 | 0 |
| 1862 Matching | 1890 Matching | 1862 Matching | 1890 Matching |
| 0 | 0 | 417878 | 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**

Faculty in this Planned Program have conducted numerous basic and applied research projects, as noted in the CRIS reports, and published in peer-reviewed journals, and in all types of other media from social networks to on-line trade journals and extension publications. As a matter of routine practice OARDC faculty, staff and administrators in this, and all Planned Programs, work in partnership with business, industry, government, NGOs, commodity groups, and other stakeholders on a daily bases. They are as committed to development, as they are to the research element, insuring that research is moved into society to create new products and services, jobs, economic activity, and overall, improve social well-being. Found within this Planned Program is a joint OSU-Ohio Department of Natural Resources ecology laboratory. Significant leadership is found within for wildlife ecology, aquatic management, and human dimension of environmental management. The program is becoming internationally recognized for their work in ornithology continuing a long history dating back to the la station's 1912 publication of SOME OHIO BIRDS, a publication that explained the beneficial role of birds in agriculture. Where complementary extension activities occur they are reported within the appropriate sections.

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

Targeted audiences include, but are not limited to: specific individuals or groups who have expressed a need for natural resources and environmental research knowledge that is to be derived through new research, extracted from on-going research, or is derived from scientific literature --(often those requests are communicated to OARDC by an intermediary such as a staffer at USDA, ODNR, or a county extension agent); related agencies or support organizations who will not only use the information but will also be brokers of that information, including embedding information into groups to encourage change, e.g. fish and wildlife clubs; populations who have not requested the information but will likely benefit from that information, e.g. people who fish for recreation; other scientists and scientific groups; political entities; extension personnel; students from pre-school to post doctorate studies; news organizations; and business groups such as Ohio Farm Bureau and community collations such as watershed collations.

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

**1. Standard output measures**

| 2009 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| Plan | 0 | 0 | 0 | 0 |
| Actual | 0 | 0 | 0 | 0 |

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

Year: 2009
Plan: 0
Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2009 | Extension | Research | Total |
|---|---|---|---|
| Plan | 0 | 25 | |
| Actual | 0 | 73 | 73 |

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

**Output Target**

**Output #1**

**Output Measure**

- Peer-reviewed publications will be tracked

| Year | Target | Actual |
|---|---|---|
| 2009 | 25 | 73 |

**Output #2**

**Output Measure**

- Non - commercialized techniques will be tracked
  Not reporting on this Output for this Annual Report

**Output #3**

**Output Measure**

- Number of graduate students completed

| Year | Target | Actual |
|---|---|---|
| 2009 | 12 | 17 |

**Output #4**

**Output Measure**

- Commercialized techniques will be tracked
  Not reporting on this Output for this Annual Report

**Output #5**

**Output Measure**

- Total number of OARDC sponsored communication products/efforts,excluding peer reviewed publications, will be reported.
  Not reporting on this Output for this Annual Report

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

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | In conjunction with companion agencies and organizations, advance research in forest biology and ecology to promote (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

Not Reporting on this Outcome Measure

**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

### 2. Associated Institution Types

- 1862 Research

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 1 | 0 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
MODEL FOR HABITAT MANAGEMENT FOR MIGRATING BIRDS: The western Lake Erie basin provides important stopover sites for all groups of migratory birds: waterfowl, shorebirds, raptors, other landbirds, and waterbirds. The landscape has been dramatically altered from presettlement conditions yet the region remains important for birds to rest and feed so they can continue their migration in good physiological condition. Habitat loss in the region continues, potentially jeopardizing the ability of birds to maintain sufficient condition to successfully complete their migration. It is critical and urgent to define, protect, restore, and better manage migratory bird stopover sites in the western Lake Erie basin.

**What has been done**
In response to this issue , OARDC scientists sought to (1) identify and summarize ecological and spatial attributes of migratory bird stopover sites in the United States portion of the western Lake Erie basin based on the literature and unpublished sources, and (2) outline a system for ranking the relative conservation importance of migratory bird stopover sites in the western Lake Erie basin that may also be useful elsewhere in the Great Lakes region and beyond.

**Results**
OARDC scientists and their collaborators created a model that catalogs migratory bird stopover site attributes and provides a ranking system to guide identification and prioritization of stopover sites for conservation action throughout the Great Lakes basin and beyond. Efforts have been initiated in Wisconsin to adopt this model for areas near the Lake Michigan and Lake Superior coastlines. This work should provide an invaluable extension of the scientists' work in the western Lake Erie basin. The research has been published by the Nature Conservancy under the title: Managing Habitats for Migrating Land Birds in the Western Lake Erie Basin - A Guide to Landscaping and Land Management. This work is part of OARDC's one hundred plus year history in ornithological research as illustrated by the recent republication of the OARDC's 1912 publication - Some Ohio Birds; that publication discusses how birds help farmers and gardeners by eating insect pests, weed seeds, and rodents.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|

135 Aquatic and Terrestrial Wildlife
136 Conservation of Biological Diversity

**Outcome #8**

**1. Outcome Measures**

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

Not Reporting on this Outcome Measure

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

**External factors which affected outcomes**

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

**Brief Explanation**

Climatic extremes, coupled with pest and diseases that are often climate related, impact outcomes. Public policy shifts, regulations, laws, and shifts in demand continue to impact outcomes. Internal factors such as the availability of base funding to ensure a core faculty and staff, availability of extramural funds, and programmatic demands that exceed resources, are affecting outcomes.

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

1. Evaluation Studies Planned

**Evaluation Results**

**Key Items of Evaluation**

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

**Program # 3**

**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% | | 10% | |
| 202 | Plant Genetic Resources | 0% | | 15% | |
| 203 | Plant Biological Efficiency and Abiotic Stresses Affecting Plants | 0% | | 5% | |
| 204 | Plant Product Quality and Utility (Preharvest) | 0% | | 20% | |
| 205 | Plant Management Systems | 0% | | 10% | |
| 206 | Basic Plant Biology | 0% | | 5% | |
| 211 | Insects, Mites, and Other Arthropods Affecting Plants | 0% | | 5% | |
| 212 | Pathogens and Nematodes Affecting Plants | 0% | | 5% | |
| 213 | Weeds Affecting Plants | 0% | | 5% | |
| 214 | Vertebrates, Mollusks, and Other Pests Affecting Plants | 0% | | 5% | |
| 216 | Integrated Pest Management Systems | 0% | | 15% | |
| | **Total** | 0% | | 100% | |

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

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

| Year: 2009 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 0.0 | 0.0 | 21.1 | 0.0 |
| Actual | 0.0 | 0.0 | 29.5 | 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 | 1886820 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 0 | 0 | 4279884 | 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

Faculty in this Planned Program have conducted numerous basic and applied research projects, as noted in the CRIS reports, and published in peer-reviewed journals, and in all types of other media from social networks to on-line trade journals and extension publications. As a matter of routine practice OARDC faculty, staff, and administrators in this, and in all Planned Programs, work in partnership with business, industry, government, NGOs, commodity groups, and other stakeholders on a daily bases. They are as committed to development, as they are to the research element, insuring that research is moved into society to create new products and services, jobs, economic activity, and overall, improve social well-being. Found within this Planned Program is a state of the art genetics research initiative, including a gene bank and a molecular imaging center. It is here that the food plant industry and the green industry come for many new cultivars, gene sequencing, research on plant pest and pathogens, and for unique services such as the breeding of specific plant varieties to meet the needs for biofuels and biobased products such as rubber from the Russian dandelion. For example, in the 2008 ROA, OARDC reported a major genetic breakthough in breeding for fruit shape. In 2009, NSF awarded this group and their collaborators 3.8 million dollars to continue this line of inquiry. Where complementary extension activities occur they are reported within the appropriate sections.

### 2. Brief description of the target audience

Targeted audiences include, but are not limited to: specific individuals or groups who have expressed a need for plant systems information that is to be derived through new research, extracted from on-going research, or is derived from scientific literature. Often those requests are communicated to OARDC by an intermediary such as a staffer at a USDA office, NRCS, or a county extension agent. Audiences also include: fellow agencies or support organizations who will not only use the information but will also be brokers of that information, including embedding it into groups to encourage change; populations who have not requested the information but will likely benefit from that information, e.g. home gardeners; other scientists and scientific groups; - political entities; - extension personnel; students for pre-school to post doctorate studies; and news organizations.

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

### 1. Standard output measures

| 2009 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| Plan | 0 | 0 | 0 | 0 |
| Actual | 0 | 0 | 0 | 0 |

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

**Patent Applications Submitted**

Year: 2009
Plan: 0
Actual: 1

**Patents listed**
PCT/US08/076936 Composition and Methods for Altering the Morphology of Plants

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

**Number of Peer Reviewed Publications**

| 2009 | Extension | Research | Total |
|---|---|---|---|
| Plan | 0 | 100 | |
| Actual | 0 | 116 | 116 |

### V(F). State Defined Outputs

**Output Target**

**Output #1**

**Output Measure**

- peer-reviewed publications will be tracked

| Year | Target | Actual |
|---|---|---|
| 2009 | 100 | 116 |

**Output #2**

**Output Measure**

- commercialized techniques will be tracked
  Not reporting on this Output for this Annual Report

**Output #3**

**Output Measure**

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

**Output #4**

**Output Measure**

- non - commercialized techniques will be tracked
  Not reporting on this Output for this Annual Report

**Output #5**

**Output Measure**

- Number of graduate students completed

| Year | Target | Actual |
|---|---|---|
| 2009 | 31 | 18 |

**Output #6**

**Output Measure**

- Total number of OARDC sponsored communication products/efforts,excluding peer reviewed publications, will be reported.
  Not reporting on this Output for this Annual Report

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

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | Meet or exceed the demand of fellow scientists and stakeholders within the next ten years for materials relating to plant genetics and plant breeding technologies, including identification of molecular markers for elite germplasms |
| 2 | Provide 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 knowledge of biological based,e.g. bacterium, interventions to advance food and non-food plant production. |

| | |
|---|---|
| 18 | To advance knowledge in agbioscience research requires new mechanical technologies as well as research processes |
| 19 | Advance knowledge and application of biotechnology tools. |

**Outcome #1**

**1. Outcome Measures**

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

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 1 | 0 |

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

**Issue (Who cares and Why)**
NEW GENE IDENTIFICATION: Plant pathogenic oomycetes, a nutrient-absorbing parasitic organisms, cause devastating diseases on numerous crops and ornamental and native plants. The most infamous oomycete pathogens are known as Phytophthora. Diseases caused by Phytophthora result in estimated yearly losses of more than $10 billion worldwide. These pathogens affect plants as diverse as potato, soybean, cocoa, and strawberries. Phytophthora infestans, the cause of the Irish potato famine, remains a destructive pathogen. in potato and tomato production.

**What has been done**
OARDC scientists' objective for this research was to use a functional genomics approach to identify avirulence genes that negatively impact the ability of a pathogen to infect its host plant. Many avirulence genes are now known to represent a subset of toxic factors involved in the mediation of the host-pathogen interaction. Scientists focused specifically on Phytophthora infestans that are recognized by specific R genes.

**Results**
Two specific avirulence genes, AvrBlb1 and AvrBlb2 of Phytophthora infestans, were identified by OARDC scientists. Both avirulence genes are members of a family of proteins that are known to be located inside plant cells. The identification of AvrBlb1 and AvrBlb2 will provide a greater understanding about the diversity of these genes in Phytophthora infestans populations for future research. This will enable scientists to evaluate the extent to which the genes have wide-spectrum activity against Phytophthora infestans. The findings will also help scientists monitor the potential occurrence or emergence of these pathogens. The ultimate elimination of these pathogens could mean salvaging many crops as well as a potential annual savings of nearly $10 billion.

**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 |
| 212 | Pathogens and Nematodes Affecting Plants |

**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 |
|---|---|---|
| 2009 | 1 | 0 |

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

**Issue (Who cares and Why)**
PLANT PATHOGENS: Corn and soybean are major food crops in Ohio. Threats to the crops from pests and pathogens is a constant issue of concern. If OARDC is to breed, or inform the breeding of, plants resistant to pest and pathogens, those threats must be identified and characterized as to potential response to treatments. Pythium sp. pathogens are water molds that attack soybean or corn seeds, as well as a number of other crops via the plant roots in saturated soil conditions. They are one of the major causes of crop replants, and are becoming more economically important because of the continued rise in seed costs.

**What has been done**
All Pythium species are not the same in terms of behavior and impact. OARDC scientists studied what appeared to be a new species. The final evidence was the DNA sequencing, which did not match any of the described species. It was proof that the scientists had discovered a species that was not in any of the data banks.

**Results**
A new species of Pythium, Pythium delawarii, a water mold that attacks soybeans and corn in saturated soils, has been identified in Ohio. Identification is important in that Ohio farms large acreages of clay soils that hold the water and encourage the growth of water mold. The discovery will aid in future management of Pythium diseases and help in the breeding of new cultivars for resistance and the creation of new chemistries for seed treatment compounds.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 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 |

**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

Not Reporting on this Outcome Measure

**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

Not Reporting on this Outcome Measure

**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

Not Reporting on this Outcome Measure

**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

Not Reporting on this Outcome Measure

**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

Not Reporting on this Outcome Measure

**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 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 1 | 0 |

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

**Issue (Who cares and Why)**
PERFORMANCE TESTS: Growers annually require science- based decisions regarding seed variety selection. Soybean, corn, and wheat are major Ohio crops and annually OARDC conducts performance test for these three crops over a range of environmental conditions. The stakeholder demand is high for this research and, each year, is expected by stakeholders.

**What has been done**

For each commodity, performance trials require planting in multiple Ohio locations that represent the major growing regions. The test consisted of multiple cultivars and breeding lines. Depending on variety and test site, yields and test weights vary. Conditions of testing were documented. Yield differences with all critical factors, including conditions of testing, are reported in print and on the web.

**Results**

The overall impacts are: (1) increasded farmer access to research-based information on hybrid performance across a range of environmental conditions in Ohio; (2) increased ability of growers to apply research based information in hybrid selection; (3) enhanced grain yield and quality and increased income; (4) assist seed companies in positioning hybrids where best adapted for production in Ohio based on environmental conditions; and (5) increased demand and use of performance test results. These data assisted producers in selecting more productive varieties for their fields resulting in an estimated yield increase of 15 kg/ha over 1.55 million hectares worth $10,800,000 for soybean and 5 bu/ac over 800,000 acres worth approximately $16,000,000 for wheat . Final summary impact data for corn are not available at this time.

**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 |
| 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

Not Reporting on this Outcome Measure

## 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

Not Reporting on this Outcome Measure

## 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

Not Reporting on this Outcome Measure

## Outcome #17

### 1. Outcome Measures

Advance knowledge of biological based,e.g. bacterium, interventions to advance food and non-food plant production.

### 2. Associated Institution Types

- 1862 Research

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | {No Data Entered} | 0 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
PLANT HEALTH: Acidic soils have a negative impact on specific crops such as corn. In low-pH soils, most crops experience nutrient stress in the form of phosphorus deficiencies and aluminum and/or manganese toxicity. The plants show loss of chlorophyll with specking and streaking of plant leaves. Low pH can be treated with lime but such approach is not always practical or highly efficient, and is not practical or economically accessible in many

developing countries that are fighting hunger.

**What has been done**
OARDC scientists studied the effects on corn plants growing in low pH soils whose seeds were treated with biofungicidal compound called 2,4-diacetylphloroglucinol (DAPG) produced by a common plant-associated bacteria, Pseudomonas fluorescens. No one in the past has identified such microorganisms as having a significant effect on protecting the plant under stess caused by low soil pH.

**Results**
A common plant-associated bacteria, Pseudomonas fluorescens, best known to suppress soil-borne root diseases, now has been found to boost corn yields in low-pH soils. The fluorescens strain produces a biofungicidal compound called 2,4-diacetylphloroglucinol (DAPG). This compound is known to help suppress soil-borne diseases and stimulate the plant's immune system. This is the first-known documentation of a root-colonizing bacterium improving plant health in acidic soil conditions. Beneficiaries of this research, in addition to the larger farming community, include organic farmers who cannot use chemical seed treatments, as well as those farmers in developing countries who do not have access to affordable lime to manage soil acidity. Such research has potential to help reduce world hunger by increasing productivity.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 203 | Plant Biological Efficiency and Abiotic Stresses Affecting Plants |
| 204 | Plant Product Quality and Utility (Preharvest) |
| 205 | Plant Management Systems |
| 206 | Basic Plant Biology |

**Outcome #18**

**1. Outcome Measures**

To advance knowledge in agbioscience research requires new mechanical technologies as well as research processes

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | {No Data Entered} | 0 |

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

**Issue (Who cares and Why)**
VISULIZATION OF GENE EXPRESSION: Scientists studying gene expression in plant tissue typically took weeks to observe and often subtle changes were completely missed. This is true for a number of other studies that require the monitoring of biological changes over time. Scientists need a technology that takes long-term experiments and condenses them into a presentable form so that change over time can be recorded, reviewed and evaluated.

**What has been done**
OARDC scientists s developed a way to see weeks  worth of plant gene expression at work in just seconds.

**Results**
OARDC scientists developed  an Automated Image Collection and Analysis  GFP Robotics system. This robotics system allows collection of images from multiple samples, in Petri dishes, that are mounted on a two dimensional robotics platform. The platform is computer-controlled, and tissues are precisely placed under the objective of a MZFLIII fluorescent dissecting microscope at specific times. Images are collected using a Spot camera controlled via custom software. Image collection, followed by image analysis, allows the generation of large amount of data quantifying gene expression. Assembly of the images yields digital time  lapse amimations of tissue growth and gene expression. The system's through striking time-lapse animations of plant tissues growing shows when genes turn on, turn off, or do neither. With this system researchers can watch the process unfold, can spot changes the moment they happen, and can quantify the events.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 201 | Plant Genome, Genetics, and Genetic Mechanisms |
| 202 | Plant Genetic Resources |

## Outcome #19

### 1. Outcome Measures

Advance knowledge and application of biotechnology tools.

### 2. Associated Institution Types

- 1862 Research

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | {No Data Entered} | 0 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
PLANTS AS PHARMACEUTICAL FACTORIES: Plants have great potential to be used as bio-factories to produce pharmaceuticals, antibodies, and other high-value products that are difficult, expensive, or otherwise impossible to mass-produce using current technology. Technological improvements are needed to make the process more effective, faster, and affordable.

**What has been done**
OARDC scientists have developed biotechnological tools, using plant viruses, to improve the production levels of proteins and other products in plants by genetically modifying them to produce the desired protein or product.

**Results**

Through the use of plant viruses, OARDC scientists have been able to improve the production levels of proteins and other products in plants up to 20 times greater than previously possible. To do this, the viruses have been genetically modified to produce the desired protein or product. In addition the virus was also modified to ensure that it cannot escape and move to other plants. The modified viruses are then allowed to infect host plants. One of the preferred plant hosts is a non-food plant called Nicotiana benthamiana, a wild relative of the tobacco family. As the modified viruses replicate, high levels of the desired product are produced in the process and can then be harvested from the plants. This technology has a wide range of research and industrial applications, including hormones, pharmaceuticals, antibodies, and enzymes. A patent application has been filed for this technology. In less than 2 years, 55 Material Transfer Agreements with investigators at 48 institutions (including 2 corporations) in 26 countries have been executed.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 201 | Plant Genome, Genetics, and Genetic Mechanisms |
| 202 | Plant Genetic Resources |
| 212 | Pathogens and Nematodes Affecting Plants |

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

**External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)
- Other (Federal/state base funding; extramral funding; spatial/temporal shifts in pests and pathogens populations)

**Brief Explanation**

Climatic extremes, climate change, pests, pathogens, weeds, and diseases all impact outcomes within plant systems. As the food, fiber, and environmental economy adjust to the global marketplace, in conjunction with public policy shifts, regulations, and shifts in demand, outcomes will continue to be impacted. Production agriculture is most sensitive to these shifts. Internal factors such as the availability of base funding to ensure a core faculty and staff, availability of extramural funds, and programmatic demands that often exceed resources, all continue to affect outcomes.

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

1. Evaluation Studies Planned

**Evaluation Results**

**Key Items of Evaluation**

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

**Program # 4**

**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: 2009 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 0.0 | 0.0 | 12.2 | 0.0 |
| Actual | 0.0 | 0.0 | 20.6 | 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 | 1168463 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 0 | 0 | 3504756 | 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**

Faculty in this Planned Program have conducted numerous basic and applied research projects, as noted in the CRIS reports, and published in peer-reviewed journals, and in all types of other media from social networks to on-line trade journals and extension publications. As a matter of routine practice OARDC faculty, staff, and administrators in this, and in all Planned Programs, work in partnership with business, industry, government, NGOs, commodity groups, and other stakeholders on a daily bases. They are as committed to development, as they are to the research element, insuring that research is moved into society to create new products and services, jobs, economic activity, and overall, improve social well-being. Found within this Planned Program is a state of the art meat processing lab, extensive herds and flocks throughout the state that permit unique research studies, and attention to unique programs such as those that address animal welfare (a joint Australian - US program) or an aquaculture program that is supporting the rapid growth of this niche market statewide. Likewise they offer a companion animal course that is of interest to students campus-wide. Where complementary extension activities occur they are reported with the appropriate sections.

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

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

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

**1. Standard output measures**

| 2009 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Plan** | 0 | 0 | 0 | 0 |
| **Actual** | 0 | 0 | 0 | 0 |

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

Year: 2009
Plan: 0
Actual: 1

**Patents listed**
61/178,879 Controlling Disease Causing Microorganisms

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

**Number of Peer Reviewed Publications**

| 2009 | Extension | Research | Total |
|---|---|---|---|
| **Plan** | 0 | 70 | |
| **Actual** | 0 | 60 | 60 |

## V(F). State Defined Outputs

**Output Target**

**Output #1**

**Output Measure**

- peer-reviewed publications will be tracked

| Year | Target | Actual |
|---|---|---|
| 2009 | 70 | 60 |

**Output #2**

**Output Measure**

- commercialized techniques will be tracked
  Not reporting on this Output for this Annual Report

**Output #3**

**Output Measure**

- non - commercialized techniques will be tracked
  Not reporting on this Output for this Annual Report

**Output #4**

**Output Measure**

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

| Year | Target | Actual |
|---|---|---|
| 2009 | 0 | 0 |

**Output #5**

**Output Measure**

- Number of graduate students completed.

| Year | Target | Actual |
|---|---|---|
| 2009 | 23 | 10 |

**Output #6**

**Output Measure**

- Total number of OARDC sponsored communication products/efforts,excluding peer reviewed publications, will be reported.
  Not reporting on this Output for this Annual Report

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

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | Improve reproduction efficiency and enhanced application of new technologies over the next five years to fully meet the competitive demands faced by OARDC's stakeholders in areas such as early maturation, estrus, fertility, and ovulation |
| 2 | 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

### 2. Associated Institution Types

- 1862 Research

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 1 | 0 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
SWINE REPRODUCTIVITY: In Ohio and across the US, swine herds need to have larger litters to be competitive in the marketplace. Modern swine herds are bred to have larger litters for purposes of increased returns and to decreased costs on a per sow basis. An increase in litter size of could save Americans an estimated 50 million dollars per year on feed costs alone. Also according to the USDA ARS, increasing litter size by just one pig per litter equates to about $200 million a year to US swine producers, both in feed reduction and increased sales.

**What has been done**
OARDC scientists studied the feeding of organic trace minerals to swine to determine impact on litter size.

**Results**
Scientists at OARDC demonstrated that feeding swine organic trace minerals increased litter size by approximately one pig per litter over six parities. Results of this series of studies suggest the advantage in litter size after feeding organic trace elements was in improved fetal survival. Swine producers can use these experiments to improve litter size in their herds.

### 4. Associated Knowledge Areas

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

## 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 Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 0 | 0 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
BEEF CATTLE - INCREASED PRODUCTION: The beef cattle industry has increased beef production per head of cattle by over 80% in the past 50 years. Pregnancy rates have substantially increased as well. But when breeding cattle do not become pregnant there is a substantial economic loss.

**What has been done**
OARDC animal scientists, in a long term series of studies to increase productivity in food animals, have explained how to increase pregnancy rates in beef cattle.

**Results**
Animal scientists with the Ohio Agricultural Research and Development Center have pioneered a new protocol for increasing pregnancy rates in beef cattle that is expected to lead to higher production efficiency and cost and time savings for farmers in Ohio and throughout the nation and world. The new fixed-time artificial insemination (AI) protocol known as 5-day CO-Synch + CIDR represents an important advancement in efforts to better synchronize a beef cow's estrus (heat) cycle so that AI can be administered to the largest number of cattle possible at the same time. The protocol, which has now become a recommended practice within the beef cattle industry, increases pregnancy rates of cows by 11 percent. It has been tested on more than 1,200 cows in Virginia and Ohio resulting in 68 percent of cows getting pregnant within one day.

### 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

   Not Reporting on this Outcome Measure

**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

2. **Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 1 | 0 |

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

**Issue (Who cares and Why)**
GROWING NICHE MARKETS: Niche markets play a key role in the agriculture enterprise. Aquaculture is one such market. Niche markets provide an opportunity for new business people who do not have access to significant tracks of farmland to enter the markets as well as providing an opportunity for existing agriculture enterprises to diversify.

**What has been done**
OARDC has made a significant investment in aquaculture using federal, state, and private resources for the past two decades. Multiple departments, universities, and private partners are involved with this OARDC initiative. Research support to these markets range from genetics to breeding and nutritions, to business planning with business planning directed by OSU Extension. The investment is showing returns.

**Results**
The OARDC research program studies multiple species for both human consumption and for fish stocks and baitfish. The Ohio freshwater shrimp industry, for example, has expanded to approximately 25 growers in 2009, up from 2 growers in 2000. The entire project has had important impacts on Ohio aquaculture through research and technology transfer. Aquaculture sales in Ohio have tripled from $1.8 million to $6.6 million in recent years. Nationally, Ohio ranks first in sales of yellow perch for food and is the number one bluegill producing state. Ohio also ranks fourth in sales of baitfish and largemouth bass sold for sport, and fifth in number of baitfish farms.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 301 | Reproductive Performance of Animals |
| 302 | Nutrient Utilization in Animals |
| 303 | Genetic Improvement of Animals |
| 304 | Animal Genome |
| 305 | Animal Physiological Processes |
| 306 | Environmental Stress in Animals |
| 307 | Animal Management Systems |
| 308 | Improved Animal Products (Before Harvest) |
| 311 | Animal Diseases |

**Outcome #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 Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 1 | 0 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**

DIAGNOSTIC NETWORKS: While there are multiple platforms for researchers to uncover information about infectious diseases diagnostics, there is not a single site for quick collaboration of all sectors of society woking to diagnose animal and plant diseases.

**What has been done**

OARDC scientists have created such site entitled DiagnosticSpeak.

**Results**

DiagnosticSpeak is a web-based system the permits the scientific community, business, end users, and government officials who are interested in a particular disease, test, or technology to find the right person(s) with whom to interact. In a parallel collaborative effort, OARDC and OSUE Extension have joined with the Ohio Department of Agriculture to created a joint Plant Diagnostic Lab to more efficiently and economically provide a quick detection, response, and recovery approach to high - consequence disease or pest outbreaks in Ohio.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 306 | Environmental Stress in Animals |
| 307 | Animal Management Systems |

## 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; federal/state base funding;)

**Brief Explanation**

Climatic extremes, coupled with animal diseases that are often climate related, impact outcomes. Public policy shifts, regulations, and shifts in demand continue to impact outcomes. Human values and environmental sensitivities of the populace to animal production and processing are also external factors impact outcomes. Internal factors such as the availability of base funding to ensure a core faculty and staff, availability of extramural funds, and programmatic demands that often exceed resources, are affecting outcomes.

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

1. Evaluation Studies Planned

## Evaluation Results

## Key Items of Evaluation

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

**Program # 5**

### 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: 2009 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 0.0 | 0.0 | 3.6 | 0.0 |
| Actual | 0.0 | 0.0 | 2.6 | 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 | 193772 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 0 | 0 | 265972 | 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

Faculty in this Planned Program have conducted numerous basic and applied research projects, as noted in the CRIS reports, and published in peer-reviewed journals, and in all types of other media from social networks to on-line trade journals and extension publications. As a matter of routine practice OARDC faculty, staff, and administrators in this, and in all Planned Programs, work in partnership with business, industry, government, NGOs, commodity groups, and other stakeholders on a daily bases. They are as committed to development, as they are to the research element, insuring that research is moved into society to create new products and services, jobs, economic activity, and overall, improve social well-being. The lead academic

department in this Planned Program, OSU's Department of Food, Agricultural and Biological Engineering, is ranked as one of the nation's top agricultural engineering programs. They work in close partnership with the OSU College of Engineering and are major contributor to OSU's internationally recognized wetland ecology program. Where complementary extension activities occur they are reported with the appropriate sections.

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

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

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

**1. Standard output measures**

| 2009 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Plan** | 0 | 0 | 0 | 0 |
| **Actual** | 0 | 0 | 0 | 0 |

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

Year: 2009
Plan: 0
Actual: 3

**Patents listed**
12/413,899 Method and Apparatus for CO2 Exchange Measurement in Plants; PCT/US09/41117 and 12/489,664 both titled Bi-phasic Bioretention System

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

**Number of Peer Reviewed Publications**

| 2009 | Extension | Research | Total |
|---|---|---|---|
| **Plan** | 0 | 17 | |
| **Actual** | 0 | 17 | 17 |

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

**Output Target**

**Output #1**

**Output Measure**

- number of graduate students completed

| Year | Target | Actual |
|---|---|---|
| 2009 | 18 | 9 |

**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 | Target | Actual |
|---|---|---|
| 2009 | 17 | 17 |

**Output #3**

**Output Measure**

- commercialized engineering techniques will be tracked
  Not reporting on this Output for this Annual Report

**Output #4**

**Output Measure**

- non - commercialized engineering techniques will be tracked
  Not reporting on this Output for this Annual Report

**Output #5**

**Output Measure**

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

| Year | Target | Actual |
|---|---|---|
| 2009 | 0 | 0 |

**Output #6**

**Output Measure**

- Total number of OARDC sponsored communication products/efforts,excluding peer reviewed publications, will be reported.
  Not reporting on this Output for this Annual Report

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

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | -provide appropriate facilities 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<br>- |

## 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

### 2. Associated Institution Types

- 1862 Research

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 0 | 0 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
CLIMATE CHANGE AND LIVESTOCK ODORS: Technologies to mitigate odor and air quality concerns on livestock farms is a major issue both in terms of community standards and the impact on atmospheric gases. Reducing greenhouse gas emissions is an important consideration for business planning.

**What has been done**
As part of OARDC's studies of mitigating odor and gas emissions from livestock operations, their scientists have established a research project to mitigate greenhouse gas emissions from livestock farms in such manner that it is a win -win proposition.

**Results**
OARDC scientists have found that technology to mitigate odor and air quality concerns on livestock farms can also be used for reducing greenhouse gas emissions, while providing potential income for farmers looking to trade carbon credits. Manure storage covers, originally designed to control odors on dairy, swine, and other livestock facilities, can also capture greenhouse gases such as methane, which is more harmful to the environment in terms of global warming effects than carbon dioxide. The collected methane can be traded for carbon credits at carbon trading markets. Methane can be used as a biogas.
In addition, manure covers capture ammonia, increasing the value of manure used as a fertilizer. The amount the carbon is worth is then paid back to the farmer. Farmers do not generally use manure covers because it's too costly. Carbon credit programs and the loan support to use manure covers to mitigate climate change are now available to help farmers to obtain manure covers.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 402 | Engineering Systems and Equipment |
| 403 | Waste Disposal, Recycling, and Reuse |

**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.)
- Other (Federal/state base funding; extramural funding)

**Brief Explanation**

Climatic extremes, economic shifts such as interest rates to borrow money for facilities, public policy shifts, regulations, and shifts in demand impact outcomes. Human values and conflicts, e.g. urban rural issues, and environmental sensitivities to agriculture processes and location concerns related to facilities by the populace are also external factors that affect outcomes, e.g. engineering of large farms. Internal factors such as the availability of base funding to ensure a core faculty and staff, availability of extramural funds, and programmatic demands that often exceed resources, continues to affect outcomes.

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

1. Evaluation Studies Planned

**Evaluation Results**

**Key Items of Evaluation**

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

**Program # 6**

**1. Name of the Planned Program**

Food 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 |
|---|---|---|---|---|---|
| 501 | New and Improved Food Processing Technologies | 0% | | 15% | |
| 502 | New and Improved Food Products | 0% | | 15% | |
| 503 | Quality Maintenance in Storing and Marketing Food Products | 0% | | 15% | |
| 701 | Nutrient Composition of Food | 0% | | 15% | |
| 702 | Requirements and Function of Nutrients and Other Food Components | 0% | | 15% | |
| 703 | Nutrition Education and Behavior | 0% | | 5% | |
| 711 | Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources | 0% | | 5% | |
| 712 | Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins | 0% | | 15% | |
| | **Total** | 0% | | 100% | |

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

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

| Year: 2009 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 0.0 | 0.0 | 8.3 | 0.0 |
| Actual | 0.0 | 0.0 | 12.7 | 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 | 846174 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 0 | 0 | 1939418 | 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 faculty working in this program are internationally recognized, work extensively with the food industry, provide statewide and national leadership for testing, developing, processing, and storage of a safe and secure food supply, nationally and worldwide. Their work in studying, processing, and stacking disease fighting foods is internationally recognized, as is their work to reduce pathogens such as salmonella from our food supply. Faculty in this Planned Program have conducted numerous basic and applied research projects, as noted in the CRIS reports, and published in peer-reviewed journals, and in all types of other media from social networks to on-line trade journals and extension publications. As a matter of routine practice OARDC faculty, staff, and administrators in this, and in all Planned Programs, work in partnership with business, industry, government, NGOs, commodity groups, and other stakeholders on a daily bases. They are as committed to development, as they are to the research element, insuring that research is moved into society to create new products and services, jobs, economic activity, and overall, improve social well-being. Where complementary extension activities occur they are reported with the appropriate sections.

### 2. Brief description of the target audience

Targeted audiences include specific individuals or groups who have expressed a need for food processing and product 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; 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

| 2009 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| Plan | 0 | 0 | 0 | 0 |
| Actual | 0 | 0 | 0 | 0 |

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

**Patent Applications Submitted**

Year: 2009
Plan: 0
Actual: 4

**Patents listed**

12/443,609 Novel Antimicrobial Peptides and methods of Their Use;
PCT/US09/33127 HIgh-purity Fractionation of Anthrocyanins From Fruits and Vegetables; 12/481,278 Methods for Monitoring Composition and Flavor Quality of Cheese Using a Rapid Spectroscopic Method;
12/489,820 Novel Paenibacillus polymyxa Strain, Antibotic Antimicrobial Agents and Methods of Their Use

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

**Number of Peer Reviewed Publications**

| 2009 | Extension | Research | Total |
|---|---|---|---|
| Plan | 0 | 35 | |
| Actual | 0 | 52 | 52 |

## V(F). State Defined Outputs

### Output Target

**Output #1**

**Output Measure**

- peer-reviewed publications will be tracked

| Year | Target | Actual |
|---|---|---|
| 2009 | 35 | 52 |

**Output #2**

**Output Measure**

- commercialized techniques will be tracked
  Not reporting on this Output for this Annual Report

**Output #3**

**Output Measure**

- non - commercialized techniques will be tracked
  Not reporting on this Output for this Annual Report

**Output #4**

**Output Measure**

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

| Year | Target | Actual |
|---|---|---|
| 2009 | 0 | 2 |

**Output #5**

**Output Measure**

- Number of graduate student completed

| Year | Target | Actual |
|---|---|---|
| 2009 | 33 | 32 |

**Output #6**

**Output Measure**

- Total number of OARDC sponsored communication products/efforts,excluding peer reviewed publications, will be reported.
  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.

### 2. Associated Institution Types

- 1862 Research

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 1 | 0 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
WORLD HUNGER: Feeding hungry people is not always a matter of simply delivering food stuffs but requires delivering it in a manner that is logistically possible and in a form that is readily consumable. United Nations medical personnel in Africa recommended the development of a low cost, stable food item to be used in developing counties that is suitable for disaster feeding.

**What has been done**
OARDC scientists have created a disaster feeding product manufactured primarily from mechanically deboned turkey, whey, soy flour, and orange juice with oil added. The product is then formed into 1-2 mm thin rods. The product was given a short term, high temperature treatment for elimination of pathogens, dehydrated, and subsequently, packaged under vacuum for shelf-life studies.

**Results**
When adopted, the feeding diet could be used in place of cornmeal which is the current diet for hospital patients in Africa. Some of the ingredients are byproducts and underpriced from a nutritional standpoint. The cost of the raw material is relatively inexpensive. To date, the product seems to be successful and the adoption could have a tremendous humanitarian effect for disaster feeding, including hospital feeding, and in areas where other alternatives are not readily available.

### 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 |
| 701 | Nutrient Composition of Food |
| 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 #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.

### 2. Associated Institution Types

- 1862 Research

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 1 | 0 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
E. COLI INHIBITOR: Escherichia coli O157:H7 is responsible for over 70,000 illnesses annually in the United States. It is one of the most harmful bacteria causing food- transmitted diseases with symptoms ranging from bloody diarrhea to kidney failure. Eliminating this bacteria from processed food has been problematic.

**What has been done**
OARDC scientists have been studying approaches to reduce or eliminate this bacteria and explain how their interventions work to do so. Understanding the response of pathogenic E. coli to preservation methods is crucial for developing effective protective strategies for safer food. Various approaches, including the use of OARDC's ultra-high pressure processing (UHP), were tested against pathogenic and non-pathogenic E. coli as well as other strains with various mutations in selected genes.

**Results**
OARDC scientists have found that combinations of ultra-high pressure processing (UHP) and the food additive tert-butylhydroquinone (TBHQ) are exceptionally effective against pathogenic E. coli. UHP is a promising emerging technology for preserving food. Subjecting foods to high pressure -- from 72,500 to as high as 130,000 pounds per square inch -- can help foods retain fresh qualities while extensively extending their shelf life. Most traditional products available in the market today are heat-processed. While heat processing is one of the safest technologies available today, heat also destroys many nutrients and impacts food quality. TBHQ is an antioxidant food additive that has been used in many foods without detrimental effect on product quality. These scientists have provided a mechanism for the enhanced lethality of ultra-high pressure treatment by TBHQ against E. coli O157:H7. The mechanism presented in this research will benefit food processors using UHP-based preservation as well as biologists interested in studying pressure-tolerant marine organisms.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 501 | New and Improved Food Processing Technologies |
| 503 | Quality Maintenance in Storing and Marketing Food Products |
| 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 #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.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|

| | | |
|---|---|---|
| 2009 | 1 | 0 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
HEALTH STANDARDS published in the US Food and Drug Administration's 2005 Food Code and adopted by most states require commercial food servers to clean tableware items by washing, rinsing, and sanitizing, with sanitizing as the last step. Diners often complain about tasting the sanitizer. Restaurants, though, could not rinse off the sanitizer. The code was written to not allow bacteria to be reintroduced in a second rinse and to not delay drying time.

**What has been done**
Addressing the complaints of sanitizer taste required changes to the Food Code. Testing for safety and effectiveness in the wash sequence was conducted by OARDC scientists. The goal was to remove the sanitizer taste without introducing any new bacteria.

**Results**
The Food and Drug Administration's new Food Code includes a provision that is the direct result of research conducted at OARDC. Diners who do not appreciate the subtle flavor of sanitizers accompanying their entree will benefit. Scientists modified a commercial dishwasher to rinse dishes after sanitizing. To wash, rinse, sanitize and rinse again, one batch of dirty table ware items takes 2.5 minutes. The OARDC tests showed that if you rinse with potable water the drying time of the dishes is not significantly different from dishes not exposed to a final rinse. And where potable water is used, no new bacteria were introduced. The impact of this research is reflected in a new section of the Food Code, section 4-904.14.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 711 | Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources |
| 712 | Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins |

## Outcome #14

### 1. Outcome Measures

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.)
- Other (Extramural funding; state/federal base funding;)

**Brief Explanation**

Climatic extremes to the extent they impact supply, economic shifts such as to cost of processing equipment or production costs, public policy shifts, regulations, and shifts in demand all impact outcomes. Food trends/fades, food advertising agendas, new biological and chemical threats, and public nutritional health - related issues are also external factors that effect outcomes. Internal factors such as the availability of base funding to ensure a core faculty and staff, availability of extramural funds, and programmatic demands that often exceed resources, continue to affect outcomes.

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

1. Evaluation Studies Planned

**Evaluation Results**

**Key Items of Evaluation**

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

**Program # 7**

### 1. Name of the Planned Program

Bio-based Non-Food Value Chains-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 |
|---|---|---|---|---|---|
| 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: 2009 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 0.0 | 0.0 | 0.9 | 0.0 |
| Actual | 0.0 | 0.0 | 1.9 | 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** |
| 0 | 0 | 138500 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 0 | 0 | 93442 | 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

Faculty working in this program are found in all academic programs within the College of FAES. Much of the extramural funding is coordinated through the College's Ohio Bioproducts Innovation Center that has received ten plus million dollars in state Third Frontier Grants. This Center provides a key linkage between the state's two largest industries..... agriculture and polymers. This Planned Program is model for public - private enterprises and is central to a new business incubator park on OARDC's Wooster Ohio campus. The first major installation in the park is a bioenergy business that will turn waste into energy to be used on that campus. Faculty in this Planned Program have conducted numerous basic and applied research projects, as noted in the CRIS reports, and published in peer-reviewed journals, and in all types of other media from social networks to on-line trade journals and extension publications. As a matter of routine practice OARDC faculty, staff, and administrators in this, and in all Planned Programs, work in partnership with business, industry, government, NGOs, commodity groups, and other stakeholders on a daily bases. They are as committed to development, as they are to the research element, insuring that research is moved into society to create new products and services, jobs, economic activity, and overall, improve social well - being. Where complementary

extension activities occur they are reported with the appropriate sections.

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

Targeted audiences include: business and industry that have expressed a need for biobased product information that is to be 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. general public; other scientists and scientific groups; political entities; extension personnel; students from middle school to post doctorate studies; and news organizations.

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

**1. Standard output measures**

| 2009 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Plan** | 0 | 0 | 0 | 0 |
| **Actual** | 0 | 0 | 0 | 0 |

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

Year: 2009
Plan: 0
Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2009 | Extension | Research | Total |
|---|---|---|---|
| **Plan** | 0 | 4 | |
| **Actual** | 0 | 6 | 6 |

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

**Output Target**

**Output #1**

**Output Measure**

- Commercialized products and processes will be tracked

| Year | Target | Actual |
|---|---|---|
| 2009 | 0 | 0 |

**Output #2**

**Output Measure**

- Number of patents will be tracked

| Year | Target | Actual |
|---|---|---|
| 2009 | 0 | 0 |

**Output #3**

**Output Measure**

- Number of peer-reviewed journal articles will be tracked

| Year | Target | Actual |
|---|---|---|
| 2009 | 4 | 7 |

**Output #4**

**Output Measure**

- Number of graduate students completed.

| Year | Target | Actual |
|---|---|---|
| 2009 | 0 | 0 |

**Output #5**

**Output Measure**

- Commercialized products and processes will be tracked

| Year | Target | Actual |
|---|---|---|
| 2009 | 0 | 0 |

**Output #6**

**Output Measure**

- Total number of OARDC sponsored communication products/efforts,excluding peer reviewed publications, will be reported
  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.

### 2. Associated Institution Types

- 1862 Research

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 1 | 0 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
BIO-BASED INSTITUTION: Institutionalizing new long term initiatives requires a substantial investment in time, money, personnel, and organizational commitments. OARDC and the larger business and government community committed to research innovation in bio-based products in 2005.

**What has been done**
In 2005 the Ohio Bioproducts Innovation Center (OBIC), founded at OARDC, was created to bring together various parties to address creation of bioproducts, including bioenergy, as a replacement for petroleum based products. OBIC has brought together two of the largest industries in Ohio, respectively, agriculture and polymers, with substantial state support. OBIC's mission is to position Ohio as a leader in economic development based on the utilization of bio-derived materials and products.

**Results**
The five year impact of OBIC is the creation of an institution that is highly interdisciplinary, highly integrated linking business, industry, government, and academia throughout Ohio to advance bioproducts research and development. Within the first five years, OBIC has received $11 million dollars in funding, with an additional 2X match from alliance members, with over $71 million dollars leveraged. OBIC Board of Directors and partners truly represent all related business/industry sectors in Ohio; OARDC serves as OBIC's home institution and managerial center.

### 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 |
|---|---|---|
| 2009 | 0 | 0 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
SUSTAINABLE ENERGY: As worldwide crude oil supplies are depleted, prices increase, and the US becomes less energy independent, new biobased sources are needed.

**What has been done**
In response OARDC scientists have developed an innovative (patent-pending) integrated technology known as iADs. The system is called "integrated" because it combines a liquid biodigester that processes wastes such as manure and sewer sludge and OARDC's "solid-state" digestion technology that allows for the production of methane from various sources of cellulosic biomass, e.g. yard trimmings and crop residue. A partner industry, with support from Ohio's Third Frontier fund will demonstrate iADs technology at its flagship biogas facility at OARDC's BiOhio Research Park in Wooster, Ohio. The integrated system will be able to process over 30,000 wet tons of biomass annually with 750 kW generation capacity. Energy will be supplied to the Wooster campus .

**Results**
OARDC scientists have developed an integrated anaerobic digestion system dubbed iADs, which can cost-effectively produce clean energy from both solid and liquid organic wastes through anaerobic digestion - a process in which microorganisms break down organic matter and yield biogas, in the absence of oxygen, inside a biodigester. Biogas can be used to generate electricity and thermal heat; it can also be cleaned, separated and dried to produce natural gas, or compressed to fuel automobiles (compressed natural gas, or CNG).

### 4. Associated Knowledge Areas

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

**Outcome #3**

**1. Outcome Measures**

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

Not Reporting on this Outcome Measure

**Outcome #4**

**1. Outcome Measures**

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

Not Reporting on this Outcome Measure

**Outcome #5**

**1. Outcome Measures**

By 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.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 0 | 0 |

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

**Issue (Who cares and Why)**
NEW BIOBASED PRODUCT: Wastestreams from bioprocessing are problematic in terms of environmental impacts, and in terms of economic losses due to the cost of disposal and the loss of economic gain from the byproduct. Two byproducts of concern to the soybean industry are glycerin and soybean straw. Biodiesel processing yields a crude glycerin wastesteam. Likewise soybean straw often ends up in the waste steam.

**What has been done**
An innovative liquefaction and foaming process was developed at OARDC for polyurethane production from crude glycerin (byproduct of biodiesel process) and soybean straw. The liquefaction and foaming conditions were optimized to obtain high quality foam with the required strength and R- value for insulation.

**Results**
OARDC scientists have worked with the Ohio Soybean Council and an Ohio-based biodiesel plant to turn soybean straw and various soybean-processing byproducts into polyurethane foam used to make products such as insulation and packing material. The polyurethane foam that is biodegradable, heat resistant, and performs as well as petroleum- based foam. The patent for this technology has been filed and a one year option agreement was assigned to an Ohio energy company.

**4. Associated Knowledge Areas**

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

**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.)
- Other (Supply and cost of crude oil, extramural funding; federal/state base funding)

**Brief Explanation**

Supply, costs, and demand for petroleum products, and shifting projections of world reserves of crude oil and natural gas, as well as U.S. access to these, are critical external factors. Availability of biobased raw products in Ohio, and regionally, and at what costs are external factors. Economic shifts such as cost of processing equipment or production costs, public policy shifts, regulations, and shifts in demand impact outcomes. Product trends/fades, advertising agendas, and public perceptions to areas such as to petroleum reserves, are also external factors that affect outcomes. Internal factors such as the availability of base funding to ensure a core faculty and staff, availability of extramural funds, and programmatic demands that often exceed resources, are affecting outcomes.

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

1. Evaluation Studies Planned

## Evaluation Results

## Key Items of Evaluation

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

**Program # 8**

### 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 |
|---|---|---|---|---|---|
| 703 | Nutrition Education and Behavior | 0% | | 20% | |
| 704 | Nutrition and Hunger in the Population | 0% | | 20% | |
| 721 | Insects and Other Pests Affecting Humans | 0% | | 10% | |
| 722 | Zoonotic Diseases and Parasites Affecting Humans | 0% | | 30% | |
| 723 | Hazards to Human Health and Safety | 0% | | 5% | |
| 724 | Healthy Lifestyle | 0% | | 15% | |
| | Total | 0% | | 100% | |

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

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

| Year: 2009 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 0.0 | 0.0 | 0.4 | 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 | 72833 | 0 |
| 1862 Matching | 1890 Matching | 1862 Matching | 1890 Matching |
| 0 | 0 | 210696 | 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

Faculty in this Planned Program have conducted numerous basic and applied research projects, as noted in the CRIS reports, and published in peer-reviewed journals, and in all types of other media from social networks to on-line trade journals and extension publications. As a matter of routine practice OARDC faculty, staff, and administrators in this, and in all Planned Programs, work in partnership with business, industry, government, NGOs, commodity groups, and other stakeholders on a daily

bases. They are as committed to development, as they are to the research element, insuring that research is moved into society to create new products and services, jobs, economic activity, and overall, improve social well - being. Faculty working in this program are academically diverse leading an array of research from obesity and nutrition, to threats for zoonotics, to insects and pests impacts on human health. For 2009 most of the obesity - specific related research is reported within this Planned Program. Where complementary extension activities occur they are reported within the appropriate sections.

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

Targeted audiences include fellow academic units that depend on scientists in this program for support information and for new health and safety technologies and approaches/measures; fellow agencies or support organizations who will not only use the information but will also extend that information; populations who have not requested the information but will likely benefit from that information; other scientists and scientific groups; specific individuals or 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; political entities; 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**

| 2009 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Plan** | 0 | 0 | 0 | 0 |
| **Actual** | 0 | 0 | 0 | 0 |

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

Year: 2009
Plan: 0
Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2009 | Extension | Research | Total |
|---|---|---|---|
| **Plan** | 0 | 18 | |
| **Actual** | 0 | 25 | 0 |

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

**Output Target**

**Output #1**

**Output Measure**

- Non - commercialized techniques will be tracked
  Not reporting on this Output for this Annual Report

**Output #2**

**Output Measure**

- Peer-reviewed publications will be tracked

| Year | Target | Actual |
|---|---|---|
| 2009 | 18 | 25 |

**Output #3**

**Output Measure**

- Commercialized techniques and processes would be tracked
  Not reporting on this Output for this Annual Report

**Output #4**

**Output Measure**

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

| Year | Target | Actual |
|---|---|---|
| 2009 | 0 | 0 |

**Output #5**

**Output Measure**

- Number of graduate students completed

| Year | Target | Actual |
|---|---|---|
| 2009 | 10 | 6 |

**Output #6**

**Output Measure**

- Total number of OARDC sponsored communication products/efforts,excluding peer reviewed publications, will be reported
  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 | 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 |
| 8 | To advance knowledge related to obesity and obesity - related diseases. |
| 9 | To advance knowledge related to childhood obesity |

## 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.

Not Reporting on this Outcome Measure

## Outcome #2

### 1. Outcome Measures

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

Not Reporting on this Outcome Measure

## Outcome #3

### 1. Outcome Measures

Reduce through research, development, and outreach the 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.

### 2. Associated Institution Types

- 1862 Research

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 0 | 0 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
HEALTH RISK: Antimicrobial drugs are arguably the most important drugs developed in human history. Resistance to antimicrobial drugs has developed against all antimicrobial drugs in almost all types of bacteria (both pathogenic bacteria that cause diseases and non-pathogenic bacteria) and is becoming more and more widespread. The widespread occurrence of antimicrobial resistance not only poses a severe risk to the health and well-being of both

humans and animals but also leads to considerable economic losses. The Institute of Medicine estimates the annual cost to be $4 to $5 billion US dollars. Thus, antimicrobial resistance has become a great concern not only in the US but also worldwide.

**What has been done**
Because a large quantity of antimicrobial drugs (up to 50% of the antimicrobial drugs produced in the US) is used in farm animal production to promote growth performance, much of the concern over antimicrobial resistance is directed at the use of antimicrobial drugs in farm animals. Animal manure is the largest antimicrobial resistance reservoir, thus, animal manure treatment offers a critical control point to contain and/or destroy antimicrobial resistance. OARDC scientists investigated the reduction of antimicrobial resistance to tetracycline and macrolide-lincosamide- streptogramin B (a superfamily of related antimicrobial drugs) in manure treatment systems employed at animal farms.

**Results**
OARDC scientists have identified effective manure treatment systems so that they can be used to reduce the antimicrobial resistance arising from animal farms. Researchers concluded that both composting at elevated temperatures and anaerobic digestion are effective and practical to reduce antimicrobial resistance arising from animal production, up to a 99.99999% reduction. Storage of animal manure and wastes in conventional, on-farm lagoons does not result in any significant reduction of antimicrobial resistance. Treatment of animal manure and wastes by biofilters doe not appreciably reduce antimicrobial resistance either.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 723 | Hazards to Human Health and Safety |

**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.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 0 | 0 |

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

**Issue (Who cares and Why)**
INFORMING H1N1 RESEARCH: Often by the time a new flu stain arrives, there is inadequate time to conduct the necessary research to effectively stop its spread. H1N1, in 2009, has proven to be one of the more problematic stains, having killed more than 16,000 people worldwide.

**What has been done**
Before the World Health Organization declared H1N1 as a major flu outbreak, science had a jump-start on the H1N1 virus, in part due to research conducted by OARDC. Researchers applied reverse genetics to determine the

genetic makeup, disease-causing mechanisms, and immunity of the influenza virus. These researchers are also studying the genetic makeup, disease- causing mechanisms, and processes of immunity of an H1N1 virus found at an Ohio county fair that, like the virus responsible for the 2009 pandemic, contained genes of swine, avian, and human influenza viruses.

**Results**
In addition to helping to determine the genetic makeup, disease-causing mechanisms, and immunity of the influenza virus, OARDC scientists are analyzing avian and swine influenza viruses to pinpoint which specific genes provides those viruses that have the ability to jump from one animal species to another, or from animals to people. OARDC is building a Plant and Animal Agrosecurity Research Facility on the Wooster, Ohio campus that will further enhance researchers' ability to prepare and respond such crisis. Construction begins in 2010 with an expected completion date of 2011.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 722 | Zoonotic Diseases and Parasites Affecting Humans |

## 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

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 1 | 0 |

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

**Issue (Who cares and Why)**
OBESITY is perhaps the largest and fastest growing risk factor for premature mortality in the United States today. Nevertheless, despite a great deal of effort aimed at combating the obesity problem through education and improved food labeling, risk management efforts have been largely unsuccessful and obesity rates have continued their dramatic rise. The process needs new and different research to inform the process.

**What has been done**
Efforts to use nutrition education to combat the growing obesity problem in the USA have been largely unsuccessful. One possible reason for the persistence of the obesity problem is the presence of consumers who discount hyperbolically. To counter this phenomenon, sophisticated agents may try to employ commitment devices to protect long - term health goals from short - term consumption decisions. OARDC scientist used data from the Continuing Survey of Food Intakes by Individuals to examine the impact of hyperbolic discounting and use of commitment devices to influnce individuals' caloric consumption.

**Results**
The OARDC researchers' results suggest that obese dieters display behavior consistent with hyperbolic discounting. Hyperbolic discounting is when an individual is given two similar rewards, they show a preference for the one that arrives first. This suggests that impatience lies at the root of this problem and that policymakers may want to allocate more resources toward helping obese or potentially obese persons overcome their impulsive behavior by helping them build more effective commitment mechanisms.

**4. Associated Knowledge Areas**

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

**Outcome #8**

**1. Outcome Measures**

To advance knowledge related to obesity and obesity - related diseases.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | {No Data Entered} | 0 |

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

**Issue (Who cares and Why)**
OBESITY, CONJUGATED LINOLEIC ACID (CLA), AND INSULIN RESISTANCE: Obesity is a growing epidemic that is characterized by dysregulation of metabolism, which can lead to type 2 diabetes as well as many other costly and chronic health conditions. The total estimated cost of diabetes exceeds $175 billion annually in the US. There is considerable evidence that the weight-loss supplement conjugated linoleic acid (CLA) reduces adipose mass, in part, by shuttling lipids away from adipose and into the liver and skeletal muscle. While CLA may be beneficial, there are risk to those users who have insulin regulation problems. Insulin resistance is a problem in non-obesity health issues as well.

**What has been done**

Because of the strong link of insulin resistance with steatosis, the abnormal lipid retention in a cell, OARDC researchers sought to investigate the extent that CLA-induced steatosis in muscle increased insulin resistance. In another OARDC study, insulin resistance in association with certain cancers were investigated.

**Results**
An OARDC study found no evidence for the induction of insulin resistance by CLA when provided in the presence of rosiglitazone. Rosiglitazone is an insulin sensitizer and one of the most commonly used drugs for the treatment of type 2 diabetes. This new knowledge is most important in that it now provides a basis for scientists to investigate the complementary effects of CLA and rosiglitazone to lower body fat in humans while maintaining insulin sensitivity needed by those afflicted with type 2 diabetes. The future of this research could potentially lead to monumental breakthroughs in both type 2 diabetes and weight loss, two of the worst health problems plaguing the nation. A parallel study has found insulin resistance in association with some cancers that results in cachexia, a condition causing chromic fat and muscle loss. In laboratory studies rosiglitazone, paradoxically, has reduced the chromic fat and muscle loss induced by the onset of insulin resistance due certain cancers. Final studies hold great promise for patients with cachexia.

**4. Associated Knowledge Areas**

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

**Outcome #9**

**1. Outcome Measures**

To advance knowledge related to childhood obesity

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | {No Data Entered} | 0 |

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

**Issue (Who cares and Why)**
CHILDHOOD OBESITY is a chronic national problem that has severe economic, health, social, and psychological impacts impacting both the child, the family/caregivers, and nation.

**What has been done**
Scientists at Ohio State University investigated three factors that may influence childhood obesity - eating dinner as a family, getting adequate sleep, and limiting their weekday television viewing time. Other studies have linked obesity to the individual behaviors of excessive TV viewing, a lack of sleep and, to a lesser extent, a low frequency of family meals. But this is the first study to assess the combination of all three routines with obesity prevalence in a national sample of preschoolers.

**Results**

The USDA supported national study 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. However, they also cautioned that this study alone does not confirm whether the routines themselves, or some other factor, protect children from obesity.

**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**

- 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; extramural funding; federal/state base funding;)

**Brief Explanation**

Shifts in economy can impact manufacturers abilities to attend to or government responsiveness to human health Within this program area public monies, and the fluctuations in appropriations of such, have dramatic effect on human health. Issues of diet, access to healthy foods, food fads, social pressure, access mental health services and similar all can have major affects on this Planned Program. Likewise public policy and the publics priorities and perceptions, especially regarding risks, are major external factors impacting this program. Priority of this research for limited dollars and the resulting competition impact the extent of research that can be carried out. Other factor is migrant populations entering the workforce without fully understanding the risks. New populations who have recently immigrated into the area, often do not understand risk and are subject to disease because of uninformed choices. Items such as potential levels of public exposure to certain zoonotic diseases are major external factors. Likewise public willingness to learn safety procedures in terms of pests or zoonotic disease threats are factors that are beyond the researchers control. Often times formative evaluation though can lessen the impact of externalities by seeking feedback throughout the life of the program. Internal factors such as the availability of base funding to ensure a core faculty and staff, availability of extramural funds, and programmatic demands that often exceed resources, are affecting outcomes.

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

1. Evaluation Studies Planned

## Evaluation Results

## Key Items of Evaluation

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

**Program # 9**

**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: 2009 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 0.0 | 0.0 | 7.1 | 0.0 |
| Actual | 0.0 | 0.0 | 7.8 | 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 | 848043 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 0 | 0 | 467126 | 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

Faculty in this program work with departments across the college to inform decisions related to understanding the value chains of their research. Their work is viewed as critical in term of the economic forecast for crops and informing marketing decisions. Work in this area informs federal policy as well, e.g. the ACRE program was in great part a product of this program. Additionally this program has an international reputation regarding their advances in theory in food, agricultural, and environmental economics research, including valuing of climate change variables. Faculty in this Planned Program have conducted numerous basic and applied research projects, as noted in the CRIS reports, and published in peer-reviewed journals, and in all types of other media from social networks to on-line trade journals and extension publications. As a matter of routine practice OARDC faculty, staff, and administrators in this, and in all Planned Programs, work in partnership with business, industry, government, NGOs, commodity groups, and other stakeholders on a daily bases. They are as committed to development, as they are to the research element, insuring that research is moved into society to create new products and services, jobs, economic activity, and overall, improve social well - being. Where complementary extension activities occur they are reported within the appropriate sections.

### 2. Brief description of the target audience

Targeted audiences include specific individuals or groups who have expressed a need for economic findings related to some aspect of human capital that is to be derived through new research, extracted from on-going research, or is derived from scientific literature; fellow academic units that depend on scientists in this program for support information and for the approaches and measures they generate; fellow agencies or support organizations who will not only use the economic information but will also extend that information; populations who have not requested the information but will likely benefit from that information; other scientists and scientific groups; political entities; extension personnel; students from junior high school to post doctorate studies; news organizations; and business and industrial groups.

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

### 1. Standard output measures

| 2009 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| Plan | 0 | 0 | 0 | 0 |
| Actual | 0 | 0 | 0 | 0 |

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

**Patent Applications Submitted**

Year: 2009
Plan: 0
Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2009 | Extension | Research | Total |
|---|---|---|---|
| Plan | 0 | 30 | |
| Actual | 0 | 43 | 43 |

## V(F). State Defined Outputs

**Output Target**

**Output #1**

**Output Measure**

- Peer-reviewed publications will be tracked

| Year | Target | Actual |
|---|---|---|
| 2009 | 30 | 43 |

**Output #2**

**Output Measure**

- Non - commercialized techniques will be tracked
  Not reporting on this Output for this Annual Report

**Output #3**

**Output Measure**

- Report number of graduate students completed

| Year | Target | Actual |
|---|---|---|
| 2009 | 3 | 23 |

**Output #4**

**Output Measure**

- Total number of OARDC sponsored communication products/efforts,excluding peer reviewed publications, will be reported
  Not reporting on this Output for this Annual Report

**Output #5**

**Output Measure**

- Commercialized techniques will be tracked
  Not reporting on this Output for this Annual Report

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

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | New knowledge of production variations in markets that help producers, processors, and distributors have requisite information for enhanced decision making leading to decreased costs of inputs and an increase in profits/outputs. |
| 2 | Advanced knowledge of how to market and manage quality attributes of commodities leading to demonstrated value added/ profits for producers, processors, and distributors, and reported satisfaction/needs attainment among consumers. |
| 3 | Business management knowledge in targeted areas, e.g. risk management, weather insurance, impacts of land use shifts, grant management that are necessary for and result in increased profitability for stakeholders. |
| 4 | Research findings on novel programs such as pollution trading, carbon trading, conservation programs, cooperatives, etc. that results in enhanced profits, new sources of income, and/or prevention of loss of profits or loss of other resources, e.g. soil. |
| 5 | Relational contracting theory and practice information that will contribute to reduction of risks, improving profits, and adding stability to the system that meet stated stakeholder needs. |
| 6 | Stakeholders will have the necessary models that will improve on the forecasting of risk, demand, and prices in various commodity sectors leading to enhanced decision making, increased profits, and reductions in 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. |

## Outcome #1

### 1. Outcome Measures

New knowledge of production variations in markets that help producers, processors, and distributors have requisite information for enhanced decision making leading to decreased costs of inputs and an increase in profits/outputs.

Not Reporting on this Outcome Measure

## Outcome #2

### 1. Outcome Measures

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

Not Reporting on this Outcome Measure

## Outcome #3

### 1. Outcome Measures

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

Not Reporting on this Outcome Measure

## Outcome #4

### 1. Outcome Measures

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

### 2. Associated Institution Types

- 1862 Research

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 1 | 0 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
CLIMATE CHANGE AND NO-TILL CARBON: No-till plowing of agricultural fields is one way to store carbon in the soil. No - till has been proposed as one means to reduce atmospheric carbon loading and generate carbon trading value to farmers who practice no -till.

**What has been done**
OARDC economists explored the economic value of no - till carbon storage to farmers in terms of carbon trading returns.

**Results**
OARDC scientists found that farmers would receive about 50 cents per acre per year in the 2009 market above their farm expenditures for continuous no-till farming. That may not be enough to overcome a 17 percent yield loss in no-till cropping. Plowing to recover those yields results in a loss of about six tons of soil carbon per acre into the atomosphere. Thus, until such time that the cash value for carbon in trading markets is substantially increased, no-till will continue to be justified for it's other benefits such as erosion control, soil carbon enhancement, and prevention of soil loss from agricultural runoff. While no -till practices do reduce atmospheric carbon loading, farmers cannot receive a true economic gain from carbon trading under current prices for traded carbon. Additionally, OARDC scientists have calculated that one acre of forest can sequestrate up to 4 - 10 tons of carbon per year and a 140 acre wetland can sequestrate up to 80 tons. Scientists are encouraging that both be added as viable carbon sequestration options.

**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 |
| 608 | Community Resource Planning and Development |
| 610 | Domestic Policy Analysis |

**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.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|

| | | |
|---|---|---|
| 2009 | 1 | 0 |

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

**Issue (Who cares and Why)**
ECONOMIC COST OF FOODBORNE ILLNESS: In a time of tightening budgets, the ability to conduct thorough evaluations demonstrating the value of programs that may be targeted for cuts are crucial.

**What has been done**
Estimates of the cost of foodborne illness in the past have been based on a method that focuses on a small subsample of "important" pathogens, accounting for fewer than four (4) million of the estimated 76 million cases of foodborne illness that Americans experience each year. These estimates have not typically included important social costs such as the lost quality of life an afflicted individual experiences from pain and suffering. OARDC scientists have sought to more fully calculate the real costs of foodborne illness to society.

**Results**
OARDC scientists include the costs of all 26 distinct foodborne pathogens to address variability and prioritization of spending. Each illness from Salmonella imposes a cost of about $4800, whereas $1700 is the average cost of foodborne illness. Consequently, health officials choosing between allocating resources to a program targeted at reducing illnesses from Salmonella and one that reduces illnesses from Bacillus cereus for example (at a value of $350 per case) could justify the latter spending if they demonstrate averting nearly 14 times as many cases of Bacillus cereus. The study provides a template that can be used to estimate costs on a state-by-state basis while accounting for differences in consumption patterns, food safety practices, and climate, all of which affect the incidence of foodborne illness, as well as state-specific costs of medical care, lost quality of life, and productivity (including lost work days, pain and suffering, and deaths) from the foodborne illness. When applied to the Family Nutrition Program, the program more than pays for itself in reduced foodborne illness.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 607 | Consumer Economics |
| 608 | Community Resource Planning and Development |
| 609 | Economic Theory and Methods |
| 610 | Domestic Policy Analysis |

**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.

Not Reporting on this Outcome Measure

**Outcome #9**

1. **Outcome Measures**

Research finding on valuing environmental resources, e.g. wetlands, river restoration, and how it applies to stakeholder needs for demonstrated gains in profits, resources sustained, and/or actions mitigated.

Not Reporting on this Outcome Measure

**Outcome #10**

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

**Outcome #11**

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

**Outcome #12**

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

**Outcome #13**

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

**Outcome #14**

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

## Outcome #15

### 1. Outcome Measures

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

Not Reporting on this Outcome Measure

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

**External factors which affected outcomes**

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

**Brief Explanation**

Shifts in economy impact all aspects of peoples lives, psychologically, socially, business wise, and physically. Within this program area public monies, and the fluctuations in appropriations of such, have dramatic (both positive and negative) effect on human well being, as do levels of government regulations. Likewise public policy, priorities, and perceptions, including popular culture and trends/fads, are major external factors impacting this program. Priority of economics research for limited dollars, and the resulting competition, impact the extent that research can be carried out. Other factors such as economic conditions and needs of migrant populations entering the community and workforce, or new populations who have recently immigrated into the area, and are ill prepared to sustain themselves socially and monetarily, are impacts. To an extent though, it is these various external factors that are studied in relationship to economic theory that yields the valued research generated by the scientists in this program. Internal factors such as the availability of base funding to ensure a core faculty and staff, availability of extramural funds, and programmatic demands that often exceed resources, are affecting outcomes.

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

1. Evaluation Studies Planned

**Evaluation Results**

**Key Items of Evaluation**

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

**Program # 10**

**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% | | 20% | |
| 804 | Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures | 0% | | 10% | |
| 805 | Community Institutions, Health, and Social Services | 0% | | 15% | |
| 903 | Communication, Education, and Information Delivery | 0% | | 15% | |
| | **Total** | 0% | | 100% | |

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

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

| Year: 2009 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 0.0 | 0.0 | 4.9 | 0.0 |
| Actual | 0.0 | 0.0 | 3.4 | 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** |
| 0 | 0 | 349488 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 0 | 0 | 221987 | 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**

Faculty in this Planned Program have conducted numerous basic and applied research projects, as noted in the CRIS reports, and published in peer-reviewed journals, and in all types of other media from social networks to on-line trade journals and extension publications. As a matter of routine practice OARDC faculty, staff, and administrators in this, and in all Planned Programs, work in partnership with business, industry, government, NGOs, commodity groups, and other stakeholders on a daily bases. They are as committed to development, as they are to the research element, insuring that research is moved into society to create new products and services, jobs, economic activity, and overall, improve social well-being. Faculty in this program work with programs across the college to inform decisions related to understanding human dimensions research. Their work is viewed as critical in advancing knowledge about the social responsible aspects of our College's mission. Where complementary extension activities occur they are reported within the appropriate sections.

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

Targeted audiences include fellow agencies or support organizations who will not only use the social information but will also extend that information; populations who have not requested the information but will likely benefit from that information; other scientists and scientific groups; political entities; extension personnel; students from pre-school to post doctorate studies; news organizations; business and industrial groups; and specific individuals or groups who have expressed a need for information related to some aspect of human capital that is to be derived through new research, extracted from on-going research, or is derived from scientific literature. Also included are fellow academic units that depend on scientists in this program for support information and for approaches/measures related to the human enterprise.

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

**1. Standard output measures**

| 2009 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Plan** | 0 | 0 | 0 | 0 |
| **Actual** | 0 | 0 | 0 | 0 |

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

Year: 2009
Plan: 0
Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2009 | Extension | Research | Total |
|---|---|---|---|
| **Plan** | 0 | 17 | |
| **Actual** | 0 | 15 | 15 |

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

**Output Target**

**Output #1**

**Output Measure**

- Peer-reviewed publications will be tracked

| Year | Target | Actual |
|---|---|---|
| 2009 | 17 | 15 |

**Output #2**

**Output Measure**

- Non - commercialized techniques will be tracked
  Not reporting on this Output for this Annual Report

**Output #3**

**Output Measure**

- Number of gradaute students completed.

| Year | Target | Actual |
|---|---|---|
| 2009 | 8 | 7 |

**Output #4**

**Output Measure**

- Total number of OARDC sponsored communication products/efforts,excluding peer reviewed publications, will be reported
  Not reporting on this Output for this Annual Report

**Output #5**

**Output Measure**

- Commercialized techniques will be tracked
  Not reporting on this Output for this Annual Report

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

## V. State Defined Outcomes Table of Content

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

**Outcome #1**

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

**Outcome #2**

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

**Outcome #3**

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

**Outcome #4**

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

**Outcome #5**

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

**Outcome #6**

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

**Outcome #7**

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

**Outcome #8**

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

**Outcome #9**

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

**Outcome #10**

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

**Outcome #11**

1. **Outcome Measures**

Advance understanding of communication, education and information services to show gain scores in the teaching and learning process within related agriculture and natural resources programs.

Not Reporting on this Outcome Measure

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

**External factors which affected outcomes**

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

**Brief Explanation**

To a greater or lesser extent all factors noted above affect impacts. Perhaps the most influential factor effecting achievement of impacts is monetary. As state and federal base funding have not kept pace with inflation, researchers have sought to continue to grow extramural funding. Research faculty size is decreasing as the result of less federal and state support meaning fewer scientists to compete for funding. While researchers have been relatively successful in bridging part of the dollar gap (loss), that funding is limited to grant and contract scopes of work. This has two effects. One, these extramural funds cannot be used to hire core faculty so the faculty cannot regrow, often meaning that faculties operate with less than a critical mass. Second, fewer faculty members working more extensively on external grants means that some of the mission oriented research services, especially those provided to stakeholders without costs, can no longer be provided at the same level. Both place the faculty member and the institution at a disadvantage in terms of scholarship, stakeholder support, and service. The majority of the faculty in this planned program are in a department that has been engaged in reorganization into a new department to better respond to need. This has affected outcomes.

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

1. Evaluation Studies Planned

**Evaluation Results**

**Key Items of Evaluation**

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

**Program # 11**

**1. Name of the Planned Program**

Building Human Capital (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 |
|---|---|---|---|---|---|
| 802 | Human Development and Family Well-Being | 95% | | 95% | |
| 806 | Youth Development | 5% | | 5% | |
| | **Total** | 100% | | 100% | |

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

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

| Year: 2009 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 20.0 | 0.0 | 0.0 | 0.0 |
| Actual | 9.0 | 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** |
| 440883 | 0 | 0 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 440883 | 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**

Provided educational sessions and materials on:

1. Divorcing and Basic Parent Education
2. Communication and Relationship Skills Development
3. Child Care Provider Training
4. Gerontology Education

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

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

child care providers

older adults and those who care for them

social service professionals

- court involved individuals

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

**1. Standard output measures**

| 2009 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Plan** | 15000 | 15000 | 10000 | 0 |
| **Actual** | 18336 | 0 | 0 | 0 |

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

Year: 2009
Plan: 0
Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2009 | Extension | Research | Total |
|---|---|---|---|
| **Plan** | 0 | 5 | |
| **Actual** | 15 | 0 | 0 |

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

**Output Target**

**Output #1**

**Output Measure**

- Total number of participants in the program/project.

| Year | Target | Actual |
|---|---|---|

| | | |
|---|---|---|
| 2009 | 45000 | 18336 |

**Output #2**

**Output Measure**

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

| Year | Target | Actual |
|---|---|---|
| 2009 | 400 | 525 |

**Output #3**

**Output Measure**

- Number of participants attending presentations and/or demonstrations.

| Year | Target | Actual |
|---|---|---|
| 2009 | 20000 | 12541 |

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

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | # of participants who learned new information from the program. |
| 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 learned new information from the program.

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 20000 | 11620 |

### 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**
Participants indicate they learned new information.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 802 | Human Development and Family Well-Being |
| 806 | Youth Development |

## 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 |
|---|---|---|
| 2009 | 8000 | 6602 |

**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**
Participants indicate intend to change behavior.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 802 | Human Development and Family Well-Being |
| 806 | Youth Development |

**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 |
|---|---|---|
| 2009 | 4000 | 2782 |

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

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

**What has been done**
Participants have internalized educational objectives.

**Results**
Behaviors have changed.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 802 | Human Development and Family Well-Being |
| 806 | Youth Development |

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

**External factors which affected outcomes**

- Economy
- Public Policy changes
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

**Brief Explanation**

{No Data Entered}

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

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)

**Evaluation Results**

Of those attending educational sessions: 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**

Knowledge Gain, Intended Behavior Change, Self-reported behavior change - Of those attending educational sessions: 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.

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

**Program # 12**

**1. Name of the Planned Program**

Nutrition Education and Behavior (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% | | 100% | |
| | **Total** | 100% | | 100% | |

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

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

| Year: 2009 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 20.0 | 0.0 | 0.0 | 0.0 |
| Actual | 37.0 | 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** |
| 1812518 | 0 | 0 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 1812518 | 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**

**Expanded Food and Nutrition Program (EFNEP)**

Series of Classes Youth programs in out of school setting using USDA Youth curricula Training provided for EFNEP staff by state personnel Collaborations with agencies including Women Infants and Children, Local Health Departments, Help Me Grow and related organizations

**Family Nutrition Program (FNP)**

Series of Classes Individual Classes Newsletter Summer Food Service Programs in select counties Training provided for FNP staff by state personnel and regional specialists Collaborations with agencies to offer programming including Jobs and Family Services, Women Infants and Children, Local Health Departments, Help Me Grow, Food Banks and Pantries, Senior Centers and related organizations

**Dining with Diabetes (DWD)**

Series of classes offered in participating counties Newsletter Training for program team provided by statewide Dining with Diabetes 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

**General Nutrition Education**

Individual workshops and/or series of classes offered in counties to address needs of local clientele.

Newsletters, press and radio releases Collaborations with agencies to offer programming include Senior Centers, community clubs and organizations, health departments, schools and other community groups

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

The target audience varies by program;

Expanded Food and Nutrition Education and Family Nutrition Education Program and Family Nutrition Program are targeted to reach low-income audience homemakers with children from birth to 18 years of age and specifically for the Family Nutrition Program food stamp recipients with mothers as the priority target.

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

General nutrition programming is specifically designed for the 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.

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

**1. Standard output measures**

| 2009 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Plan** | 37000 | 5000 | 11500 | 0 |
| **Actual** | 47584 | 718000 | 10611 | 0 |

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

Year: 2009
Plan: 0
Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2009 | Extension | Research | Total |
|---|---|---|---|
| **Plan** | 4 | 0 | |
| **Actual** | 6 | 0 | 0 |

| | | | |
|---|---|---|---|
| | | | |

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

**Output Target**

**Output #1**

**Output Measure**

- Number of newsletters for EFNEP, FNP, DWD, and general nutrition programs

| Year | Target | Actual |
|---|---|---|
| 2009 | 16 | 16 |

**Output #2**

**Output Measure**

- Collaborations formed/maintained

| Year | Target | Actual |
|---|---|---|
| 2009 | 3 | 8 |

**Output #3**

**Output Measure**

- Number of classes

| Year | Target | Actual |
|---|---|---|
| 2009 | 50 | 41681 |

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

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | % of participants who demonstrate the ability to plan menus and choose foods using the Dietary Guidelines and My Pyramid. |
| 2 | % of participants who indicate an intent to adopt one or more healthy food/nutrition practices. |
| 3 | % of participants who demonstrate adoption of healthy eating practices by:<br><br>Improved lifestyle practices based on the Dietary Guidelines and My Pyramid<br>Improved intake of food group servings (increased intake of vegetables, fruits and low calorie dairy items; reduced intake of calories and fat) |
| 4 | % of participants who demonstrate adoption of increased time spent in physical activity<br><br>Implementing regular physical activity<br>Increased participation in games involving physical activity<br>Reduction in sedentary activities such as watching TV and playing video games |

## Outcome #1

### 1. Outcome Measures

% of participants who demonstrate the ability to plan menus and choose foods using the Dietary Guidelines and My Pyramid.

Not Reporting on this Outcome Measure

## Outcome #2

### 1. Outcome Measures

% of participants who indicate an intent to adopt one or more healthy food/nutrition practices.

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 77 | 95 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
A healthy, well-nourished population is dependent on the ability of people to obtain foods that will improve the overall quality of their diets, and the quality of the food they eat. Nutrition plays an important role in reducing obesity, diabetes, cancer and heart diseases. Intentions to adopt/implement behaviors is a primary component of the Theory of Reasoned Action.

**What has been done**
Community-based nutrition education programs are offered at the local level by OSU Extension to increase the ability of individuals to improve their individual and family feeding practices.

**Results**
95% of participants indicated on end-of-session evaluations that they intend to adopt one or more health food/nutrition practices that will lead to a healthier population and ultimately reduce the risks for chronic nutrition-impacted diseases and associated health care costs.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 703 | Nutrition Education and Behavior |

## Outcome #3

### 1. Outcome Measures

% of participants who demonstrate adoption of healthy eating practices by: Improved lifestyle practices based on the Dietary Guidelines and My Pyramid Improved intake of food group servings (increased intake of vegetables, fruits and low calorie dairy items; reduced intake of calories and fat)

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Action Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 55 | 85 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
The Dietary Guidelines for Americans provide a basis for healthy lifestyle choices. My Pyramid is a pictorial and practical guide for educating consumers to use the Dietary Guidelines. Improving the intake of servings of vegetables, fruits and low-fat/calorie dairy items have been targeted as key public health messages.

**What has been done**
Non-formal nutrition education series for youth and adults, as well as programs targeted to the elderly, and to individuals at risk for or having diabetes, have been offered to Ohioans. OSU Extension professionals inform consumers of health risk factors (e.g., obesity, hypertension, etc.) and nutrition practices and encourage appropriate nutrition and lifestyle changes and promote reading labels on processed foods.

**Results**
85% of participants indicated on follow-up evaluations that they adopted eating practices that will lead to a healthier population and ultimately reduce the risks for chronic nutrition-impacted diseases and associated health care costs.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 703 | Nutrition Education and Behavior |

## Outcome #4

### 1. Outcome Measures

% of participants who demonstrate adoption of increased time spent in physical activity Implementing regular physical activity Increased participation in games involving physical activity Reduction in sedentary activities such as watching TV and playing video games

### 2. Associated Institution Types

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 35 | 72 |

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

**Issue (Who cares and Why)**
A healthy population engages in positive health practices, including physical activity, that will reduce the risks of disease and associated health care costs.

**What has been done**
OSU Extension professionals have been actively educating the people of Ohio regarding the importance of physical activity and good nutrition practices for improved health and well-being. The professionals met with individuals and groups, in formal and non-formal teaching sessions, in workshops, committee meetings, health fairs, and walk-by exhibits.

**Results**
72% of participants indicated on follow-up evaluations that they adopted improved physical activity practices that will lead to a healthier population and ultimately reduce the risks for chronic nutrition-impacted diseases and associated health care costs.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 703 | Nutrition Education and Behavior |

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

**External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- 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)**

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Comparisons between program participants (individuals, group, organizations) and non-participants

**Evaluation Results**

**Key Items of Evaluation**

Eighty-five percent (n=49,465) of participants indicated on follow-up evaluations that they adopted eating practices that will lead to a healthier population and ultimately reduce the risks for chronic nutrition-impacted diseases and associated health care costs.

Seventy-two percent (n=41,900) of participants indicated on follow-up evaluations that they adopted improved physical activity practices that will lead to a healthier population and ultimately reduce the risks for chronic nutrition-impacted diseases and associated health care costs.

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

**Program # 13**

**1. Name of the Planned Program**

Financial Stability and Security (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% | | 100% | |
| | **Total** | 100% | | 100% | |

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

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

| Year: 2009 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 16.0 | 0.0 | 0.0 | 0.0 |
| Actual | 10.0 | 0.0 | 0.0 | 0.0 |

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

| Extension | | Research | |
|---|---|---|---|
| **Smith-Lever 3b & 3c** | **1890 Extension** | **Hatch** | **Evans-Allen** |
| 489870 | 0 | 0 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 489870 | 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**

Provide in-class training in basic money management

Development and distribute educational materials to accompany instruction

Provide in-service training for educators on strategies to enable participants to change their behavior
Conduct workshops and other educational sessions

Work with stakeholders and partners to leverage resources

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

Baby boomers
Women
New employees
Bankruptcy filers

Young adults

Debt-burdened individuals and couples

Limited-resource families

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

**1. Standard output measures**

| 2009 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Plan** | 4000 | 8000 | 0 | 0 |
| **Actual** | 26416 | 0 | 0 | 0 |

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

Year: 2009
Plan: 0
Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2009 | Extension | Research | Total |
|---|---|---|---|
| **Plan** | 2 | 0 | |
| **Actual** | 11 | 0 | 0 |

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

**Output Target**

**Output #1**

**Output Measure**

- # of educational sessions with two or more participants

| Year | Target | Actual |
|---|---|---|
| 2009 | 200 | 1625 |

**Output #2**

**Output Measure**

- # of participants

| Year | Target | Actual |
|---|---|---|
| 2009 | 1400 | 26416 |

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

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | % of participants will plan to adopt one or more recommended financial management practices |
| 2 | % of participants who plan to use specific goals to guide financial decisions |
| 3 | % of participants who organized their financial records for quick retrieval |
| 4 | % of participants who set aside money for occasional expenses |
| 5 | Number of participants who indicated an increase in knowledge. |

## Outcome #1

### 1. Outcome Measures

% of participants will plan to adopt one or more recommended financial management practices

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 50 | 0 |

### 3c. Qualitative Outcome or Impact Statement

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

**What has been done**
{No Data Entered}

**Results**
{No Data Entered}

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 801 | Individual and Family Resource Management |

## Outcome #2

### 1. Outcome Measures

% of participants who plan to use specific goals to guide financial decisions

Not Reporting on this Outcome Measure

## Outcome #3

### 1. Outcome Measures

% of participants who organized their financial records for quick retrieval

Not Reporting on this Outcome Measure

## Outcome #4

### 1. Outcome Measures

% of participants who set aside money for occasional expenses

Not Reporting on this Outcome Measure

## Outcome #5

### 1. Outcome Measures

Number of participants who indicated an increase in knowledge.

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | {No Data Entered} | 18491 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
Knowledge is required before behaviors can be changed, increased knowledge may indicate a change in future behaviors.

**What has been done**
Consubstantiation occurred.

**Results**
70 percent of participants (n=18,491) indicated an increase in knowledge.

### 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

**Brief Explanation**

{No Data Entered}

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

1. Evaluation Studies Planned

- After Only (post program)

**Evaluation Results**

Of those who attended educational sessions, 70% reported learning new information, 55% reported planning to adopt one or more recommended practices. Frequent non-completion of end-of-program evaluations and surveys limited evaluation efforts.

**Key Items of Evaluation**

Of those who attended educational sessions, 70% reported learning new information, 55% reported planning to adopt one or more recommended practices.

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

**Program # 14**

**1. Name of the Planned Program**

Volunteer Education & Training (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 |
|---|---|---|---|---|---|
| 802 | Human Development and Family Well-Being | 100% | | 100% | |
| | **Total** | 100% | | 100% | |

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

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

| Year: 2009 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 40.0 | 0.0 | 0.0 | 0.0 |
| Actual | 40.0 | 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** |
| 1959479 | 0 | 0 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 1959479 | 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 county-based required volunteer orientation for all new volunteers serving in the youth development program focusing on principles of positive youth development, organizational policies, procedures, and best practices.

Conduct annual statewide volunteer conference focusing on project specific knowledge and skills and leadership development for adult volunteers who work directly with youth.

Conduct continuing professional education opportunities for volunteers on the local, regional and statewide level focusing on youth development principles and subject matter content.

Develop web-based training and education modules for volunteers and build library of resources for Educators to use when conducting training/education programs for volunteers locally.

Establish methods to document knowledge and skills gained and identify the extent of impact training, education, and service has on volunteers.

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

Adult volunteers, over the age of 18 and not current 4-H members, who are currently serving the 4-H youth development program or who potentially will be serving the 4-H youth development program.

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

**1. Standard output measures**

| 2009 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Plan** | 12000 | 10000 | 0 | 225000 |
| **Actual** | 12147 | 0 | 0 | 196864 |

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

Year: 2009
Plan: 0
Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2009 | Extension | Research | Total |
|---|---|---|---|
| **Plan** | 0 | 0 | |
| **Actual** | 0 | 0 | 0 |

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

**Output Target**

**Output #1**

**Output Measure**

- County-based volunteer training and education programs will be held each year engaging adult volunteers serving community clubs, after-school programs, residential and day camps, and special interest programs. County Educators will report the number of training and/or educational programs conducted and volunteers attending through a year-end evaluation.

| Year | Target | Actual |
|---|---|---|
| 2009 | 1200 | 3900 |

## Output #2

### Output Measure

- Conduct annual statewide volunteer conference for adult volunteers who may select from 100 educational workshops focusing on project specific knowledge and skills and leadership development for adult volunteers who work directly with youth.

| Year | Target | Actual |
|---|---|---|
| 2009 | 1200 | 1200 |

## Output #3

### Output Measure

- Develop three new statewide training and/or education modules focusing on youth development principles, youth/adult partnerships, and conflict management for volunteers and build library of resources that includes over 50 curriculum pieces for Educators to use when conducting required new volunteer orientation training/education programs for 1800 individuals yearly.
  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 | 75% will increase their awareness of the principles of positive youth development by attending at least one county-based volunteer training/education program during the year. |
| 2 | 50% of volunteers that have participated in county-based, statewide, and/or web-based education/training programs will adopt and apply at least two new strategies for engaging young people in programs and activities. |
| 3 | Ohio 4-H Youth Development will increase the number of caring adults from 20,000 to 30,000 serving in the 4-H Youth Development program who are providing safe and positive environments for hands-on learning as defined by youth participants and parents/guardians. |

## Outcome #1

### 1. Outcome Measures

75% will increase their awareness of the principles of positive youth development by attending at least one county-based volunteer training/education program during the year.

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 7500 | 3900 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
Parents of 4-H members want to know that their children are participating in programs that occur in a safe environment.

**What has been done**
New volunteers received training in safety expectations of 4-H club and experiential learning.

**Results**
Extension professionals reported positive experiences for 4-H club members

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 802 | Human Development and Family Well-Being |

## Outcome #2

### 1. Outcome Measures

50% of volunteers that have participated in county-based, statewide, and/or web-based education/training programs will adopt and apply at least two new strategies for engaging young people in programs and activities.

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 5000 | 6000 |

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

**Issue (Who cares and Why)**
Parents and stakeholders of Ohio 4-H want the youth to have positive educational experiences.

**What has been done**
Incorporated the Experiential Learning Model into new 4-H volunteer orientation and training

**Results**
Feedback gathered from youth verifies their appreciation of hands-on learning in 4-H

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 802 | Human Development and Family Well-Being |

**Outcome #3**

**1. Outcome Measures**

Ohio 4-H Youth Development will increase the number of caring adults from 20,000 to 30,000 serving in the 4-H Youth Development program who are providing safe and positive environments for hands-on learning as defined by youth participants and parents/guardians.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 1200 | 1200 |

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

**Issue (Who cares and Why)**
4-H professionals & 4-H parents want the confidence that 4-H programs are positive & educational

**What has been done**
Orientation of volunteers emphasizes emotional and physical safety for positive learning environment

**Results**
Trained volunteers acknowledge an understanding of the 4-H club as a dynamic learning environment

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 802 | Human Development and Family Well-Being |

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

**External factors which affected outcomes**

- Economy
- Public Policy changes
- Populations changes (immigration, new cultural groupings, etc.)

**Brief Explanation**

{No Data Entered}

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

1. Evaluation Studies Planned

- After Only (post program)
- Before-After (before and after program)
- During (during program)
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.

**Evaluation Results**

At state training at least 50% volunteers valued knowledge & skills gained and intended to implement in clubs. Knowledge before and after, one new idea gained, and intention to teach at club, county and state

**Key Items of Evaluation**

At state training at least 50% volunteers valued knowledge & skills gained and intended to implement in clubs.

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

**Program # 15**

**1. Name of the Planned Program**

Ohio 4-H Teen Leadership (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% | | 100% | |
| | **Total** | 100% | | 100% | |

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

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

| Year: 2009 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 31.0 | 0.0 | 0.0 | 0.0 |
| Actual | 10.0 | 0.0 | 0.0 | 0.0 |

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

| Extension | | Research | |
|---|---|---|---|
| **Smith-Lever 3b & 3c** | **1890 Extension** | **Hatch** | **Evans-Allen** |
| 489870 | 0 | 0 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 489870 | 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**

4-H Leadership Projects

- 4 H projects are planned experiences in which youth develop knowledge, attitudes, skills, and aspirations related to a specific topic, and also develop leadership and citizenship life skills related to those topics. Information and research results were disseminated to youth through over 200 Ohio 4 H projects in 2009. A Teen Leadership Action Team was formed in 2009, with a Curriculum Sub-Committee charged with updating the 6 of the 7 existing 4 H leadership projects which remained following the 2008 review (during which 5 of the 12 leadership projects noted in the plan were dropped, with the remaining 7 offered in 2009)

4-H Club Officer And Committee System

- 4 H members became more effective leaders through real life responsibilities as club officers and committee members. Officer

and committee resources and workshops were provided in most Ohio counties in 2009, as well as at the 2009 Ohio 4-H Teen Conference. 4-H Club Officer Resource Handbooks were updated and posted on the www.ohio4-H.org website for use by 4-H officers throughout the state.

Junior/Teen Leadership Programs

Resources and education in County 4 H Junior/Teen Leadership programs enabled teens to develop advanced leadership among peer leaders in 2009

4-H Camp Counselor Opportunities

Teens developed advanced leadership abilities by serving as 4 H camp counselors, student assistants and in similar roles in 2009. These teens received training, supervised internships, and practical experience in these roles.

4-H Teen Boardsmanship / Youth in Governance

- By serving on 4 H boards and representing 4 H on boards of partner organizations, teens gained real life leadership experience. Resources and workshops were provided in 2009 to strengthen teen board leadership opportunities.

4-H Ambassadors & Spokesperson Opportunities

- Ohio 4 H Ambassadors developed leadership by serving as 4 H youth spokespersons throughout the state. Also, county programs such as Awareness Teams, Public Relations Corps and other leadership opportunities were offered.

4-H CARTEENS, 4-H TAP, and other 4-H Leadership Emphasis Programs

- Teens developed leadership through special emphasis 4 H leadership programs such as the 4 H CARTEENS program (in which teen leaders peer teach traffic safety and personal responsibility). Resources and workshops were provided.

4-H Service Leadership

- Ohio 4 H members developed leadership abilities by planning, conducting, and evaluating 4 H service learning programs and projects in 2009. Resources and education were provided

4-H Workforce Preparation

Integrated Extension and Research programming will enable 4-H teen participants (and stakeholders) to document high-value workforce abilities gained.

State 4-H Leadership Camp

- Leadership Camp was again a very successful "learn by doing" leadership development experience for Ohio 4-H Teen Leaders

Ohio 4-H Teen Conference

- A strong leadership dimension was incorporated into the annual Ohio 4 H Teen Conference, which involved over 800 teens in 2009.

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

Ohio teens age 13 and older

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

**1. Standard output measures**

| 2009 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| Plan | 2500 | 5000 | 25000 | 50000 |
| Actual | 2873 | 8746 | 33603 | 67206 |

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

Year: 2009
Plan: 0
Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2009 | Extension | Research | Total |
|---|---|---|---|
| Plan | 0 | 0 | |
| Actual | 0 | 0 | 0 |

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

**Output Target**

**Output #1**

**Output Measure**

- Numbers of teens participating in Ohio 4-H teen leadership development program opportunities

| Year | Target | Actual |
|---|---|---|
| 2009 | 25000 | 33603 |

**Output #2**

**Output Measure**

- Types of roles in which 4-H teens and young alumni exercise leadership following participation in 4-H teen leadership development program opportunities

| Year | Target | Actual |
|---|---|---|
| 2009 | 12 | 12 |

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

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | 250,000 Ohio youth learn to effectively exercise leadership through project experiences and group activities |
| 2 | 20,000+ Ohio teens develop advanced leadership skills knowledge, attitudes and aspirations each year as a result of targeted 4-H teen leadership program activities |
| 3 | Ohio youth apply what they learn through 4-H in real-life leadership to make a positive difference in their clubs, communities, country and world. |
| 4 | 4-H teens and young 4-H alumni effectively lead groups, programs, and activities in a variety of youth leadership roles. (types of roles) |
| 5 | Better lives, businesses, and communities for all citizens. (types of roles) |
| 6 | As adults, alumni of 4-H teen leadership programs are engaged as pro-active leaders in strengthening and determining the future of their communities, the nation, and the world. (types of roles) |

## Outcome #1

### 1. Outcome Measures

250,000 Ohio youth learn to effectively exercise leadership through project experiences and group activities

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 250000 | 332260 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
Youth leadership development is an essential component of preparing youth for adult success

**What has been done**
More than 200 Ohio 4-H projects and numerous 4-H group leadership experiences involved more than 330,000-Hers

**Results**
332,260 Ohio 4-H Members learned to effectively exercise leadership through 4-H projects and group leadership.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 806 | Youth Development |

## Outcome #2

### 1. Outcome Measures

20,000+ Ohio teens develop advanced leadership skills knowledge, attitudes and aspirations each year as a result of targeted 4-H teen leadership program activities

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 20000 | 33603 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
The development of leadership knowledge, attitudes, skills, and aspirations (KASA) is a key element of youth leadership

**What has been done**
Targeted 4-H teen leadership program learning experiences were offered to youth throughout Ohio.

**Results**
33,603 teens developed advanced level leadership knowledge, attitudes, skills and aspirations through Ohio 4-H.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 806 | Youth Development |

## Outcome #3

### 1. Outcome Measures

Ohio youth apply what they learn through 4-H in real-life leadership to make a positive difference in their clubs, communities, country and world.

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Action Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 2000 | 166130 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
The application of real life leadership is necessary for making a positive impact with others

**What has been done**
Youth were provided opportunities to us real life leadership in their clubs, communities, country, and world.

**Results**

More than 165,000 Ohio youth applied what they learned through 4-H in real-life leadership roles and responsibilities.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 806 | Youth Development |

**Outcome #4**

**1. Outcome Measures**

4-H teens and young 4-H alumni effectively lead groups, programs, and activities in a variety of youth leadership roles. (types of roles)

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 12 | 12 |

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

**Issue (Who cares and Why)**
4-H teens and young alumni must learn to effectively lead groups, programs and activities in various leadership roles

**What has been done**
4-H teens were provided opportunities to provide leadership in various local, county, and state leadership roles.

**Results**
33,603 Ohio 4-H teens effectively lead groups, programs and activities in the 12 major Ohio 4-H leader roles.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 806 | Youth Development |

**Outcome #5**

**1. Outcome Measures**

Better lives, businesses, and communities for all citizens. (types of roles)

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 12 | 332260 |

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

**Issue (Who cares and Why)**
The development of youth leadership is important for the betterment of people's lives, businesses and communities

**What has been done**
4-H programs and opportunities built around the goal of making the best better were offered to all Ohio 4-H youth

**Results**
332,260 Ohio 4-H youth were involved in 4-H programs built around the goal of making the best better.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 806 | Youth Development |

**Outcome #6**

**1. Outcome Measures**

As adults, alumni of 4-H teen leadership programs are engaged as pro-active leaders in strengthening and determining the future of their communities, the nation, and the world. (types of roles)

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 12 | 2217 |

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

**Issue (Who cares and Why)**

Young adults must be engaged as pro-active leaders in strengthening their communities, country, and world

**What has been done**
Post-high school age 4-Hers provided leadership through continued involvement in 4-H programs and opportunities.

**Results**
2,217 older 4-Hers became more pro-active as leaders for the future through continued involvement in -H programs

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 806 | Youth Development |

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

**External factors which affected outcomes**

- Appropriations changes
- Competing Public priorities
- Competing Programmatic Challenges

**Brief Explanation**

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

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.

**Evaluation Results**

County-based 4-H teen leadership programs were evaluated by local 4-H program professionals. In addition, evaluations of the 2009 State 4-H Leadership Camp revealed significant improvements in several leadership dimensions.

State 4-H Leadership Camp was rated very highly overall, and all objectives were achieved.
Evaluation results are outlined on the table below (scale: 7=strongly agree/excellent to 1=strongly disagree/very poor):
Overall Evaluation of State 4-H Leadership Camp
Item: Overall, how would you rate State 4-H Leadership Camp? (n=92), mean=6.0, SD=.85

Evaluation Ratings of Achievement of Leadership Camp Objectives
Items: As a result of participating in this camp, campers...
improved their leadership abilities (n=92), mean=6.1, SD=1.0
gained skills and abilities for working and contributing leadership as part of a group (n=92). mean=6.2, SD=.92

contributed leadership in helping groups shape & achieve goals and gain support (n=92), mean=6.3, SD=.73
developed leadership skills such as consensus-building, negotiation, perspective-taking, public relations, group building and recognition (n=92), mean=6.1, SD=.79
better understood that they are in control of their lives, and can control their lives (n=92), mean=6.2, SD=1.2
were encouraged to take initiative to try new things and not be afraid of failure or success (n=91), mean=6.4, SD=.77
gained in physical, intellectual, emotional and social development & became more competent, caring and contributing individuals (n=92), mean=6.3, SD=.80
gained ideas to improve their clubs, communities, country & world (n=92), mean=6.2, SD=.99
provided real leadership in committees, leadership groups & cabins (n=90), mean=6.4, SD=.71
had fun (n=92), mean=6.4, SD=.70
made new friends (n=92), mean=6.7, SD=.52

**Key Items of Evaluation**

Leadership Camp Made Significant Positive Impacts On Campers' Leadership Development

To evaluate the extent to which Leadership Camp impacted campers' leadership development, participants were asked to rate themselves at the beginning and end of the camp, using a 7-point scale (7=Excellent, 6=Very Good, 5=Good, 4=Average, 3=Below Average, 2=Poor, and 1=Very Poor). Results show that Leadership Camp significantly impacted campers' perceptions of their leadership development in every dimension measured, and that the camp was successful and effective in enhancing youth leadership development. The following dimensions of personal characteristics/leadership were measured: a) ability to control my own life and manage my time; b) initiative to try new things and not fear failure or success; c) skills and abilities in leading groups; d) level of self-understanding; e) communications abilities; f) interpersonal skills / abilities in working with others; g) respect for myself and others; h) trustworthiness; i) responsibility; j) fairness; k) caring; and l) citizenship.

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

**Program # 16**

**1. Name of the Planned Program**

Community Leadership Development (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 | 20% | | 20% | |
| 608 | Community Resource Planning and Development | 20% | | 20% | |
| 802 | Human Development and Family Well-Being | 20% | | 20% | |
| 803 | Sociological and Technological Change Affecting Individuals, Families, and Communities | 20% | | 20% | |
| 805 | Community Institutions, Health, and Social Services | 20% | | 20% | |
| | **Total** | 100% | | 100% | |

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

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

| Year: 2009 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 3.2 | 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** |
| 97974 | 0 | 0 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 97974 | 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**

Partner with local organizations

Develop curriculum

Conduct classes

Evaluate results

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

Elected and appointed officials

Non-profit leaders

Business leaders

Community volunteer leaders

Citizens who are thinking about running for public office

Potential leaders

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

**1. Standard output measures**

| 2009 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Plan** | 800 | 0 | 0 | 0 |
| **Actual** | 1167 | 0 | 0 | 0 |

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

Year: 2009
Plan: 0
Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2009 | Extension | Research | Total |
|---|---|---|---|
| **Plan** | 0 | 0 | |
| **Actual** | 0 | 0 | 0 |

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

**Output Target**

**Output #1**

**Output Measure**

- Number of classes

| Year | Target | Actual |
|---|---|---|
| 2009 | 36 | 24 |

**Output #2**

**Output Measure**

- Partnerships with local organizations

| Year | Target | Actual |
|---|---|---|
| 2009 | 15 | 24 |

**Output #3**

**Output Measure**

- number of curriculum developed

| Year | Target | Actual |
|---|---|---|
| 2009 | 2 | 4 |

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

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | Increase in ethics knowledge by 70% of participants |
| 2 | Increase in willingness to step forward and be a leader 70% of participants |
| 3 | Increase by 70% of participants in knowledge about: Being responsible making wise choices inclusivity courage acting decisively collaborating humility compassion justice openness integrity |
| 4 | Increase in large community meetings |
| 5 | Increase in regional cooperation by elected officials |
| 6 | Increase in community vision building |
| 7 | Increase in participation in Ohio Community Leadership Development Programs |
| 8 | Increase in citizen participation in local government |
| 9 | Decrease in community conflict and the need for mediation |
| 10 | Increase in participant trust of local government |
| 11 | Increase in the number of people willing to step forward when asked to lead |

## Outcome #1

### 1. Outcome Measures

Increase in ethics knowledge by 70% of participants

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 15 | 815 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
Based on research conducted by OSU Extension personnel conducting leadership programs, community leaders lack a thorough understanding of and knowledge of how local governments operate.

**What has been done**
Five local government leadership programs have been developed to address critical knowledge

**Results**
24 programs occurred throughout the state with 70% of participants indicating they increased their knowledge of ethics issues.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 802 | Human Development and Family Well-Being |

## Outcome #2

### 1. Outcome Measures

Increase in willingness to step forward and be a leader 70% of participants

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 560 | 816 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
A need exists in Ohio for new leaders to increase knowledge and increase awareness of critical issues

**What has been done**
Developed and delivered programs targeted to developing new leaders

**Results**
Seventy percent (n=816) of participants indicated a willingness and interest in becoming new community leaders.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 805 | Community Institutions, Health, and Social Services |

## Outcome #3

### 1. Outcome Measures

Increase by 70% of participants in knowledge about: Being responsible making wise choices inclusivity courage acting decisively collaborating humility compassion justice openness integrity

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 125 | 875 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
A need exists in Ohio to develop new leaders

**What has been done**
Developed and delivered new programming

**Results**

Eight hundred seventy-five participants increased their knowledge of being responsible, making wise choices, inclusivity, courage, acting decisively, collaborating, humility, compassion, justice, openness, and integrity.

**4. Associated Knowledge Areas**

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

**Outcome #4**

**1. Outcome Measures**

Increase in large community meetings

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 2 | 2 |

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

**Issue (Who cares and Why)**
A need to conduct meetings and programs targeted to Community Leaders

**What has been done**
Targeted additional organizations

**Results**
Programs targeted to two new groups occurred

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 805 | Community Institutions, Health, and Social Services |

**Outcome #5**

**1. Outcome Measures**

Increase in regional cooperation by elected officials

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 15 | 20 |

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

**Issue (Who cares and Why)**
In effort to cut costs, the need exists to consolidate programming and services by numerous organizations and agencies.

**What has been done**
Additional groups were targeted with programming

**Results**
Two new programs were conducted targeting two new groups

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 608 | Community Resource Planning and Development |

**Outcome #6**

**1. Outcome Measures**

Increase in community vision building

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 10 | 2 |

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

**Issue (Who cares and Why)**

Community Leaders need to make decisions based on strategic vision

**What has been done**
Programming conducted in two communities

**Results**
Two strategic visioning programs were started

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 608 | Community Resource Planning and Development |

**Outcome #7**

**1. Outcome Measures**

Increase in participation in Ohio Community Leadership Development Programs

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 50 | 62 |

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

**Issue (Who cares and Why)**
Future Leaders, Existing Leaders and new leaders need to be educated on concepts

**What has been done**
Increase awareness of programming.

**Results**
Number of participants have increased.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 802 | Human Development and Family Well-Being |

## Outcome #8

### 1. Outcome Measures

Increase in citizen participation in local government

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Condition Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 15 | 20 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
Community Leaders need to make decisions based on the needs of constituents.

**What has been done**
Increased delivery of citizen participation programming

**Results**
New programs delivered.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 802 | Human Development and Family Well-Being |

## Outcome #9

### 1. Outcome Measures

Decrease in community conflict and the need for mediation

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 5 | 2 |

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

**Issue (Who cares and Why)**
Need exists to deliver programming in communities related to public issues education.

**What has been done**
Program area of specialization has been created for CD Educators

**Results**
Creation of public issues education team

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 802 | Human Development and Family Well-Being |

**Outcome #10**

**1. Outcome Measures**

Increase in participant trust of local government

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 10 | 12 |

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

**Issue (Who cares and Why)**
Citizens need to increase and develop trust in local elected officials in order to have an effective government.

**What has been done**
Course material offered in local government curriculum.

**Results**

Program participants indicated increased awareness of concepts of ethics in local government.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 802 | Human Development and Family Well-Being |

**Outcome #11**

**1. Outcome Measures**

Increase in the number of people willing to step forward when asked to lead

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 560 | 62 |

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

**Issue (Who cares and Why)**
Citizens need to step up and participate as leaders when called upon to influence change and the decision making process.

**What has been done**
Inclusion of concepts in curriculum.

**Results**
Participants have indicated a willingness to serve.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 802 | Human Development and Family Well-Being |

### 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 Programmatic Challenges

**Brief Explanation**

{No Data Entered}

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

1. Evaluation Studies Planned

- Before-After (before and after program)
- Comparisons between program participants (individuals, group, organizations) and non-participants

**Evaluation Results**

90% of participants indicated knowledge gained after participating in programs

**Key Items of Evaluation**

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

**Program # 17**

**1. Name of the Planned Program**

Downtown Revitalization (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 | 20% | | 20% | |
| 603 | Market Economics | 15% | | 15% | |
| 607 | Consumer Economics | 15% | | 15% | |
| 608 | Community Resource Planning and Development | 50% | | 50% | |
| | **Total** | 100% | | 100% | |

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

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

| Year: 2009 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 6.0 | 0.0 | 3.0 | 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**

No activities on this program in 2009.

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

None

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

### 1. Standard output measures

| 2009 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| Plan | 300 | 1500 | 0 | 0 |
| Actual | 0 | 0 | 0 | 0 |

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

**Patent Applications Submitted**

Year: 2009
Plan: 0
Actual: {No Data Entered}

**Patents listed**
{No Data Entered}

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

**Number of Peer Reviewed Publications**

| 2009 | Extension | Research | Total |
|---|---|---|---|
| Plan | 0 | 0 | |
| Actual | {No Data Entered} | {No Data Entered} | 0 |

## V(F). State Defined Outputs

**Output Target**

**Output #1**

**Output Measure**

- number of people will attending meetings.
  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 | Participants will develop an awareness and knowledge of community downtown revitalization. The participants will be able to identify assets of the community and economic and social areas of the community that need further development. |
| 2 | Identify and develop written plan for local downtown economic revitalization. |
| 3 | Participants will implement the plan written and developed by them that will allow their community to increase social and human capital through economic growth. |

**Outcome #1**

1. **Outcome Measures**

Participants will develop an awareness and knowledge of community downtown revitalization. The participants will be able to identify assets of the community and economic and social areas of the community that need further development.

Not Reporting on this Outcome Measure

**Outcome #2**

1. **Outcome Measures**

Identify and develop written plan for local downtown economic revitalization.

Not Reporting on this Outcome Measure

**Outcome #3**

1. **Outcome Measures**

Participants will implement the plan written and developed by them that will allow their community to increase social and human capital through economic growth.

Not Reporting on this Outcome Measure

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

**External factors which affected outcomes**

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

**Brief Explanation**

Downtown Revitalization programs were not delivered due to restructuring and reassignments along with lack of requests.

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

1. Evaluation Studies Planned

- After Only (post program)
- Before-After (before and after program)
- Time series (multiple points before and after program)

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

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

**Program # 18**

**1. Name of the Planned Program**

Business & Economic Development (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 | 15% | | 15% | |
| 603 | Market Economics | 5% | | 5% | |
| 604 | Marketing and Distribution Practices | 10% | | 10% | |
| 606 | International Trade and Development | 5% | | 5% | |
| 608 | Community Resource Planning and Development | 60% | | 60% | |
| 609 | Economic Theory and Methods | 5% | | 5% | |
| | **Total** | 100% | | 100% | |

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

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

| Year: 2009 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 9.0 | 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** |
| 195948 | 0 | 0 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 195948 | 0 | 0 | 0 |
| **1862 All Other** | **1890 All Other** | **1862 All Other** | **1890 All Other** |
| 0 | 0 | 0 | 0 |

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

**1. Brief description of the Activity**

This program will involve one-on-one and group teaching using workshops, public meetings, and consultation. Written materials will supplement in-person teaching. Partnerships with state government and state association development officials as well as other local or regional development officials and organizations will be developed and maintained.

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

Development officials (chambers, CIC, downtown/main street, etc), Elected Officials (county commissioners, twp trustees), Business owners and leaders, Entrepreneurs, Community members, Extension professionals

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

**1. Standard output measures**

| 2009 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Plan** | 2000 | 90000 | 100 | 40000 |
| **Actual** | 1100 | 45000 | 0 | 10000 |

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

Year: 2009
Plan: 0
Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2009 | Extension | Research | Total |
|---|---|---|---|
| **Plan** | 5 | 0 | |
| **Actual** | 2 | 0 | 0 |

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

**Output Target**

**Output #1**

**Output Measure**

- Output targets measured in terms of number of: Workshop and educational program participants, workshops conducted, partnerships created, press releases published, reports created, studies performed, block grants awarded, tax incentives granted.

| Year | Target | Actual |
|---|---|---|
| 2009 | 1089 | 367 |

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

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | Identify issues and develop plan of work for community officials engaged in economic development activities |
| 2 | Determine the economic impact of a proposed new or existing economic sector within a community or region (eg plant closing, or new industrial investment) |
| 3 | Diversify retail economies and strengthen retail base by identifying retail sales leakages & surpluses |
| 4 | Provide direct technical assistance in areas of money, marketing, and management for entrepreneurs and small business owners. |

## Outcome #1

### 1. Outcome Measures

Identify issues and develop plan of work for community officials engaged in economic development activities

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 100 | 9 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
Economic development officials lack a comprehensive economic development strategy, resulting in inefficiencies.

**What has been done**
Two community workshops describing a process for creating a comprehensive strategy were conducted. Handout materials were created and distributed. Electronic visual aids were created and presented. Follow up conversations were conducted with key participants.

**Results**
Community officials decided against pursuing the development of a formal comprehensive economic development strategy using the process described in the community workshops. A less-structured format, however, was pursued to achieve the desired result. Workshop participants have indicated that they gained a better understanding for the need to conduct such efforts and they have learned more about the role of such strategies as a result of their participation.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 602 | Business Management, Finance, and Taxation |
| 608 | Community Resource Planning and Development |
| 609 | Economic Theory and Methods |

## Outcome #2

### 1. Outcome Measures

Determine the economic impact of a proposed new or existing economic sector within a community or region (eg plant closing, or new industrial investment)

### 2. Associated Institution Types

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 48 | 33 |

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

**Issue (Who cares and Why)**
What strategies could be employed to boost investment in particular sectors (e.g. food and food related)?

**What has been done**
Models were generated to estimate the economic impact of increased investment in specific community economic sectors. Discussions were held with key development officials to share the modeling logic as well as modeling limitations. Eight electronic reports were generated for reference.

**Results**
Specific incentives were offered by community leaders to encourage a significant employer from relocation. The large employer decided against relocation. Based on the economic modeling reports, community leaders have begun to pursue strategies for incentivizing investment in specific sectors of their community.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 603 | Market Economics |

**Outcome #3**

**1. Outcome Measures**

Diversify retail economies and strengthen retail base by identifying retail sales leakages & surpluses

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 155 | 110 |

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

**Issue (Who cares and Why)**
Local officials lack knowledge of their community retail market, resulting in failed businesses and vacant storefronts.

**What has been done**
An analysis of retail health was conducted to better understand opportunities for retail expansion by retail sector. Models were generated based on public input. Reports were generated and distributed to key community leaders on seven different occasions. Electronic visual aids were created and presented to key community leaders and interested citizens. Follow up conversations were conducted with key participants.

**Results**
Local economic development officials indicated they gained a much clearer understanding of how their retail market functioned. Furthermore, officials indicated the study findings would be helpful in informing lenders and entrepreneurs about the opportunities for new business ventures in the community.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 608 | Community Resource Planning and Development |
| 609 | Economic Theory and Methods |

**Outcome #4**

**1. Outcome Measures**

Provide direct technical assistance in areas of money, marketing, and management for entrepreneurs and small business owners.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 155 | 625 |

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

**Issue (Who cares and Why)**
Appalachian entrepreneurs require knowledge of money, marketing and small business management to succeed.

**What has been done**
Individual counseling and classroom-styled group instruction was conducted focused on taxes, labor law compliance, and marketing. Handout materials were created and distributed. Electronic visual aids were created and presented. Follow up conversations were conducted with participants. Business plan counseling was conducted.

**Results**

625 entrepreneurs in the region have a better understanding of business planning and management. New businesses were created. Existing businesses were strengthened. Entrepreneur-minded residents indicated that they gained a better understanding of business planning and management.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 602 | Business Management, Finance, and Taxation |
| 604 | Marketing and Distribution Practices |
| 606 | International Trade and Development |

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

**External factors which affected outcomes**

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Populations changes (immigration, new cultural groupings, etc.)

**Brief Explanation**

{No Data Entered}

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

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- Case Study

**Evaluation Results**

Relationships were created with 420 companies who created at least 532 new jobs and retained another 620 jobs.

**Key Items of Evaluation**

Relationships were created with 420 companies who created at least 532 new jobs and retained another 620 jobs.

Job creation and retention yields an estimated $43.9 million return on investment.

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

**Program # 19**

**1. Name of the Planned Program**

Advancing Community Tourism (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 |
|---|---|---|---|---|---|
| 134 | Outdoor Recreation | 10% | | 10% | |
| 604 | Marketing and Distribution Practices | 25% | | 25% | |
| 605 | Natural Resource and Environmental Economics | 30% | | 30% | |
| 607 | Consumer Economics | 10% | | 10% | |
| 608 | Community Resource Planning and Development | 20% | | 20% | |
| 805 | Community Institutions, Health, and Social Services | 5% | | 5% | |
| | **Total** | 100% | | 100% | |

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

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

| Year: 2009 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 7.0 | 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** |
| 97974 | 0 | 0 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 97974 | 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**

• Educate no fewer than 500 business leaders, decision makers, coastal residents, policymakers, and other stakeholders about the importance of tourism and resource conservation to the economic potential of Ohio and the Great Lakes region.

• Support no fewer than five research, education, and outreach efforts that enhance our understanding and ability to implement resource-based sustainable tourism strategies.

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

Internal - Extension Educators and other Extension staff; other related teams and OSU people

External - 1. Persons involved with local and regional destination marketing organizations, tourism initiatives, and tourism-related businesses; 2. Farmers and farm organizations and landowners considering agri-tourism and other direct marketing opportunities; 3. Community leaders; and public and elected officials; 4. Regional and state economic development professionals interested in tourism as an economic development strategy; 5. Local, district and state resource managers of natural areas, state parks, historical sites, etc., including those affiliated directly with ODNR, Ohio Historical Society and related organizations; 6. Crafters, artisans, small business operators, gift and museum shop operators, and tourism-related entrepreneurs; 7. Persons affiliated with or contemplating developing new tourism experiences, events, or souvenir and gift products embracing the region's intrinsic qualities; 8. National Scenic Byway program, key; 9, Statewide tourism-related organizations and divisions, such as the Ohio Travel Association, Ohio Restaurant Association, Ohio Hotel and Lodging Association, Ohio Division of Travel and Tourism, etc.

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

**1. Standard output measures**

| 2009 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Plan** | 1900 | 10000 | 150 | 250 |
| **Actual** | 4042 | 10000 | 150 | 30 |

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

Year: 2009
Plan: 0
Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2009 | Extension | Research | Total |
|---|---|---|---|
| **Plan** | 1 | 0 | |
| **Actual** | 1 | 0 | 0 |

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

**Output Target**

**Output #1**

**Output Measure**

- # of fact sheets developed

| Year | Target | Actual |
|---|---|---|
| 2009 | 6 | 1 |

**Output #2**

**Output Measure**

- # invited presentations

| Year | Target | Actual |
|---|---|---|
| 2009 | 8 | 28 |

**Output #3**

**Output Measure**

- # of times Tourism Teaching modules utilized, audience reached

| Year | Target | Actual |
|---|---|---|
| 2009 | 10 | 4 |

**Output #4**

**Output Measure**

- # of attendees at Advancing Community Tourism Conferences

| Year | Target | Actual |
|---|---|---|
| 2009 | 100 | 2100 |

**Output #5**

**Output Measure**

- # of Tourism/Direct Marketing team members

| Year | Target | Actual |
|---|---|---|
| 2009 | 14 | 14 |

**Output #6**

**Output Measure**

- # of members called upon as resource professionals

| Year | Target | Actual |
|---|---|---|
| 2009 | 6 | 8 |

**Output #7**

**Output Measure**

- # dollars directly awarded for tourism projects

| Year | Target | Actual |
|---|---|---|
| 2009 | 50000 | 180000 |

**Output #8**

**Output Measure**

- # Extension personnel involved in tourism projects/educational development

| Year | Target | Actual |
|---|---|---|
| 2009 | 9 | 9 |

**Output #9**

**Output Measure**

- # contacts reached through regional e-newsletters distributed

| Year | Target | Actual |
|---|---|---|
| 2009 | 500 | 650 |

**Output #10**

**Output Measure**

- # new travel itineraries developed

| Year | Target | Actual |
|---|---|---|
| 2009 | 1 | 1 |

**Output #11**

**Output Measure**

- # travel inquiries/web site visitors about Extension-led byway efforts
  Not reporting on this Output for this Annual Report

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

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | Local leaders and businesses perceive tourism as a viable economic development strategy for their community. Achieved through - Educational sessions/workshops (Advancing Community Tourism, presentations), educational materials (Tourism Trails, written, web, etc.), community asset inventory development, strategic planning. Measured by - survey, interview, policy development/implementation, direct support, use of Extension materials, direct contact with Extension professionals as resources |
| 2 | Community building, pride and image developed, quality of life improved, increased civic involvement demonstrated across socio-economic lines. Achieved through - Educational sessions/workshops (Advancing Community Tourism, customer service/hospitality presentations), educational materials (Tourism Trails, written, web, etc.), community asset inventory development, strategic planning. Measured by - survey of changes in practice, community awards, community project completion, measured community change in perception. |
| 3 | Increased community economic vitality demonstrated. Achieved through - Educational sessions/workshops (Advancing Community Tourism, customer service/hospitality presentations), educational materials (Tourism Trails, written, web, etc.), community asset inventory development, strategic planning, development of standardized measurement of impact, outreach to potential visitors, development of materials to be used by destination marketing organizations to promote the region. Measured by - direct and indirect visitor spending, jobs created, local and state tax revenue generated, payroll expenditures |
| 4 | Community and grassroots efforts to protect and conserve local and regional natural areas, historic sites, and cultural features are successful. Achieved through - Educational materials and workshops (grant-writing, importance of intrinsic features), cooperative groups (such as lighthouses, gardens, etc. with similar needs to consolidate purchasing and efforts), regional plans for enhancing the intrinsic features of communities, regular communications (thru newsletters, web site) to provide funding sources and preservation/conservation assistance. Measured by - number of support requests received by Extension Team members for funding efforts and/or preservation/conservation projects, acreage preserved, number of projects restored or under process, amount of grant funding/investment in historic preservation and natural areas conservation. |
| 5 | Residents and nonresidents view Extension-led byway regions as destinations. Achieved through - byway and wayfinding signage development and installation; design standards and distribution of regional byway signage logos; local, regional and national media stories placed; new products created to enhance the visitor experience. Measured by - Adoption of byway logos in local tourism promotional materials, observation, comments by local officials, number of requests for information, and/or surveys of byway visitors |

## Outcome #1

### 1. Outcome Measures

Local leaders and businesses perceive tourism as a viable economic development strategy for their community. Achieved through - Educational sessions/workshops (Advancing Community Tourism, presentations), educational materials (Tourism Trails, written, web, etc.), community asset inventory development, strategic planning. Measured by - survey, interview, policy development/implementation, direct support, use of Extension materials, direct contact with Extension professionals as resources

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 100 | 75 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
Enhance the delivery of tourism development to constituents. The need to develop a regional destination management organization that focuses on resource based tourism was identified as an issued when local leaders and businesses were surveyed as part of a strategic planning process.

**What has been done**
Increased delivery of programming. A Tourism heritage committee was created that identified projects in an effort to improve the tourism economy and quality of life and advocate for natural, historical, and cultural resources of Ohio.

**Results**
Training and workshops reached 75 participants. Three new publications were developed and 10,000 copies were distributed. Increased number of participants showing knowledge gained.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 134 | Outdoor Recreation |
| 605 | Natural Resource and Environmental Economics |
| 608 | Community Resource Planning and Development |

## Outcome #2

### 1. Outcome Measures

Community building, pride and image developed, quality of life improved, increased civic involvement demonstrated across socio-economic lines. Achieved through - Educational sessions/workshops (Advancing Community Tourism, customer service/hospitality presentations), educational materials (Tourism Trails, written, web, etc.), community asset inventory development, strategic planning. Measured by - survey of changes in practice, community awards, community project completion, measured community change in perception.

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Action Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 25 | 28 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
Ohio's tourism industry continues to develop and present changing opportunities. There continues to be a need to educate entrepreneurs and community leaders. There also continues to be a need to advance the level of activity and overall standing of the tourism industry in Ohio.

**What has been done**
The Tourism Team was created consisting of tourism professionals who network, collaborate and contribute to projects statewide. The Ohio Tourism Toolbox , a source for tourism educational materials, continues to be expanded. Developed a new industry gateway website. Increased number of presentations throughout the state.

**Results**
Two new educational programs were developed and conducted directed toward 1600 participants. Increased participation of organizations and communities by 28.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 604 | Marketing and Distribution Practices |
| 607 | Consumer Economics |
| 608 | Community Resource Planning and Development |
| 805 | Community Institutions, Health, and Social Services |

## Outcome #3

### 1. Outcome Measures

Increased community economic vitality demonstrated. Achieved through - Educational sessions/workshops (Advancing Community Tourism, customer service/hospitality presentations), educational materials (Tourism Trails, written, web, etc.), community asset inventory development, strategic planning, development of standardized measurement of impact, outreach to potential visitors, development of materials to be used by destination marketing organizations to promote the region. Measured by - direct and indirect visitor spending, jobs created, local and state tax revenue generated, payroll expenditures

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Condition Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 1 | 1 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
Nature based tourism is emerging as a key market for the state's tourism industry. However, few natural resource managers, community leaders or tourism industry professionals understand the markets complexities.

**What has been done**
Conducted presentations and workshops to park managers, resource users and community officials. Three fact sheets and 2 videos were developed. Delivered programming on the need to promote tourism.

**Results**
One community adopted new practices.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 604 | Marketing and Distribution Practices |
| 605 | Natural Resource and Environmental Economics |
| 607 | Consumer Economics |
| 608 | Community Resource Planning and Development |

## Outcome #4

### 1. Outcome Measures

Community and grassroots efforts to protect and conserve local and regional natural areas, historic sites, and cultural features are successful. Achieved through - Educational materials and workshops (grant-writing, importance of intrinsic features), cooperative groups (such as lighthouses, gardens, etc. with similar needs to consolidate purchasing and efforts), regional plans for enhancing the intrinsic features of communities, regular communications (thru newsletters, web site) to provide funding sources and preservation/conservation assistance. Measured by - number of support requests received by Extension Team members for funding efforts and/or preservation/conservation projects, acreage preserved, number of projects restored or under process, amount of grant funding/investment in historic preservation and natural areas conservation.

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Condition Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 3 | 16 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
There is a need to increase awareness that local and regional natural areas, historical sites and cultural features are important to the Tourism Economy and should continue to be identified and preserved.

**What has been done**
Developed Curriculum for Tourism Academy. Additional grant funding was obtained to deliver programming to increase awareness of participants to protect and conserve.

**Results**
16 students graduated from the Tourism Academy and additional grant funding has been received.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 134 | Outdoor Recreation |
| 605 | Natural Resource and Environmental Economics |
| 608 | Community Resource Planning and Development |

## Outcome #5

### 1. Outcome Measures

Residents and nonresidents view Extension-led byway regions as destinations. Achieved through - byway and wayfinding signage development and installation; design standards and distribution of regional byway signage logos; local, regional and national media stories placed; new products created to enhance the visitor experience. Measured by - Adoption of byway logos in local tourism promotional materials, observation, comments by local officials, number of requests for information, and/or surveys of byway visitors

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 3 | 2 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
Need to educate citizenry on the view that byway regions are destinations.

**What has been done**
Following a resource inventory and strategic planning process along the Lake Erie shore, a regional destination, a management organization was created and identified projects to improve the Lake Erie Tourism Economy. Lake Erie Coastal Ohio Trail national scenic byway is being coordinated by OSU Extension personnel. Staff members are working with advisory board, developing strategic actions.

**Results**
30 new volunteers participated and three multi-state partnerships were associated with this program. 2009 saw an increased adoption of byway logos by communities and increased requests for information.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 604 | Marketing and Distribution Practices |
| 605 | Natural Resource and Environmental 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.)
- Other (National Security Issues)

**Brief Explanation**

{No Data Entered}

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

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- Case Study
- Other (Qualitative, anecdotal, particip)

**Evaluation Results**

**Key Items of Evaluation**

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

**Program # 20**

**1. Name of the Planned Program**

Direct Marketing Program (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 |
|---|---|---|---|---|---|
| 604 | Marketing and Distribution Practices | 50% | | 50% | |
| 607 | Consumer Economics | 10% | | 10% | |
| 608 | Community Resource Planning and Development | 40% | | 40% | |
| | **Total** | 100% | | 100% | |

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

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

| Year: 2009 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 10.0 | 0.0 | 1.0 | 0.0 |
| Actual | 7.0 | 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** |
| 342909 | 0 | 0 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 342909 | 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 plan of work for the OSU Direct Marketing team includes developing a more in-depth stakeholder database and assessing priorities of these target audiences; developing and delivering educational programming in a variety of formats; engaging in outreach activities with media, consumer groups and a diverse group of organizations.

Activities include providing convenient educational programs; innovative tools and resources; reliable technical assistance; and applied research. Primary activities include an Annual Direct Marketing conference, educational resource development and applied research to identify and report the profile, priorities and impacts of direct marketing.

We build individual and community capacity through new tools, training, technical assistance and networking opportunities for target audiences. We raise the visibility and standing of direct marketing ventures through a series of research reports and branded communications that strengthen the farmer-consumer-market-community connection.We partner with the Ohio State University Extension Tourism Team to advance shared priorities.

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

Target audiences include 1) farmers, producers and other agripreneurs who are currently or not currently engaged in direct marketing; 2) facilitators, such as educators, farmers' market managers, food system organizers; government agencies, industry associations, travel and tourism groups, economic development professionals and community organizations; 3) media, consumer groups and other collaborators interested in advancing farmer-consumer-market-community connections.

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

**1. Standard output measures**

| 2009 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Plan** | 700 | 2000 | 0 | 0 |
| **Actual** | 3017 | 20000 | 0 | 0 |

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

Year: 2009
Plan: 0
Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2009 | Extension | Research | Total |
|---|---|---|---|
| **Plan** | 1 | 0 | |
| **Actual** | 10 | 0 | 0 |

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

**Output Target**

**Output #1**

**Output Measure**

- Output measures will be documented through event registration and evaluation forms; information request summaries; web statistics; media clips; and copies of research reports and educational resources. Milestones for specific activities are established and monitored through monthly team interaction. Evaluation methodology includes print and electronic quantitative surveys, as well as telephone and face-to-face interviews for qualitative evaluation.

| Year | Target | Actual |
|---|---|---|
| 2009 | 5 | 5 |

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

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | The primary long term outcome measure is the growth direct farm sales in Ohio as reported through the Census of Agriculture and other Direct Marketing team activities that provide insight into improved economic and social conditions. |
| 2 | increased awareness and knowledge of audiences engaged in the program; improved marketing practices of entrepreneurs; improved behavior that supports networking through agencies, associations and events; improved educational and promotional practices of educators and advocates. |
| 3 | increasing the connections between consumers-farmers-markets-communities. |

## Outcome #1

### 1. Outcome Measures

The primary long term outcome measure is the growth direct farm sales in Ohio as reported through the Census of Agriculture and other Direct Marketing team activities that provide insight into improved economic and social conditions.

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Condition Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 5 | 5 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
Ohio is one of the top ten state for direct to consumer sales according to the 2007 Census of Ag. By assisting farmers and other agripreneurs to retain a higher share of consumer expenditures, direct marketing has proved to be a profitable alternative.

**What has been done**
Development of a state wide network to deliver expertise.

**Results**
Direct Marketing website for communication and educational resources on various topics.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 604 | Marketing and Distribution Practices |

## Outcome #2

### 1. Outcome Measures

increased awareness and knowledge of audiences engaged in the program; improved marketing practices of entrepreneurs; improved behavior that supports networking through agencies, associations and events; improved educational and promotional practices of educators and advocates.

### 2. Associated Institution Types

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 150 | 5000 |

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

**Issue (Who cares and Why)**
While there is increasing demand for local and regional foods, connections in the food chain have limitations.

**What has been done**
Developed Ohio Market Maker

**Results**
The site generate 5000 unique users from throughout the state.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 604 | Marketing and Distribution Practices |
| 607 | Consumer Economics |
| 608 | Community Resource Planning and Development |

**Outcome #3**

**1. Outcome Measures**

increasing the connections between consumers-farmers-markets-communities.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 150 | 4385 |

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

**Issue (Who cares and Why)**
There is a need to help consumers connect better with local agricultural markets in communities throughout Ohio.

**What has been done**
Created Ohio Farmers Market Program. 342 hours of one-on one technical assistance have been provided to Ohio farmers' markets and their vendors/producer and 63 participants attended 6 training programs representing 18 existing farmers markets and 3 potential markers.

**Results**
Increased awareness and increase in Farmers Markets in Ohio by 50%

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 604 | Marketing and Distribution Practices |
| 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
- Populations changes (immigration, new cultural groupings, etc.)

**Brief Explanation**

{No Data Entered}

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

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- Case Study

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

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

**Program # 21**

**1. Name of the Planned Program**

Land Use (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% | | 100% | |
| | **Total** | 100% | | 100% | |

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

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

| Year: 2009 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 3.8 | 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** |
| 97974 | 0 | 0 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 97974 | 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**

Major educational areas of the Land Use Team

Land Use Tools

Sustainable Development

AEPP Program

Estate Planning

Farm Land Preservation

-Workshops

-Team and committee meetings

-Develop planning documents

-Develop curriculum modules

-Develop Fact sheets on land use issues

-Develop Course curriculum.

-Upgraded interactive website.

-Maintain existing partnerships with the elected and appointed public officials throughout the state.

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

Local appointed and elected public officials throughout Ohio. Citizens Planning Organizations. Extension Educators Extension personnel

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

**1. Standard output measures**

| 2009 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Plan** | 50 | 1800 | 0 | 0 |
| **Actual** | 0 | 0 | 0 | 0 |

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

Year: 2009
Plan: 0
Actual: {No Data Entered}

**Patents listed**
{No Data Entered}

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

**Number of Peer Reviewed Publications**

| 2009 | Extension | Research | Total |
|---|---|---|---|
| **Plan** | 0 | 0 | |
| **Actual** | {No Data Entered} | {No Data Entered} | 0 |

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

**Output Target**

**Output #1**

**Output Measure**

- # of participants at workshops

| Year | Target | Actual |
|---|---|---|
| 2009 | 150 | 1145 |

**Output #2**

**Output Measure**

- # of committee meetings

| Year | Target | Actual |
|---|---|---|
| 2009 | 20 | 33 |

**Output #3**

**Output Measure**

- # of planning documents produced

| Year | Target | Actual |
|---|---|---|
| 2009 | 2 | 2 |

**Output #4**

**Output Measure**

- # of curricula

| Year | Target | Actual |
|---|---|---|
| 2009 | 1 | 1 |

**Output #5**

**Output Measure**

- # of fact sheets

| Year | Target | Actual |
|---|---|---|
| 2009 | 1 | 0 |

**Output #6**

**Output Measure**

- # of hits on upgraded website

| Year | Target | Actual |
|---|---|---|
| 2009 | 10000 | 9872 |

## Output #7

### Output Measure

- Partnerships maintained/developed with officials

| Year | Target | Actual |
|---|---|---|
| 2009 | 4 | 4 |

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

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | Communities engaging in the development or update of a Land Use Plan. |
| 2 | Implementation of Policies by government officials related to land use |

## Outcome #1

### 1. Outcome Measures

Communities engaging in the development or update of a Land Use Plan.

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Action Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 4 | 3 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
Government leaders have indicated a need to provide education programming on Land Use Issues

**What has been done**
8 workshops were conducted , 1 fact sheet produced, 2 planning documents completed for communities

**Results**
100% of participants in workshops indicated knowledge gained in post assessment

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 608 | Community Resource Planning and Development |

## Outcome #2

### 1. Outcome Measures

Implementation of Policies by government officials related to land use

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Condition Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 2 | 2 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
The need exists throughout Ohio to address land use issues comprehensively. A majority of counties throughout the state do not have a current land use plan

**What has been done**
Work shops and training sessions have been provided.

**Results**
2 planning documents completed; 2 nearing completion

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 608 | Community Resource Planning and Development |

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

**External factors which affected outcomes**

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

**Brief Explanation**

{No Data Entered}

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

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- Time series (multiple points before and after program)
- Case Study

**Evaluation Results**

100 % of participants indicated knowledge gained.

## Key Items of Evaluation

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

**Program # 22**

### 1. Name of the Planned Program

Preparing Communities for the Knowledge Economy (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% | | 100% | |
| | **Total** | 100% | | 100% | |

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

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

| Year: 2009 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 10.0 | 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** |
| 48987 | 0 | 0 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 48987 | 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

Creation and delivery of programs and curriculum including:

Workshops

Web pages and related media

Capacity training

Customized educational programs

Community assessments

Employment skill training

Leadership skill development

Collaboration, networking and partnership tools

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

Targeted audiences include:

Local elected and appointed officials

Business leaders

Economic development professionals

Community residents

School officials and parents of school age children

Support service providers (banks, advisors)

Youth aged 13 - 17

Lower skilled/traditional workforce

Potential and existing entrepreneurs

Unemployed/underemployed

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

**1. Standard output measures**

| 2009 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Plan** | 600 | 3100 | 100 | 400 |
| **Actual** | 600 | 3000 | 100 | 400 |

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

Year: 2009
Plan: 0
Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2009 | Extension | Research | Total |
|---|---|---|---|
| Plan | 0 | 0 | |
| Actual | 0 | 0 | 0 |

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

**Output Target**

**Output #1**

**Output Measure**

- Local elected and appointed officials

| Year | Target | Actual |
|---|---|---|
| 2009 | 150 | 100 |

**Output #2**

**Output Measure**

- Business leaders

| Year | Target | Actual |
|---|---|---|
| 2009 | 75 | 75 |

**Output #3**

**Output Measure**

- Economic development professionals

| Year | Target | Actual |
|---|---|---|
| 2009 | 40 | 40 |

**Output #4**

**Output Measure**

- Community residents

| Year | Target | Actual |
|---|---|---|
| 2009 | 2000 | 1000 |

**Output #5**

**Output Measure**

- Support service providers (banks, advisors)

| Year | Target | Actual |
|---|---|---|
| 2009 | 75 | 300 |

**Output #6**

**Output Measure**

- Youth aged 13 - 17

| Year | Target | Actual |
|---|---|---|
| 2009 | 90 | 100 |

**Output #7**

**Output Measure**

- Lower skilled/traditional workforce

| Year | Target | Actual |
|---|---|---|
| 2009 | 200 | 200 |

**Output #8**

**Output Measure**

- Potential and existing entrepreneurs

| Year | Target | Actual |
|---|---|---|
| 2009 | 50 | 100 |

**Output #9**

**Output Measure**

- Unemployed/underemployed

| Year | Target | Actual |
|---|---|---|
| 2009 | 80 | 100 |

**Output #10**

**Output Measure**

- number of communities reached

| Year | Target | Actual |
|---|---|---|
| 2009 | 8 | 4 |

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

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | -number of participants with a greater understanding of the knowledge economy |
| 2 | -development of networks of professionals to support knowledge economy initiatives |

## Outcome #1

### 1. Outcome Measures

-number of participants with a greater understanding of the knowledge economy

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 200 | 600 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
The Ohio Economy is transitioning from a traditional heavy industrial based economy to an economy that requires more skills education and training to succeed.

**What has been done**
Three new networks have been created, One new curriculum has been developed and five programs have been delivered.

**Results**
600 participants in programs have become aware of the knowledge economy issue.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 608 | Community Resource Planning and Development |

## Outcome #2

### 1. Outcome Measures

-development of networks of professionals to support knowledge economy initiatives

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Action Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 65 | 200 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
Because of the need to gain knowledge related to the transitioning economy people can increase awareness quickly by utilizing available networking opportunities.

**What has been done**
Two new networking opportunities have been created in the state.

**Results**
One new industry located in northwest Ohio and one new industry located in Northeast Ohio as a result of networking around available resources.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 608 | Community Resource Planning and Development |

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

**External factors which affected outcomes**

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

**Brief Explanation**

{No Data Entered}

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

1. Evaluation Studies Planned

- Retrospective (post program)
- During (during program)
- Time series (multiple points before and after program)

**Evaluation Results**

{No Data Entered}

### Key Items of Evaluation

{No Data Entered}

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

**Program # 23**

**1. Name of the Planned Program**

Community Based Watershed Program (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 | 100% | | 100% | |
| | **Total** | 100% | | 100% | |

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

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

| Year: 2009 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 6.5 | 0.0 | 0.0 | 0.0 |
| Actual | 7.0 | 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** |
| 342909 | 0 | 0 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 342909 | 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**

**Ohio Watershed Academy (OWA)**

Conduct OWA (annual 4 month distance education course)

Conduct face-to-face meetings (three face to face meetings per course)

Develop modules and manual (on-line modules and manual updated annually)

Market program

Evaluations (one summative, one formative and on-going on-line evaluations annually)

Update website (GIS, land use, and project implementation modules to be added in 2006)

**Ohio Watershed Leaders (OWLs)**

Coordinate overnight facilities, guest speakers and facilitators

Conduct multi-agency program planning meetings

Market program

Develop and conduct evaluation (one summative evaluation)

**Ohio Certified Volunteer Naturalist (OCVN)**

Develop OCVN manual

Conduct OCVN trainings for potential volunteers

Develop marketing materials

Develop website

Develop and conduct evaluations

Organize and coordinate volunteers

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

**Ohio Watershed Academy**

Watershed group leaders

Graduate and undergraduate students

Natural Resource Professionals

Local public officials

Watershed group volunteers

**Ohio Watershed Leaders**

Watershed coordinators

Nonprofit coordinators

Natural resource professionals

Watershed group volunteers

**Ohio Certified Volunteer Naturalists**

Youth

Retirees

Park and natural area volunteers

Home and garden club members

Volunteers from various environmental organizations (e.g., watershed groups, land trusts)

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

**1. Standard output measures**

| 2009 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Plan** | 115 | 0 | 20 | 0 |
| **Actual** | 115 | 0 | 20 | 0 |

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

Year: 2009
Plan: 0
Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2009 | Extension | Research | Total |
|---|---|---|---|
| **Plan** | 0 | 0 | |
| **Actual** | 1 | 0 | 0 |

### V(F). State Defined Outputs

**Output Target**

**Output #1**

**Output Measure**

- Ohio Watershed Academy Number of Ohio Watershed Academy classes offered Number of manuals distributed Number of face-to-face meetings Number of promotional materials distributed Number of watershed plans Academy participants complete Number of on-line modules developed Number of guest instructors

| Year | Target | Actual |
|---|---|---|
| 2009 | 1 | 1 |

## Output #2

### Output Measure

- Ohio Watershed Leaders Number of workshops Number of materials distributed Number of workshop participants

| Year | Target | Actual |
|---|---|---|
| 2009 | 1 | 1 |

## Output #3

### Output Measure

- Ohio Certified Volunteer Naturalists Number of trainingsNumber of agency partners collaborating Number of manuals distributed Number of certified and trained volunteers Number of chapters formed Number of volunteer service hours completed

| Year | Target | Actual |
|---|---|---|
| 2009 | 15 | 15 |

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

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | Ohio Watershed Academy Short Term Percentage of participant incremental increase in self reported knowledge assessment scores (offered pre and post Academy training) Percentage of participants expanding knowledge and skills in watershed planning and professional networks (self reported) |
| 2 | Ohio Watershed Academy Medium Term Percentage of participants implementing specific skills (e.g., stakeholder involvement, evaluation and/or outreach strategies) Percentage of participants taking on new leadership roles in watershed management |
| 3 | Ohio Watershed Academy Long term Improved watershed health (e.g., changes in water and habitat quality) Improved community and capacity for watershed protection in participant groups or organizations (percentage funding increase, new protection policies) Improved group organizational capacity (e.g., number of members, strategic plans created) |
| 4 | Ohio Watershed Leaders (OWLs) short term Percentage of participants increasing professional networks Percentage of participants increasing knowledge and skills |
| 5 | Ohio Watershed Leaders (OWLs) Medium term Percentage of participants cooperating or collaborating as a result of participation at OWLs Number of new partnerships or collaborations Percentage of participants implementing a new idea or skill gained from OWLs |
| 6 | Ohio Watershed Leaders (OWLs) long term Dollars saved or generated as a result of new partnerships and/or collaborations |
| 7 | Ohio Certified Volunteer Naturalists (OCVN) Short term Percentage of participants gaining knowledge and skills in local ecology, ecological systems, data collection, conservation, and interpretation Incremental increase in organizational capacity due to OCVN contributions (e.g., number of hours of interpretation offered, number of visitors reached) |
| 8 | Ohio Certified Volunteer Naturalists (OCVN) medium Percentage of participants applying conservation practices Percentage of participants involved in long-term monitoring and/or educational programs Percentage of OCVN volunteers participating in community service efforts beyond required service Percentage of OCVN who take on leadership roles (e.g., serve on the boards of directors of organizations serving the community and/or leading community events) |
| 9 | Ohio Certified Volunteer Naturalists (OCVN) long term Increases in ecosystem quality (as measured with test-kit and monitoring protocols) Increases in environmental services (e.g., acres of green space and/or protected areas, number of easements) |

## Outcome #1

### 1. Outcome Measures

Ohio Watershed Academy Short Term Percentage of participant incremental increase in self reported knowledge assessment scores (offered pre and post Academy training) Percentage of participants expanding knowledge and skills in watershed planning and professional networks (self reported)

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 80 | 80 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
Ohio Environmental Protection Agency and Ohio Department of Natural Resources rely heavily on local watershed group leaders to develop and implement watershed action plans. Students in the Ohio Watershed Academy are leading those planning efforts.

**What has been done**
Ohio Watershed Academy course was completed.

**Results**
Course evaluations indicate that 80% of students had self-reported increase in knowledge and awareness of watershed management processes. 70% indicated that they felt better prepared to lead watershed protection efforts.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 112 | Watershed Protection and Management |

## Outcome #2

### 1. Outcome Measures

Ohio Watershed Academy Medium Term Percentage of participants implementing specific skills (e.g., stakeholder involvement, evaluation and/or outreach strategies) Percentage of participants taking on new leadership roles in watershed management

### 2. Associated Institution Types

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 80 | 70 |

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

**Issue (Who cares and Why)**
Ohio Environmental Protection Agency and Ohio Department of Natural Resources rely heavily on local watershed group leaders to develop and implement watershed action plans. Students in the Ohio Watershed Academy are leading those planning efforts.

**What has been done**
Ohio Watershed Academy course was completed.

**Results**
Graduates of the Academy indicated that they had gained knowledge and skills in many areas related to watershed management, including stakeholder involvement.
Over 70% of graduates reported significant increase in knowledge and skills in stakeholder involvement.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 112 | Watershed Protection and Management |

**Outcome #3**

**1. Outcome Measures**

Ohio Watershed Academy Long term Improved watershed health (e.g., changes in water and habitat quality) Improved community and capacity for watershed protection in participant groups or organizations (percentage funding increase, new protection policies) Improved group organizational capacity (e.g., number of members, strategic plans created)

Not Reporting on this Outcome Measure

**Outcome #4**

**1. Outcome Measures**

Ohio Watershed Leaders (OWLs) short term Percentage of participants increasing professional networks Percentage of participants increasing knowledge and skills

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 80 | 80 |

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

**Issue (Who cares and Why)**
Ohio Environmental Protection Agency and Ohio Department of Natural Resources rely heavily on local watershed group leaders to develop and implement watershed action plans. Students in the Ohio Watershed Academy are leading those planning efforts.

**What has been done**
Ohio Watershed Leaders workshop was completed.

**Results**
Participants indicated they increased their professional networks and knowledge/skills related to watershed protection. More than 50% of participants indicated they made a professional contact. Over 80% indicated they had substantial knowledge gain in some area of watershed management.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 112 | Watershed Protection and Management |

**Outcome #5**

**1. Outcome Measures**

Ohio Watershed Leaders (OWLs) Medium term Percentage of participants cooperating or collaborating as a result of participation at OWLs Number of new partnerships or collaborations Percentage of participants implementing a new idea or skill gained from OWLs

Not Reporting on this Outcome Measure

**Outcome #6**

**1. Outcome Measures**

Ohio Watershed Leaders (OWLs) long term Dollars saved or generated as a result of new partnerships and/or collaborations

Not Reporting on this Outcome Measure

**Outcome #7**

1. **Outcome Measures**

Ohio Certified Volunteer Naturalists (OCVN) Short term Percentage of participants gaining knowledge and skills in local ecology, ecological systems, data collection, conservation, and interpretation Incremental increase in organizational capacity due to OCVN contributions (e.g., number of hours of interpretation offered, number of visitors reached)

Not Reporting on this Outcome Measure

**Outcome #8**

1. **Outcome Measures**

Ohio Certified Volunteer Naturalists (OCVN) medium Percentage of participants applying conservation practices Percentage of participants involved in long-term monitoring and/or educational programs Percentage of OCVN volunteers participating in community service efforts beyond required service Percentage of OCVN who take on leadership roles (e.g., serve on the boards of directors of organizations serving the community and/or leading community events)

Not Reporting on this Outcome Measure

**Outcome #9**

1. **Outcome Measures**

Ohio Certified Volunteer Naturalists (OCVN) long term Increases in ecosystem quality (as measured with test-kit and monitoring protocols) Increases in environmental services (e.g., acres of green space and/or protected areas, number of easements)

Not Reporting on this Outcome Measure

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

**External factors which affected outcomes**

- Economy
- Appropriations changes

**Brief Explanation**

Two Watershed Educator positions were eliminated due to reductions in the state budget. Many county educator positions were eliminated, which affected the Ohio Certified Volunteer Naturalist program. In some cases, local OCVN programs were eliminated.

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

1. Evaluation Studies Planned

- After Only (post program)
- Before-After (before and after program)
- During (during program)
- Case Study

### Evaluation Results

{No Data Entered}

### Key Items of Evaluation

{No Data Entered}

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

**Program # 24**

**1. Name of the Planned Program**

Youth Food Producing Animal Quality Assurance (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 |
|---|---|---|---|---|---|
| 306 | Environmental Stress in Animals | 10% | | 10% | |
| 307 | Animal Management Systems | 5% | | 5% | |
| 308 | Improved Animal Products (Before Harvest) | 5% | | 5% | |
| 315 | Animal Welfare/Well-Being and Protection | 10% | | 10% | |
| 711 | Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources | 10% | | 10% | |
| 723 | Hazards to Human Health and Safety | 10% | | 10% | |
| 806 | Youth Development | 50% | | 50% | |
| | **Total** | 100% | | 100% | |

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

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

| Year: 2009 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 15.0 | 0.0 | 0.0 | 0.0 |
| Actual | 25.0 | 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** |
| 1224674 | 0 | 0 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 1224674 | 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**

1. Extension Education: Development of Ohio's "Youth Food Animal Quality Assurance Curriculum Guide" (YFAQACG) including 12 chapters (Animal Welfare and Ethics, Food Safety, and the 10 Good Production Practices recognized by the Animal

Industry), power-point presentation style notes and 22 hands-on experiential learning activities complimenting the important information that youth need to learn about animal production and food safety.

2. Volunteer Training: Yearly Quality Assurance (QA) in-service for 4-H extension educators and volunteers who will be instrumental in delivering quality assurance programming in Ohio at the county, club and species clinic level. This will serve to train the educator for QA programming state wide making each individual county, club or species clinic training session consistent from program to program.

3. Youth Training: County, club and species clinics will be used to educate youth exhibitors reaching 56,500 youth and their parents involved in youth food producing animal projects in Ohio.

4. Youth Evaluation: In 2007 a test out option was introduced into the Ohio State QA program.This option allows students which truly comprehend the information they have been taught to test out for up to a three year period at the county level.

5. All can use as reference: Further information will be posted in electronic form on the 4-H animal sciences website and will include updates to the YFAQACG.

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

**Activity 1 and 5:** "Educating the Educator" training portion of QA programming will be directed toward Extension Educators (n=100) that will be in a leadership role for the purpose of delivering QA sessions at the County, Club and Species Clinic Level. This will be a face to face training and Extension Educators will be able to interact with authors of the curriculum piece (YFAQACG).

**Activity 2 and 5:** Extension Educators will serve in the capacity of training volunteers (n=1500) that will deliver QA material to Youth at the county, club and species clinic level. These too will be face to face sessions that will allow for interaction with those teaching QA to Youth.

**Activity 3 and 5:** Volunteers at the county, club and species clinic level will deliver QA material to Youth (n=56,500) and any attending parents in Ohio

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

**1. Standard output measures**

| 2009 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Plan** | 1600 | 25000 | 56500 | 56500 |
| **Actual** | 1483 | 25000 | 69025 | 69025 |

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

Year: 2009
Plan: 0
Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2009 | Extension | Research | Total |
|---|---|---|---|
| Plan | 0 | 0 | |
| Actual | 0 | 0 | 0 |

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

**Output Target**

**Output #1**

**Output Measure**

- Communicate with Extension Educators yearly during the in-service/updates to determine if we are meeting their need for curriculum and use of the curriculum through yearly training. (track # of participants and # of sessions and topics discussed)

| Year | Target | Actual |
|---|---|---|
| 2009 | 80 | 65 |

**Output #2**

**Output Measure**

- Survey volunteers through extension educators to determine if YFAQACG is an effective tool in conducting QA programming at county, club and species clinic level

| Year | Target | Actual |
|---|---|---|
| 2009 | 150 | 223 |

**Output #3**

**Output Measure**

- Survey youth (n=56,500) participating in QA programming to determine if the program is meeting the needs of youth exhibitors maintaining the content standards that we have set for the curriculum and increasing the hands-on experiential activities as mode of delivery to youth.

| Year | Target | Actual |
|---|---|---|
| 2009 | 2500 | 1000 |

**Output #4**

**Output Measure**

- All can use as reference: Further information will be posted in electronic form on the 4-H animal sciences website and will include updates to the YFAQACG (track visits to website)

| Year | Target | Actual |
|---|---|---|
| 2009 | 5000 | 3788 |

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

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | (Activity 3) To determine the effectiveness of QA programming, there will be a Pre- and post-test set administered for determining the comprehension of youth in QA principles. This will determine the effectiveness of the information listed in the YFAQACG and the implementation of the minimum standards delivered to 56,500 yearly in Ohio. |
| 2 | (Activity 3) To determine the effectiveness of QA programming, there will be a Pre- and post-test administered to the parents of youth exhibitors who attend QA sessions for determining comprehension of QA principles being taught using the YFAQACG and the minimum standards. |
| 3 | (Activity 1 and 2) Yearly QA in-service evaluations will be administered to extension professionals and volunteers that will be teaching QA to determine the efficiency of educational materials offered to teach youth in QA. |
| 4 | (Activity 1, 2, and 3) Tracking the incidence of drug residues in fair animals intended for food - Comprehension of QA principles will lead to a better understanding and a subsequent reduction in the amount type and degree of drug residue detected and subsequent retained and then condemned from human consumption. |
| 5 | (Activity 1, 2, and 3) Administer packer surveys to determine if an improvement in product quality post-QA education has been noticed by the commercial packing industry. |
| 6 | (Activity 1, 2, and 3) Survey producers that began their education in QA programming as a youth exhibitor and determine the impact that has had on there production practice today. Further compare and contrast their efforts with those producers who did not learn about QA from a youth based extension program. |
| 7 | (Activity 1, 2, and 3) Assuring that youth comprehend QA principles will increase the number of Livestock producers in the future that will be assuring consumers that they are receiving a safe wholesome product from the food producing animal industry. |

## Outcome #1

### 1. Outcome Measures

(Activity 3) To determine the effectiveness of QA programming, there will be a Pre- and post-test set administered for determining the comprehension of youth in QA principles. This will determine the effectiveness of the information listed in the YFAQACG and the implementation of the minimum standards delivered to 56,500 yearly in Ohio.

Not Reporting on this Outcome Measure

## Outcome #2

### 1. Outcome Measures

(Activity 3) To determine the effectiveness of QA programming, there will be a Pre- and post-test administered to the parents of youth exhibitors who attend QA sessions for determining comprehension of QA principles being taught using the YFAQACG and the minimum standards.

Not Reporting on this Outcome Measure

## Outcome #3

### 1. Outcome Measures

(Activity 1 and 2) Yearly QA in-service evaluations will be administered to extension professionals and volunteers that will be teaching QA to determine the efficiency of educational materials offered to teach youth in QA.

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Action Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 50 | 123 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
Educators have been looking for new ways to educate youth as well as a helping hand in areas that they are unfamiliar with. Each year we hold an educator in-service training that will give educators the tools they need to educate youth and volunteers in the county.

**What has been done**
We have taken the survey information and utilize that in order to put together a useful hands-on in-service with curriculum pieces that educators can use in order to put on programs in their counties.

**Results**
The result is a starting point for further curriculum development within the county. As well there is a certain level of consistency with in the state of Ohio from one county to the next. As a result youth in Ohio are regardless from which county they reside are hearing the same message.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 306 | Environmental Stress in Animals |
| 307 | Animal Management Systems |
| 308 | Improved Animal Products (Before Harvest) |
| 315 | Animal Welfare/Well-Being and Protection |
| 711 | Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources |
| 723 | Hazards to Human Health and Safety |
| 806 | Youth Development |

**Outcome #4**

**1. Outcome Measures**

(Activity 1, 2, and 3) Tracking the incidence of drug residues in fair animals intended for food - Comprehension of QA principles will lead to a better understanding and a subsequent reduction in the amount type and degree of drug residue detected and subsequent retained and then condemned from human consumption.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 12 | 2 |

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

**Issue (Who cares and Why)**
Drug residues in the food supply may have an impact on human health. The State of Ohio has been checking animals randomly as well as any fair champion to determine the rate of violation. Some drugs or unnatural or unacceptable practices may put consumers at risk.

**What has been done**
As a result of concerns drug testing is being conducted by the Ohio Department of Agriculture on all food producing animal champions and then a certain percentage of random animals. These tests are expense but the state government sees a benefit in regard to consumer safety. Further with the educational materials that have been produced, they have been completed with sound scientific information.

**Results**
The results of this awareness, the partnership between the state government, and the QA educational program have resulted in 2 positive drug residue tests in 2009 and 0 in 2008 where as in 2007 there were 12 positives. There has been a reduction in the amount of drug residue detected since the inception of this program in Ohio.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|

| | |
|---|---|
| 307 | Animal Management Systems |
| 308 | Improved Animal Products (Before Harvest) |
| 711 | Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources |
| 723 | Hazards to Human Health and Safety |
| 806 | Youth Development |

**Outcome #5**

**1. Outcome Measures**

(Activity 1, 2, and 3) Administer packer surveys to determine if an improvement in product quality post-QA education has been noticed by the commercial packing industry.

Not Reporting on this Outcome Measure

**Outcome #6**

**1. Outcome Measures**

(Activity 1, 2, and 3) Survey producers that began their education in QA programming as a youth exhibitor and determine the impact that has had on there production practice today. Further compare and contrast their efforts with those producers who did not learn about QA from a youth based extension program.

Not Reporting on this Outcome Measure

**Outcome #7**

**1. Outcome Measures**

(Activity 1, 2, and 3) Assuring that youth comprehend QA principles will increase the number of Livestock producers in the future that will be assuring consumers that they are receiving a safe wholesome product from the food producing animal industry.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 200 | 1105 |

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

**Issue (Who cares and Why)**
The consuming public is becoming increasingly more inquisitive about their food supply.

**What has been done**

By setting up opportunities for youth participate in knowledge based hands-on learning experiences in the form of State Fair Skill-a-thons, we expose the youth to an array of items that we think will challenge them yet also inspire them to learn. Further, the more times they do this they will continue increase there knowledge base and learning of sound scientific information.

**Results**
The result is clear youth seem do the best at the station that deals with food and animal safety. They understand and will take what they have learned and begin to build their knowledge base further.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 307 | Animal Management Systems |
| 315 | Animal Welfare/Well-Being and Protection |
| 806 | Youth Development |

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

**External factors which affected outcomes**
- Government Regulations

**Brief Explanation**

{No Data Entered}

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

1. Evaluation Studies Planned

- After Only (post program)

**Evaluation Results**

[1] The survey was sent to 91 potential respondents on September 22, 2009. By the survey close on October 7, 2009, there was a 76% response. Although this response rate is good, it is a bit disappointing for such a "hot topic"; however, it is high enough to extrapolate results to all 88 counties.

[2] Extension Educators assume the lead for Quality Assurance (QA) programs in 93% of counties; Fair Boards assume the lead for QA programs in 7% of counties; and High School Agricultural Educators do not assume the lead for QA program anywhere

[3] QA is mostly an Extension function instead of Fair Boards or High School Agricultural Educators; Of all the roles related to QA, the only role that Extension Educators do not lead in is, "Establishing local rules", but even in this, half the county respondents indicated they had a role in this.

[4] Summary of descriptives:
- 38,000 youth attend QA programs annually (extrapolated to 88 counties; 430+ per county average)
- 3/4 of counties allow QA participants to go to another county
- Almost all have at least one county-wide QA training
- About 20% have an option to deliver QA programs through local 4-H clubs
- 2/3 of counties require youth only to attend QA programs; 1/3 require youth and one parent
- 2/3 of counties allow the QA test out option

[5] Only 10 counties charge for out-of-county QA participants; Only 7 counties charge for in-county participants (mostly for "last chance" sessions)

[6] Options described for QA Test Out options included:

- Schedule BEFORE trainings, so that those who do not pass can still attend a training to meet qualifications
- High School Agricultural Educators and Extension Educators gave QA Tests by appointment
- Times were scheduled at local schools during study halls or lunch hours for QA Test Out option
- Scheduled at the end of a QA group training session, so that if the participant failed the test, s/he was still qualified that year
- Only used the QA Test Out option for those 15+, because it was easier to track

[7] QA Instructors - Average of 5.9 per county with a range of zero to 39: Percentage of counties reported the following people taught at QA sessions:

- 81% 4-H Educators
- 39% ANR Educators
- 27% Extension Program Assistants or Program Coordinators
- 46% Vo-Ag teachers
- 49% 4-H Advisors
- 13% Fair Board Members
- 18% Veterinarians

[8] When asked who deals with QA non-compliance issues, percentage of counties reported the following:

- 68% Fair Board
- 62% Extension staff
- 14% Junior Fair Committee
- 10% Junior Fair Board

[9] When asked how likely QA processes would happen in 2010:

- 69% of counties reported would likely not change
- 80% of counties reported would likely cooperate with multi-county QA programming
- 71% of counties likely to host a multi-county QA training on an annual basis
- 88% of counties likely to take their turn to host a multi-county QA training

[10] Major obstacles to overcome before changes in QA program delivery can overcome:

- Large number of youth participants
- History/ Attitudes/ Resistance to change
- Travel
- Fair Board ownership/ Must cooperate for a change
- Certification of more instructors
- Need for more uniform requirements from county to county

[11] Other Comments made most often:

- Develop web-based alternative that includes a test-out option
- Update/ expand resources and lesson plans
- Charge for the program
- Need more consistency across the state

[12] Other Ideas and Insights by Archer as a result of reviewing the results of this survey:

- If develop web-based options for completion of QA requirements, how to insure that it is the youth who complete?
- How about making QA more of an ANR Educator responsibility, or at least, incorporate ANR Educators more?

- If increase the number of youth completing the test out option, this would reduce the number of youth who would need to be serviced through group trainings.

**Key Items of Evaluation**

When asked how likely Quality Assurance processes would happen in 2010:

- 69% of counties reported would likely not change
- 80% of counties reported would likely cooperate with multi-county QA programming
- 71% of counties likely to host a multi-county QA training on an annual basis
- 88% of counties likely to take their turn to host a multi-county QA training

Major obstacles to overcome before changes in Quality Assurance program delivery can overcome:

- Large number of youth participants
- History/ Attitudes/ Resistance to change
- Travel
- Fair Board ownership/ Must cooperate for a change
- Certification of more instructors

- Need for more uniform requirements from county to county

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

**Program # 25**

**1. Name of the Planned Program**

Greenhouse and Floriculture Systems and Marketing (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 | 15% | | 15% | |
| 201 | Plant Genome, Genetics, and Genetic Mechanisms | 10% | | 10% | |
| 202 | Plant Genetic Resources | 5% | | 5% | |
| 203 | Plant Biological Efficiency and Abiotic Stresses Affecting Plants | 5% | | 5% | |
| 204 | Plant Product Quality and Utility (Preharvest) | 10% | | 10% | |
| 211 | Insects, Mites, and Other Arthropods Affecting Plants | 10% | | 10% | |
| 212 | Pathogens and Nematodes Affecting Plants | 15% | | 15% | |
| 215 | Biological Control of Pests Affecting Plants | 10% | | 10% | |
| 216 | Integrated Pest Management Systems | 15% | | 15% | |
| 403 | Waste Disposal, Recycling, and Reuse | 5% | | 5% | |
| | **Total** | 100% | | 100% | |

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

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

| Year: 2009 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 6.0 | 0.0 | 2.2 | 0.0 |
| Actual | 8.0 | 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** |
| 391896 | 0 | 0 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 391896 | 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 floriculture team will conduct workshops, regional and state-wide seminars and presentations, greenhouse extension tours; develop fact sheets, web based educational materials, curriculum and other educational tools; partner within and outside OSU. Continue partnership with the Ohio greenhouse industry through OFA, An Association of Floriculture Professionals, and Extension personnel from other states such as Michigan and Illinois.

The team will also engage in interdisciplinary research projects that would develop new ideas using funds from local, regional and national agencies. These research projects will produce some of the information we will make available for our stakeholders.

### 2. Brief description of the target audience

Our target audience is comprised of greenhouse and garden center owners, managers, growers, pesticide applicators, industry representatives, and product manufacturers, consumers, and students.

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

### 1. Standard output measures

| 2009 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| Plan | 475 | 169000 | 120 | 0 |
| Actual | 485 | 129621 | 16 | 0 |

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

**Patent Applications Submitted**

Year: 2009
Plan: 0
Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2009 | Extension | Research | Total |
|---|---|---|---|
| Plan | 0 | 0 | |
| Actual | 0 | 0 | 0 |

## V(F). State Defined Outputs

**Output Target**

**Output #1**

**Output Measure**

- Visit at least 125 growers each year across the State

| Year | Target | Actual |
|---|---|---|
| 2009 | 125 | 55 |

**Output #2**

**Output Measure**

- Reach up to 400 growers through talks and workshops

| Year | Target | Actual |
|---|---|---|
| 2009 | 375 | 460 |

**Output #3**

**Output Measure**

- Reach at least 500 growers through Annuals and Mixed Container Trials tours and visits

| Year | Target | Actual |
|---|---|---|
| 2009 | 500 | 480 |

**Output #4**

**Output Measure**

- Reach at least 160,000 visitors through the internet and web-based training

| Year | Target | Actual |
|---|---|---|
| 2009 | 160000 | 120000 |

**Output #5**

**Output Measure**

- Develop new greenhouse related fact sheets. The team will also revise existing disease and insect ornamental fact sheets. Topics for new facts sheets include ethylene in greenhouses, organic greenhouse production, building a hobby greenhouse, etc.

| Year | Target | Actual |
|---|---|---|
| 2009 | 4 | 2 |

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

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | Increase knowledge, skills and aspirations of greenhouse producers in Ohio. These goals will be evaluated by making personal interviews with growers, focus groups, and observations of Extension personnel on grower's production practices. |
| 2 | Change the way greenhouse businesses currently operate to adopt research-based information to improve efficiency of production, increase worker safety, decrease environmental pollution. Evaluation will be done as described for short-term outcomes plus statistics at the State and Federal levels. |

## Outcome #1

### 1. Outcome Measures

Increase knowledge, skills and aspirations of greenhouse producers in Ohio. These goals will be evaluated by making personal interviews with growers, focus groups, and observations of Extension personnel on grower's production practices.

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 325 | 330 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
Greenhouse growers have to produce almost perfect plants because consumers look for beauty. This represents a challenge for the industry that has to satisfy their clients and at the same time do it in a sustainable and environment friendly way. Greenhouse producers and employees are in need of educational materials and programs that increase their knowledge of cultural practices that lead to the implementation of research-based techniques that improve their cultural and pest management skills. As part of an effective integrated pest management (IPM) program, growers must be good stewards of available chemicals and properly rotate between similar active ingredients to ensure against selection for resistant pests and diseases. At the same time, growers need to be aware of the new fertilization techniques that allow them to reduce the levels of nutrients in the leachates of their crops. Growers need also to be aware of the importance of disinfectants practices and the efficacy and advantages/disadvantages of various products.

**What has been done**
In cooperation with regional and state-wide industry associations, the greenhouse extension team personally visited over 150 greenhouse operations in Ohio and reached nearly 485 individuals through workshops, tours and other programs specifically geared for producers. Educational programs and materials focused on how to properly rotate fungicides and insecticides, use of disinfectants, alternative fertilizer methods, improving energy efficiency of greenhouses, and how to detect and avoid ethylene contamination in the greenhouse.

**Results**
In cooperation with regional and state-wide industry associations, the greenhouse extension team personally visited over 150 greenhouse operations in Ohio and reached nearly 485 individuals through workshops, tours and other programs specifically geared for producers. Educational programs and materials focused on how to properly rotate fungicides and insecticides, use of disinfectants, alternative fertilizer methods, improving energy efficiency of greenhouses, and how to detect and avoid ethylene contamination in the greenhouse.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 102 | Soil, Plant, Water, Nutrient Relationships |
| 201 | Plant Genome, Genetics, and Genetic Mechanisms |

| | |
|---|---|
| 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 |
| 215 | Biological Control of Pests Affecting Plants |
| 216 | Integrated Pest Management Systems |
| 403 | Waste Disposal, Recycling, and Reuse |

**Outcome #2**

**1. Outcome Measures**

Change the way greenhouse businesses currently operate to adopt research-based information to improve efficiency of production, increase worker safety, decrease environmental pollution. Evaluation will be done as described for short-term outcomes plus statistics at the State and Federal levels.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 165 | 165 |

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

**Issue (Who cares and Why)**
Greenhouse producers are limited in the availability of effective chemical control products for common pests of vegetable and ornamental crops. Additionally, the production of herbaceous plant material requires sound sanitation practices to minimize losses due to pathogens yet there is little published research that compares the efficacy of disinfectants against common greenhouse pathogens, thus making it difficult to make recommendations to growers. In addition, growers are under pressure (even from consumers) to grow plants in a more sustainable manner. Reducing the amount of nutrients that are leached into the environment has become a priority.

**What has been done**
Chemistries that are effective against thrips were tested. Data with disinfectants to control Tobacco mosaic virus on tools was presented at several national conferences, multiple local meetings and publication of results in trade and peer-reviewed publications. Similarly, research-based results on how to use controlled release fertilizers on bedding plants were presented to growers, and a trade magazine article was written.

**Results**
Through various presentations given at Extension meetings, growers visits, and pesticide certification conferences, research-based cultural practices such as new pesticide rotations, the use of disinfectants to avoid the spread of viruses, and the use of controlled release fertilizers to reduce nutrient losses were adopted buy some growers who act in the community as leaders. These growers are spear-heading the use of new techniques that will represent savings for their business and a better environment.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 102 | Soil, Plant, Water, Nutrient Relationships |
| 201 | Plant Genome, Genetics, and Genetic Mechanisms |
| 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 |
| 215 | Biological Control of Pests Affecting Plants |
| 216 | Integrated Pest Management Systems |
| 403 | Waste Disposal, Recycling, and Reuse |

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

**External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Government Regulations
- Populations changes (immigration, new cultural groupings, etc.)

**Brief Explanation**

{No Data Entered}

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

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals, group, organizations) and non-participants

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

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

**Program # 26**

**1. Name of the Planned Program**

Agronomic Crop Management and Certified Crop Advisor (Extension)

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

1. Program Knowledge Areas and Percentage

| KA Code | Knowledge Area | %1862 Extension | %1890 Extension | %1862 Research | %1890 Research |
|---|---|---|---|---|---|
| 102 | Soil, Plant, Water, Nutrient Relationships | 10% | | 10% | |
| 133 | Pollution Prevention and Mitigation | 5% | | 5% | |
| 204 | Plant Product Quality and Utility (Preharvest) | 5% | | 5% | |
| 205 | Plant Management Systems | 20% | | 20% | |
| 211 | Insects, Mites, and Other Arthropods Affecting Plants | 15% | | 15% | |
| 212 | Pathogens and Nematodes Affecting Plants | 13% | | 13% | |
| 213 | Weeds Affecting Plants | 20% | | 20% | |
| 402 | Engineering Systems and Equipment | 7% | | 7% | |
| 601 | Economics of Agricultural Production and Farm Management | 5% | | 5% | |
| | **Total** | 100% | | 100% | |

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

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

| Year: 2009 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 17.0 | 0.0 | 0.0 | 0.0 |
| Actual | 14.0 | 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** |
| 685818 | 0 | 0 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 685818 | 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**

Crop Observation and Recommendation Network Newsletter

Crop Production Conference

Certified Crop Advisor College

FSR Certified Crop Advisor

Conservation Tillage 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**

| 2009 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| Plan | 5000 | 40000 | 0 | 1000 |
| Actual | 7267 | 174000 | 0 | 1250 |

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

Year: 2009
Plan: 0
Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2009 | Extension | Research | Total |
|---|---|---|---|
| Plan | 1 | 0 | |
| Actual | 1 | 0 | 0 |

**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 | Target | Actual |
|---|---|---|
| 2009 | 5000 | 6475 |

**Output #2**

**Output Measure**

- One Crop Production Conference which provides updated training for ag industry and CCA reaching 200.

| Year | Target | Actual |
|---|---|---|
| 2009 | 200 | 185 |

**Output #3**

**Output Measure**

- One Certified Crop Advisor (CCA) College which provides updated training for ag industry and CCA reaching 140.

| Year | Target | Actual |
|---|---|---|

| | | |
|---|---|---|
| 2009 | 120 | 115 |

**Output #4**

**Output Measure**

- One Farm Science Review (FSR) Certified Crop Advisor which provides updated training for ag industry and CCA reaching 35

| Year | Target | Actual |
|---|---|---|
| 2009 | 35 | 40 |

**Output #5**

**Output Measure**

- One Conservation Tillage Conference which provides updated training for ag industry and CCA reaching 600.

| Year | Target | Actual |
|---|---|---|
| 2009 | 600 | 890 |

**Output #6**

**Output Measure**

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

| Year | Target | Actual |
|---|---|---|
| 2009 | 2500 | 3280 |

**Output #7**

**Output Measure**

- Production and Issues Workshops totaling 15 reaching 300 people

| Year | Target | Actual |
|---|---|---|
| 2009 | 50 | 75 |

**Output #8**

**Output Measure**

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

| Year | Target | Actual |
|---|---|---|
| 2009 | 60000 | 174294 |

**Output #9**

**Output Measure**

- Local/On-Farm Research project sites.

| Year | Target | Actual |
|---|---|---|
| 2009 | 20 | 22 |

**Output #10**

**Output Measure**

- Field Days totaling 5 location and reaching 500 people

| Year | Target | Actual |
|---|---|---|
| 2009 | 500 | 558 |

**Output #11**

**Output Measure**

- Weed Control Guide for Ohio and Indiana 4000 distributed annually

| Year | Target | Actual |
|---|---|---|
| 2009 | 4000 | 4500 |

**Output #12**

**Output Measure**

- Tri-State Fertilizer Recommendations for Corn, Soybean, Wheat and Alfalfa 250 distributed annually.
  Not reporting on this Output for this Annual Report

**Output #13**

**Output Measure**

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

**Output #14**

**Output Measure**

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

| Year | Target | Actual |
|---|---|---|
| 2009 | 1000 | 2000 |

**Output #15**

**Output Measure**

- Corn Disease Management in Ohio distribution

| Year | Target | Actual |
|---|---|---|
| 2009 | 500 | 298 |

**Output #16**

**Output Measure**

- Profitable Soybean Disease Management in Ohio 500 distributed annually

| Year | Target | Actual |
|---|---|---|
| 2009 | 500 | 276 |

**Output #17**

**Output Measure**

- Wheat Disease Management in Ohio 250 distributed annually

| Year | Target | Actual |
|---|---|---|
| 2009 | 250 | 195 |

**Output #18**

**Output Measure**

- Seed Treatment for Ohio Agronomic Crops 150 distributed annually

| Year | Target | Actual |
|---|---|---|
| 2009 | 150 | 25 |

**Output #19**

**Output Measure**

- Ohio Agronomy Guide 700 distributed annually

| Year | Target | Actual |
|---|---|---|
| 2009 | 700 | 567 |

**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. |

## Outcome #1

### 1. Outcome Measures

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

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Action Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 15 | 29 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
Increased management and decision making through the use of precision agriculture techniques should allow for better utilization of crop input improving profitability and reduce environmental impact.

**What has been done**
Precision technology workshop and direct one-on-one consulting on precision ag use have resulted in on-farm projects and demonstration to test site specific application of agronomic principle.

**Results**
During 2009, 29 farm operators reported economic benefits of $89,000 utilizing this programming.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 102 | Soil, Plant, Water, Nutrient Relationships |
| 205 | Plant Management Systems |
| 211 | Insects, Mites, and Other Arthropods Affecting Plants |
| 212 | Pathogens and Nematodes Affecting Plants |
| 213 | Weeds Affecting Plants |

## 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 Condition Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 25 | 1182 |

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

**Issue (Who cares and Why)**
Putting into place best management practices from university research have been a corner stone of advancements in yield and profitability.

**What has been done**
Workshops, field days and agronomy meetings have provided educational opportunities for over 2815 participants.

**Results**
In 2009, 42% of the 2815 participants indicated they took Extension program information home and utilized it to improve their management. The average size farm participating was 750 acres and indicated changes were valued at $12.5 per acre resulting in $11 million dollars of value for these adapting farms.

**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.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 25 | 409 |

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

**Issue (Who cares and Why)**
In 2009, Nitrogen accounted for 13% of the variable cost of corn production. Wise utilization has economic and environmental benefits.

**What has been done**
Research has resulted in an economic nitrogen rate model. The spreadsheet was downloaded 409 times in 2009.

**Results**
Typically the user of the spreadsheet lowers nitrogen rates 18% on 10% of Ohio's corn acres.

**4. Associated Knowledge Areas**

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

**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 |
|---|---|---|
| 2009 | 25 | 20 |

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

**Issue (Who cares and Why)**
An increase in resistant marestail has reduced yield in southwest Ohio, now resistant giant ragweed is increasing.

**What has been done**
In-services were held to train educators. Training was then provided to 30% of licensed pesticide applicators.

**Results**
Impact is local - until the grower sees yield loss they delay resistance strategy implementation. 20% changed plans.

**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.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 15 | 20 |

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

**Issue (Who cares and Why)**
Foliar applications are being made for control of insects & disease that do not occur, costing money needlessly.

**What has been done**
Field days, winter conferences and on-site training were held showing scouting methods and use of economic thresholds.

**Results**
Grain prices fell, requiring wise use of products, which in turn required scouting before applications. Producers used IPM practices on 20% of crop acres, which in turn reduced pesticide use.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 211 | Insects, Mites, and Other Arthropods Affecting Plants |

| | |
|---|---|
| 212 | Pathogens and Nematodes Affecting Plants |
| 213 | Weeds Affecting Plants |

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

**External factors which affected outcomes**

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

**Brief Explanation**

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

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Case Study

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

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

**Program # 27**

**1. Name of the Planned Program**

Managed Forage and Grazing (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 |
|---|---|---|---|---|---|
| 205 | Plant Management Systems | 50% | | 50% | |
| 307 | Animal Management Systems | 50% | | 50% | |
| | **Total** | 100% | | 100% | |

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

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

| Year: 2009 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 5.0 | 0.0 | 1.0 | 0.0 |
| Actual | 7.0 | 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** |
| 342909 | 0 | 0 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 342909 | 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**

Curriculum will be developed and delivered to teach and facilitate adoption of the principles of management intensive grazing. A variety of learning activities will be used to deliver this curriculum, including intensive workshops with outdoor hands-on activities, major conferences, research and demonstrations, development of individualized grazing plans, newsletters, articles in popular press, web-based educational resources, and TV and media programs.

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

Forage and livestock producers of Ohio; Extension Educators and Natural Resource Conservation Service grassland specialists; technical service advisors and providers

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

**1. Standard output measures**

| 2009 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| Plan | 1200 | 100000 | 45 | 1000 |
| Actual | 1800 | 125000 | 48 | 1100 |

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

Year: 2009
Plan: 0
Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2009 | Extension | Research | Total |
|---|---|---|---|
| Plan | 0 | 0 | |
| Actual | 0 | 0 | 0 |

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

**Output Target**

**Output #1**

**Output Measure**

- Intensive workshops and educational presentations: Single and multiple session workshops will be delivered to teach concepts and practices on forage production, pasture management, and forages for horses. Approximately 6 to 8 workshops will be held each year in different locations throughout Ohio. These workshops often include hands-on learning activities. These workshops will be managed by the Integrated Forage Management Team of OSU Extension.

| Year | Target | Actual |
|---|---|---|
| 2009 | 6 | 6 |

**Output #2**

**Output Measure**

- Research and demonstrations: Applied research and demonstrations on forage and grazing lands management will be conducted each year. These include annual and multi-year evaluations of forage varieties for productivity and persistence in Ohio. Results and research summaries will be disseminated through the Ohio Forage Network website and through media outlets. In addition, a funded research project will be conducted in SE Ohio aimed at increasing farm profitability and productivity of grazing beef and dairy farms while maintaining minimum environmental impacts. Over the next five years we will develop new grazing management tools that will be validated on six monitor farms.

| Year | Target | Actual |
|---|---|---|

| | | |
|---|---|---|
| 2009 | 10 | 10 |

**Output #3**

**Output Measure**

- Development of individualized grazing plans: Plans will be developed for approximately 30 producers annually, which will include paddock layout and design, water system development plans, seasonal forage inventory and feed budgeting management plans. This activity will be managed by the Integrated Forage Management Team of OSU Extension.

| Year | Target | Actual |
|---|---|---|
| 2009 | 30 | 30 |

**Output #4**

**Output Measure**

- Newsletter: These will be the primary methods used for written communication to out clientele concerning management of forages and grazing lands. We will produce a quarterly electronic and hardcopy newsletter that will also be posted on the web. While extension fact sheets are produced, they are no longer the primary method of delivering information. This activity will be managed by the Co-chairs the Integrated Forage Management Team of OSU Extension.

| Year | Target | Actual |
|---|---|---|
| 2009 | 2 | 2 |

**Output #5**

**Output Measure**

- Articles in popular press: Educational articles will be produced for biweekly column in Farm & Dairy magazine (All About Grazing) and approximately six articles in Ohio's Country Journal on an annual basis. In addition, results from the Ohio Forage Performance Trials will be published annually in Ohio's Country Journal. This activity will be managed by the Integrated Forage Management Team of OSU Extension.

| Year | Target | Actual |
|---|---|---|
| 2009 | 20 | 20 |

**Output #6**

**Output Measure**

- Web-based educational resources: The Integrated Forage Management Team of OSU Extension will manage, maintain, and publish new information on the Ohio Forage Network (http://forages.osu.edu). Resources available through this website include contact information for forage specialists, fact sheets and bulletins, research summaries, and software products. The quarterly newsletter produced by the team will be posted on this website.

| Year | Target | Actual |
|---|---|---|
| 2009 | 6 | 6 |

**Output #7**

**Output Measure**

- TV and media programs: Approximately 2 TV programs and 6 to 10 radio programs will be produced on an annual basis on topics related to forage and grazing lands management.. This activity will be managed by members of the Integrated Forage Management Team of OSU Extension.

| Year | Target | Actual |
|---|---|---|

| | | |
|---|---|---|
| 2009 | 10 | 10 |

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

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | Managed grazing plans will be developed for 10,000 acres annually and improved grazing management will be adopted on 6,000 acres annually. |
| 2 | More Ohio forage-based farms will become economically and environmentally sustainable. |

## Outcome #1

### 1. Outcome Measures

Managed grazing plans will be developed for 10,000 acres annually and improved grazing management will be adopted on 6,000 acres annually.

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Action Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 20 | 20 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
Increase farm economic profitability through the efficient use of pasture and forage resources. The adoption of these farm practices increase farm profitability and are considered sustainable management practices protecting and improving our soil and water resources.

**What has been done**
The Ohio Integrated Forage Management team has developed curriculum, which has been utilized to teach livestock producers, USDA/NRCS and Extension Educators the principlss of managed grazing. Grazing schools have been conducted, newsletters written, and a forage blog created to facilitate the adoption of these grazing principles. Grazing management plans have been written and practices implemented.

**Results**

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 205 | Plant Management Systems |
| 307 | Animal Management Systems |

## Outcome #2

### 1. Outcome Measures

More Ohio forage-based farms will become economically and environmentally sustainable.

### 2. Associated Institution Types

- 1862 Extension

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 10 | 10 |

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

**Issue (Who cares and Why)**
Qualitative evaluation of the forage team efforts was conducted so that we may trouble-shoot our teaching methods and curriculum to facilitate adoption of grazing practices

**What has been done**
Conducted an approved qualitative evaluation of our grazing school participants.

**Results**
Participants of Ohio grazing schools evaluated the economics of adopting the practices taught in the "pasture for profit schools." A 60% response rate was achieved utilizing an approved evaluation instrument. Results indicate average forage production increased after attending school by a total 1116 tons of forage. At and average value of $100 per ton this equals $111,600.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 205 | Plant Management Systems |
| 307 | Animal Management Systems |

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

**External factors which affected outcomes**

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

**Brief Explanation**

{No Data Entered}

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

1. Evaluation Studies Planned

- Retrospective (post program)
- During (during program)

**Evaluation Results**

149 participants were asked to evaluate the grazing schools. A 60% response rate was achieved. After attending grazing school average number of livestock per farm increased, forage production increased, and the number of grazing days increased.

**Key Items of Evaluation**

Respondents indicated they were able to increase the days animals could spend grazing by an average of 40 days in the fall and an average of 24 days in the spring. The two most commonly listed ways livestock producers increased production was by increasing forage production and increasing number of animals per acre. When asked what expense decreased the most common answer was, "decreased feed costs." Livestock producers also stated that they are taking better care of their livestock. Cattle production increase from an average of 35 cows per farm to 42. Total forage production increased by 1112 tons.

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

**Program # 28**

**1. Name of the Planned Program**

Conservation Tillage (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 | 35% | | 35% | |
| 104 | Protect Soil from Harmful Effects of Natural Elements | 10% | | 10% | |
| 111 | Conservation and Efficient Use of Water | 5% | | 5% | |
| 112 | Watershed Protection and Management | 5% | | 5% | |
| 132 | Weather and Climate | 5% | | 5% | |
| 205 | Plant Management Systems | 15% | | 15% | |
| 216 | Integrated Pest Management Systems | 10% | | 10% | |
| 405 | Drainage and Irrigation Systems and Facilities | 5% | | 5% | |
| 601 | Economics of Agricultural Production and Farm Management | 10% | | 10% | |
| | **Total** | 100% | | 100% | |

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

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

| Year: 2009 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 2.6 | 0.0 | 0.0 | 0.0 |
| Actual | 5.0 | 0.0 | 0.0 | 0.0 |

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

| Extension | | Research | |
|---|---|---|---|
| **Smith-Lever 3b & 3c** | **1890 Extension** | **Hatch** | **Evans-Allen** |
| 244935 | 0 | 0 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 244935 | 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**

Conservation Tillage Conference each February

No-till Field Days each summer

No-till Council program each December

Farm Science Review demonstrations and programs each September

Develop educational materials (fact sheets, powerpoints) for use by educators

Ohio No-till News page in Ohio's Country Journal, 10 issues per year

Information also presented on farm radio networks (ABN, Agri-Net) and on web sites.

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

Farmers, primarily those growing corn, soybeans and wheat, plus large livestock operations with manure management problems

Public agency personnel (primarily Extension; NRCS; SWCD)

Crop consultants

Ag industry (suppliers of machinery, fertilizer, chemicals)

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

**1. Standard output measures**

| 2009 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Plan** | 2200 | 50000 | 200 | 8000 |
| **Actual** | 1800 | 50000 | 150 | 5000 |

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

Year: 2009
Plan: 0
Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2009 | Extension | Research | Total |
|---|---|---|---|
| **Plan** | 0 | 0 | |
| **Actual** | 0 | 0 | 0 |

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

**Output Target**

**Output #1**

**Output Measure**

- At the Conservation Tillage Conference, we know how many crop consultants attend and which sessions they participate in. Based on evaluations submitted, we also have a good estimate on the number of farmers attending, the total acres, and the economic value per acre these farmers place on the conference. Total economic impace reported in millions of dollars.

| Year | Target | Actual |
|---|---|---|
| 2009 | 75 | 250 |

**Output #2**

**Output Measure**

- No-till field days and the Ohio No-till conference also offer credits for crop consultants, and evaluation surveys provide estimates of economic value to consultants and farmers. Reported in millions of dollars.

| Year | Target | Actual |
|---|---|---|
| 2009 | 2 | 2 |

**Output #3**

**Output Measure**

- Ohio No-Till News page appears in Ohio's Country Journal, about 8 issues per year. The circulation of the journal is 20,000 and growing.

| Year | Target | Actual |
|---|---|---|
| 2009 | 22000 | 22000 |

**Output #4**

**Output Measure**

- The value of the web sites (ctc.osu.edu and fabe.osu.edu/notill) can be roughly estimated by the number of page views.

| Year | Target | Actual |
|---|---|---|
| 2009 | 500 | 1200 |

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

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | All participants gain knowledge of conservation tillage topics, including no-till corn, precision agriculture, controlled traffic, manure management for crops, water management, and cover crops. Average knowledge gain based on a 0 to 5 scale. |
| 2 | Ten percent of participants not currently using conservation tillage for growing corn will at least try the practice. We will ask about tillage intentions on our evaluation form, and also ask about changes made the previous year as a result of attending a previous CTC or another one of our programs. |
| 3 | A measurable goal is that the acres of corn farmed no-till will increase 5% by 2011, as determined by a USDA survey. The most recent one in 2004 showed 23% of Ohio corn was no-tilled, so increasing to 28% is doable. Since 63% of soybeans are already no-tilled, virtually all of the increase would be in continuous no-till. |

## Outcome #1

### 1. Outcome Measures

All participants gain knowledge of conservation tillage topics, including no-till corn, precision agriculture, controlled traffic, manure management for crops, water management, and cover crops. Average knowledge gain based on a 0 to 5 scale.

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 0 | 1250 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
The general population wants cleaner water and maintenance of low cost food products.

**What has been done**
The Conservation Tillage programs emphasize the specific topics of no-till corn, precision agriculture, controlled traffic, manure management for crops, water management, and cover crops.

**Results**
1250 farmers increased their knowledge of cover crops, compaction, precision agriculture and manure management.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 102 | Soil, Plant, Water, Nutrient Relationships |
| 104 | Protect Soil from Harmful Effects of Natural Elements |
| 601 | Economics of Agricultural Production and Farm Management |

## Outcome #2

### 1. Outcome Measures

Ten percent of participants not currently using conservation tillage for growing corn will at least try the practice. We will ask about tillage intentions on our evaluation form, and also ask about changes made the previous year as a result of attending a previous CTC or another one of our programs.

### 2. Associated Institution Types

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 10 | 40 |

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

**Issue (Who cares and Why)**
Increasing acres of continuous no-till will decrease costs for farmers and improve water quality for society.

**What has been done**
Attendees are adopting no-till at a rate about double the overall farm population

**Results**
Attendees use no-till for about 40% of corn acres, compared to about 20% for state average.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 102 | Soil, Plant, Water, Nutrient Relationships |
| 112 | Watershed Protection and Management |
| 132 | Weather and Climate |
| 601 | Economics of Agricultural Production and Farm Management |

**Outcome #3**

**1. Outcome Measures**

A measurable goal is that the acres of corn farmed no-till will increase 5% by 2011, as determined by a USDA survey. The most recent one in 2004 showed 23% of Ohio corn was no-tilled, so increasing to 28% is doable. Since 63% of soybeans are already no-tilled, virtually all of the increase would be in continuous no-till.

Not Reporting on this Outcome Measure

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

**External factors which affected outcomes**

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

**Brief Explanation**

{No Data Entered}

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

1. Evaluation Studies Planned

- After Only (post program)
- During (during program)

### Evaluation Results

### Key Items of Evaluation

Twenty percent of the Conservation Tillage conference participants completed an end-of-session evaluation. Respondents said the educational value was about $15 per acre, or $4 Million for farmers and $250 Million for Consultants

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

**Program # 29**

**1. Name of the Planned Program**

Sustainable Agriculture (Extension)

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

1. Program Knowledge Areas and Percentage

| KA Code | Knowledge Area | %1862 Extension | %1890 Extension | %1862 Research | %1890 Research |
|---|---|---|---|---|---|
| 102 | Soil, Plant, Water, Nutrient Relationships | 10% | | 10% | |
| 123 | Management and Sustainability of Forest Resources | 10% | | 10% | |
| 131 | Alternative Uses of Land | 10% | | 10% | |
| 136 | Conservation of Biological Diversity | 10% | | 10% | |
| 205 | Plant Management Systems | 10% | | 10% | |
| 216 | Integrated Pest Management Systems | 10% | | 10% | |
| 307 | Animal Management Systems | 10% | | 10% | |
| 601 | Economics of Agricultural Production and Farm Management | 10% | | 10% | |
| 604 | Marketing and Distribution Practices | 20% | | 20% | |
| | **Total** | 100% | | 100% | |

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

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

| Year: 2009 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 2.0 | 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** |
| 195948 | 0 | 0 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 195948 | 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**

Primary:

Plan and conduct Sustainable ag newsletter, workshops, field days, travel scholarships, teaching kit for new educators, farm tours

Other:

Provide leadership for sustainable agriculture professional development programs for Extension agents, NRCS staff, and other agriculture professionals in Ohio

Serve as a technical resource regarding various sustainable ag issues for Extension agents, NRCS staff and other ag professionals.

Serve as a liason to the North Central Region of SARE Program and promote SARE programs and resources among farmers, Extension agents, NRCS staff, and other ag professionals in Ohio.

Provide opportunities to network for sustainable ag non-profit organizations, ag agencies, and organizations as well as farmers to develop educational programs and resources for Ohio farm families and consumers.

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

Extension Educators, NRCS staff, agricultural professionals, farmers, consumers

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

**1. Standard output measures**

| 2009 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Plan** | 1200 | 6000 | 0 | 0 |
| **Actual** | 1412 | 6000 | 0 | 0 |

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

Year: 2009
Plan: 0
Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2009 | Extension | Research | Total |
|---|---|---|---|
| **Plan** | 0 | 0 | |
| **Actual** | 0 | 0 | 0 |

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

**Output Target**

**Output #1**

**Output Measure**

- Number of requests for resources and programs, participant roster, number of grants submitted, participant evaluation

| Year | Target | Actual |
|---|---|---|
| 2009 | 150 | 185 |

**Output #2**

**Output Measure**

- A quarterly newsletter is sent to over 100 Educators, ag agency personnel, and farmers.

| Year | Target | Actual |
|---|---|---|
| 2009 | 180 | 171 |

**Output #3**

**Output Measure**

- Workshops are held in various locations around Ohio and are scheduled 2-3 times each year. Topics of workshops include SARE grants, cover crops, organic grain production, and alternative enterprises.

| Year | Target | Actual |
|---|---|---|
| 2009 | 2 | 6 |

**Output #4**

**Output Measure**

- Field days and tours are held during summer months around Ohio at various locations. Farm topics include grain, vegetable, and livestock sustainable practices.

| Year | Target | Actual |
|---|---|---|
| 2009 | 5 | 3 |

**Output #5**

**Output Measure**

- $500 scholarships are given to Educators to travel to attend sustainable functions.

| Year | Target | Actual |
|---|---|---|
| 2009 | 8 | 32 |

**Output #6**

**Output Measure**

- Over 50 requests for grants and resources are received each year.

| Year | Target | Actual |
|---|---|---|
| 2009 | 55 | 21 |

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

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | Increase the sustainable agriculture knowledge and skills of Extension Educators, NRCS staff and other ag professionals in Ohio |
| 2 | Increase the use of the SARE program and resources among farmers, Extension Educators, NRCS staff, and other ag professionals in Ohio |
| 3 | Improve the practices of the farmers of Ohio to include sustainable agriculture approaches} |
| 4 | More Educators will become knowledgeable about sustainable practices, such as cover crops, organic fruit & vegetable production, sustainable beef production, direct marketing. |
| 5 | More Extension educators will conduct a greater number of programs on sustainable ag topics |
| 6 | Ohio farms will become more economically, environmentally, and socially sustainable |

## Outcome #1

### 1. Outcome Measures

Increase the sustainable agriculture knowledge and skills of Extension Educators, NRCS staff and other ag professionals in Ohio

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 150 | 28 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
Extension Educators and other Ag professionals can help farm families become more sustainable if they increase their skills and knowledge related to sustainable agriculture.

**What has been done**
Three-day in-service tour of Michigan State University; Kellogg Biological Station was conducted

**Results**
Twenty-eight Extension Educators and other Ag professionals reported that they increased their knowledge about bio-energy crops and other sustainable practices.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 102 | Soil, Plant, Water, Nutrient Relationships |
| 216 | Integrated Pest Management Systems |
| 307 | Animal Management Systems |
| 601 | Economics of Agricultural Production and Farm Management |
| 604 | Marketing and Distribution Practices |

## Outcome #2

### 1. Outcome Measures

Increase the use of the SARE program and resources among farmers, Extension Educators, NRCS staff, and other ag professionals in Ohio

### 2. Associated Institution Types

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 175 | 215 |

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

**Issue (Who cares and Why)**
SARE resources can help educators and farmers identify new methods to increase sustainability.

**What has been done**
Over 215 resources (books, CD's, etc.) were provided on various sustainable agriculture topics to farmers, Extension Educators, and other Ag professionals

**Results**
Farmers and Extension Educators have reported an increase in knowledge about sustainability as a result of using the SARE resources.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 205 | Plant Management Systems |
| 216 | Integrated Pest Management Systems |
| 307 | Animal Management Systems |
| 601 | Economics of Agricultural Production and Farm Management |
| 604 | Marketing and Distribution Practices |

**Outcome #3**

**1. Outcome Measures**

Improve the practices of the farmers of Ohio to include sustainable agriculture approaches}

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|

| | | |
|---|---|---|
| 2009 | 100 | 120 |

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

**Issue (Who cares and Why)**
Farmers who adopt sustainable practices can improve the profitability of their farm operations.

**What has been done**
4 workshops, 2 field days, 14 programs at Small Farm Center at Farm Science Review

**Results**
More than 120 farmers have reported the adoption of sustainable practices as a result of participating in OSU Sustainable Ag Team workshops, field days, Center for Small Farms at Farm Science Review.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 102 | Soil, Plant, Water, Nutrient Relationships |
| 136 | Conservation of Biological Diversity |
| 205 | Plant Management Systems |
| 216 | Integrated Pest Management Systems |
| 307 | Animal Management Systems |
| 601 | Economics of Agricultural Production and Farm Management |
| 604 | Marketing and Distribution Practices |

**Outcome #4**

**1. Outcome Measures**

More Educators will become knowledgeable about sustainable practices, such as cover crops, organic fruit & vegetable production, sustainable beef production, direct marketing.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 200 | 260 |

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

**Issue (Who cares and Why)**
Extension Educators can help farm families become more sustainable if they increase their skills and knowledge related to sustainable agriculture.

**What has been done**

6 workshops, 3 field days, 1 study tour

**Results**
Extension Educators report increased knowledge and skills as a result of participating in these programs.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 205 | Plant Management Systems |
| 307 | Animal Management Systems |
| 604 | Marketing and Distribution Practices |

**Outcome #5**

**1. Outcome Measures**

More Extension educators will conduct a greater number of programs on sustainable ag topics

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 50 | 62 |

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

**Issue (Who cares and Why)**
Farm managers who participate in sustainable agriculture programs can improve the economic, environmental, and social sustainability of their farming operation.

**What has been done**
6 workshops, 3 field days, 1 study tour

**Results**
An increased number of educational programs were conducted for farm managers by OSU Extension Educators in 2009.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 102 | Soil, Plant, Water, Nutrient Relationships |
| 123 | Management and Sustainability of Forest Resources |
| 131 | Alternative Uses of Land |
| 136 | Conservation of Biological Diversity |

| | |
|---|---|
| 205 | Plant Management Systems |
| 216 | Integrated Pest Management Systems |
| 307 | Animal Management Systems |
| 601 | Economics of Agricultural Production and Farm Management |
| 604 | Marketing and Distribution Practices |

**Outcome #6**

1. **Outcome Measures**

Ohio farms will become more economically, environmentally, and socially sustainable

Not Reporting on this Outcome Measure

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

**External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Public Policy changes

**Brief Explanation**

{No Data Entered}

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

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

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

**Program # 30**

**1. Name of the Planned Program**

Ohio Dairy Health and Management Certificate Program (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 |
|---|---|---|---|---|---|
| 301 | Reproductive Performance of Animals | 15% | | 15% | |
| 302 | Nutrient Utilization in Animals | 20% | | 20% | |
| 311 | Animal Diseases | 20% | | 20% | |
| 312 | External Parasites and Pests of Animals | 5% | | 5% | |
| 313 | Internal Parasites in Animals | 5% | | 5% | |
| 314 | Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals | 5% | | 5% | |
| 315 | Animal Welfare/Well-Being and Protection | 15% | | 15% | |
| 711 | Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources | 15% | | 15% | |
| | **Total** | 100% | | 100% | |

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

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

| Year: 2009 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 14.0 | 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** |
| 48987 | 0 | 0 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 48987 | 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 Dairy Health and Management Certificate Program offers advanced educational knowledge and hands-on opportunities in a face-to-face workshop environment to progressive dairy veterinary practitioners. The program provides a framework to develop cutting edge applied skills in dairy production medicine and decision making. This is a 3-year program consisting of eleven 2-3 day modules that emphasize application at every level. Educational materials are delivered through in-class lectures followed by case-based learning and group discussions. A farm visit and an out-of-class assignment are implemented to allow participants to work together on real world problems. Speakers will include experts from the College of Veterinary Medicine and the College of Food, Agricultural, and Environmental Sciences; as well as experts from industry, private practice, and other universities from around the country. An e mail listserv is used to allow participants to communicate with each other at any time over the three-year period.

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

Veterinary practitioners whose practice has a large percentage of dairy clients; Practicing veterinarians who have been out of school and in practice for at least a few years.

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

**1. Standard output measures**

| 2009 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Plan** | 40 | 0 | 0 | 0 |
| **Actual** | 15 | 26 | 0 | 0 |

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

Year: 2009
Plan: 0
Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2009 | Extension | Research | Total |
|---|---|---|---|
| **Plan** | 0 | 0 | |
| **Actual** | 0 | 0 | 0 |

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

**Output Target**

**Output #1**

**Output Measure**

- Number of participants at each session

| Year | Target | Actual |
|---|---|---|

| | | |
|---|---|---|
| 2009 | 25 | 15 |

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

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | Better understanding of dairy records |
| 2 | Better understanding of economics, nutrition, milk quality, cow comfort, and facilities; Interpersonal & Leadership skills; and Business & economic skills |
| 3 | A thorough understanding of all aspects in a modern dairy operation |
| 4 | Participants recognize OSU as leader in area |
| 5 | A change in behavior of the participants such that they have better interpersonal and consulting skills for Dairy Herd Health Management by increasing the number of veterinary services available, increasing the number of milk quality services, and increasing in consulting visits by veterinarians who were program participants |
| 6 | Improved economic viability for dairy veterinary practitioners and their dairy clients |
| 7 | Improved milk quality on client farms |
| 8 | Be able to design and implement on-farm synchronization protocols aimed at improving fertility in dairy cattle (for heifers and lactating dairy cows) |
| 9 | Participants gain a better understanding of factors affecting reproductive performance in dairy cattle. |
| 10 | Better understanding of advanced reproductive techniques such as ultrasonography and embryo transfer and its field potential. |
| 11 | Better understanding of dairy cattle nutrition (e.g., dry matter intake, proteins, dietary fiber, carbohydrate, fats, vitamins and minerals). |
| 12 | Be able to evaluate and to interpret feeding programs and rations for dairy cattle. |
| 13 | Increase the ability of veterinarians to identify and solve nutritionally related issues on dairy farms, especially reduce the incidence of nutritionally related diseases. |

## Outcome #1

### 1. Outcome Measures

Better understanding of dairy records

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 25 | 15 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
Dairy practicing veterinarians are a vital source of information for dairy producers. Monitoring and Identifying reproductive areas (in a timely manner) that need improvement is paramount for dairy producers' sustainability and profitability.

**What has been done**
Implemented learning methods: in-class lectures, case-based-learning, group discussion, farm visit, and out-of-class assignment

**Results**
Better understanding of dairy reproductive records, analyses, interpretation, and monitoring. Increased understanding of record-keeping and monitoring reproductive performance and increased the knowledge level of the attendees (20.2% points increase from pre-test to post-test scores)

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 301 | Reproductive Performance of Animals |
| 315 | Animal Welfare/Well-Being and Protection |

## Outcome #2

### 1. Outcome Measures

Better understanding of economics, nutrition, milk quality, cow comfort, and facilities; Interpersonal & Leadership skills; and Business & economic skills

Not Reporting on this Outcome Measure

**Outcome #3**

1. **Outcome Measures**

   A thorough understanding of all aspects in a modern dairy operation

   Not Reporting on this Outcome Measure

**Outcome #4**

1. **Outcome Measures**

   Participants recognize OSU as leader in area

   Not Reporting on this Outcome Measure

**Outcome #5**

1. **Outcome Measures**

   A change in behavior of the participants such that they have better interpersonal and consulting skills for Dairy Herd Health Management by increasing the number of veterinary services available, increasing the number of milk quality services, and increasing in consulting visits by veterinarians who were program participants

   Not Reporting on this Outcome Measure

**Outcome #6**

1. **Outcome Measures**

   Improved economic viability for dairy veterinary practitioners and their dairy clients

   Not Reporting on this Outcome Measure

**Outcome #7**

1. **Outcome Measures**

   Improved milk quality on client farms

   Not Reporting on this Outcome Measure

**Outcome #8**

1. **Outcome Measures**

   Be able to design and implement on-farm synchronization protocols aimed at improving fertility in dairy cattle (for heifers and lactating dairy cows)

2. **Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | {No Data Entered} | 15 |

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

**Issue (Who cares and Why)**
Dairy practicing veterinarians are a vital source of information for dairy producers. Improving reproductive performance of dairy herds is paramount for dairy producers' sustainability and profitability.

**What has been done**
Implemented learning methods: in-class lectures, case-based-learning, group discussion, farm visit, and out-of-class assignment.

**Results**
Increased understanding of reproductive programs/strategies and increased the knowledge level of the attendees (20.2% points increase from pre-test to post-test scores)

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 301 | Reproductive Performance of Animals |

**Outcome #9**

**1. Outcome Measures**

Participants gain a better understanding of factors affecting reproductive performance in dairy cattle.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | {No Data Entered} | 15 |

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

**Issue (Who cares and Why)**

Dairy practicing veterinarians are a vital source of information for dairy producers. Identifying reproductive areas (in a timely manner) that need improvement is paramount for dairy producers' sustainability and profitability.

**What has been done**
Implemented learning methods: in-class lectures, case-based-learning, group discussion, farm visit, and out-of-class assignment

**Results**
Increased understanding of factors affecting reproductive performance and increased the knowledge level of the attendees (20.2% points increase from pre-test to post-test scores)

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 301 | Reproductive Performance of Animals |
| 311 | Animal Diseases |
| 315 | Animal Welfare/Well-Being and Protection |

**Outcome #10**

**1. Outcome Measures**

Better understanding of advanced reproductive techniques such as ultrasonography and embryo transfer and its field potential.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | {No Data Entered} | 15 |

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

**Issue (Who cares and Why)**
Dairy practicing veterinarians are a vital source of information for dairy producers. Monitoring and Identifying reproductive areas (in a timely manner) that need improvement is paramount for dairy producers' sustainability and profitability.

**What has been done**
Implemented learning methods: in-class lectures, case-based-learning, group discussion, and wet laboratory demonstration.

**Results**
Increased understanding of advanced reproductive techniques and increased the knowledge level of the attendees (20.2% points increase from pre-test to post-test scores)

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 301 | Reproductive Performance of Animals |
| 311 | Animal Diseases |

## Outcome #11

### 1. Outcome Measures

Better understanding of dairy cattle nutrition (e.g., dry matter intake, proteins, dietary fiber, carbohydrate, fats, vitamins and minerals).

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | {No Data Entered} | 15 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
Dairy practicing veterinarians are a vital source of information for dairy producers. Monitoring and identifying nutrition performance and related diseases (in a timely manner) is paramount for dairy producers' sustainability and profitability.

**What has been done**
Implemented learning methods: in-class lectures, case-based-learning, group discussion, farm visit, hands-on demonstration, and out-of-class assignment.

**Results**
Increased understanding of dairy cattle nutrition and increased the knowledge level of the attendees (16.9% points increase from pre-test to post-test scores)

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 311 | Animal Diseases |
| 315 | Animal Welfare/Well-Being and Protection |

## Outcome #12

### 1. Outcome Measures

Be able to evaluate and to interpret feeding programs and rations for dairy cattle.

### 2. Associated Institution Types

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | {No Data Entered} | 15 |

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

**Issue (Who cares and Why)**
Dairy practicing veterinarians are a vital source of information for dairy producers. Monitoring and identifying nutrition performance and related diseases (in a timely manner) is paramount for dairy producers' sustainability and profitability.

**What has been done**
Implemented learning methods: in-class lectures, case-based-learning, group discussion, farm visit, hands-on demonstration, and out-of-class assignment.

**Results**
Increased understanding of dairy cattle nutrition and increased the knowledge level of the attendees (16.9% points increase from pre-test to post-test scores).

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 302 | Nutrient Utilization in Animals |
| 315 | Animal Welfare/Well-Being and Protection |

**Outcome #13**

**1. Outcome Measures**

Increase the ability of veterinarians to identify and solve nutritionally related issues on dairy farms, especially reduce the incidence of nutritionally related diseases.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | {No Data Entered} | 15 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
Dairy practicing veterinarians are a vital source of information for dairy producers. Monitoring and identifying nutrition performance and related diseases (in a timely manner) is paramount for dairy producers' sustainability and profitability

**What has been done**
Implemented learning methods: in-class lectures, case-based-learning, group discussion, farm visit, hands-on demonstration, and out-of-class assignment.

**Results**
Increased understanding of dairy cattle nutrition and increased the knowledge level of the attendees (16.9% points increase from pre-test to post-test scores).

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 302 | Nutrient Utilization in Animals |
| 311 | Animal Diseases |
| 315 | Animal Welfare/Well-Being and Protection |

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

**External factors which affected outcomes**
- Natural Disasters (drought, weather extremes, etc.)

**Brief Explanation**

{No Data Entered}

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

1. Evaluation Studies Planned

- Before-After (before and after program)
- During (during program)

**Evaluation Results**

A comprehensive reproductive (two modules) dairy cattle nutrition (two modules) curriculum was developed with participants from 11 veterinary practices located in 5 States (IN, NY, PA, NM, and OH), serving an estimated 186,150 dairy cattle in 469 herds, attended the two advanced nutrition modules (~2.5 day each and ~80 hours of learning) in 2009. Initially, a survey was developed to gather information regarding the most common dairy practices and needs. At the beginning of the program, enrolled participants were asked to complete the voluntary survey. Additionally, pre- and post-tests of knowledge were implemented to determine the level of knowledge gained by participants after each educational module. At the conclusion of each module participants had the opportunity to evaluate the program (e.g., educational materials, content and instructor) and provide feedback (quantitative and qualitative).

Veterinarians reported that the overall program, presentations and discussions were useful. Attendees found the presented information relevant for their work (neutral=6.15%, agree=60% and strongly agree=40%) and of great immediate use to them (strongly disagree=0.6%, disagree=1.2%, neutral=15%, agree=47.2% and strongly agree=36%). The presented materials and the implemented educational delivery methods substantially increased the knowledge level of the attendees [20.2% (reproductive modules) and 16.9% (nutrition modules) points increase from pre-test to post-test scores]. Reproductive modules: A

number of learned skills/practices were listed by participants immediately after each educational module such as synchronization programs/strategies, the value of breeding soundness examination in bulls, value of body condition scoring, record analyses/interpretation, and embryo transfer programs. Nutrition modules: Importance of feed particle size, ration evaluation, interpreting feed analysis, carbohydrate components, and metabolic profiling in fresh cows were listed as learned concepts that participants could apply in their practices. Qualitative Feedback: The following statements were provided immediately after each educational module by participants:

- "Very useful series of lectures. My knowledge base is growing and I'm looking forward to taking this info back to our clients to help improve their operations, increasing efficiency and increasing ability to more accurately trouble shoot. Thank you."
- "This has been an excellent lecture series. The programs were quite useful."
- "I like all the information and I don't have suggestions for change/improvements except maybe timely breaks. It is a large change of pace from field work to intensive presentations which is a challenge."
- "This has been an outstanding course. I have yet to find a better course. The information has boosted my confidence and energy for the profession. Thanks for the work!"

**Key Items of Evaluation**

Veterinarians reported that the overall program, presentations and discussions were useful. Attendees found the presented information relevant for their work (neutral=6.15%, agree=60% and strongly agree=40%) and of great immediate use to them (strongly disagree=0.6%, disagree=1.2%, neutral=15%, agree=47.2% and strongly agree=36%). The presented materials and the implemented educational delivery methods substantially increased the knowledge level of the attendees [20.2% (reproductive modules) and 16.9% (nutrition modules) points increase from pre-test to post-test scores].

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

**Program # 31**

**1. Name of the Planned Program**

Livestock Environmental Assurance and Mortality Management (Extension)

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

1. Program Knowledge Areas and Percentage

| KA Code | Knowledge Area | %1862 Extension | %1890 Extension | %1862 Research | %1890 Research |
|---|---|---|---|---|---|
| 102 | Soil, Plant, Water, Nutrient Relationships | 5% | | 5% | |
| 112 | Watershed Protection and Management | 10% | | 10% | |
| 133 | Pollution Prevention and Mitigation | 20% | | 20% | |
| 141 | Air Resource Protection and Management | 15% | | 15% | |
| 302 | Nutrient Utilization in Animals | 5% | | 5% | |
| 307 | Animal Management Systems | 25% | | 25% | |
| 401 | Structures, Facilities, and General Purpose Farm Supplies | 5% | | 5% | |
| 404 | Instrumentation and Control Systems | 5% | | 5% | |
| 405 | Drainage and Irrigation Systems and Facilities | 5% | | 5% | |
| 601 | Economics of Agricultural Production and Farm Management | 5% | | 5% | |
| | **Total** | 100% | | 100% | |

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

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

| Year: 2009 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 3.0 | 0.0 | 3.0 | 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** |
| 195948 | 0 | 0 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 195948 | 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**

Communication and information exchange with key food-animal production entities for the purpose of refinement of educational programming and targeted programs

Development of production site planning information to avoid or minimize future conflict.

Provide on-farm environmental assessment for the purpose of review of the production site, facilities within the site, and general extraneous conditions that influence environmental and neighbor/community relations

Expand and refine Mortality Composting Materials to address identified needs and challenges observed through current monitoring processes.

Enhance program delivery to improve access to stakeholders and improve efficiency of staff time and effort while improving materials offered.

Where applicable, develop species specific Standard Operating Procedures, manuals, materials, and training.

Develop courses/workshops that have direct application and on-site training capabilities to enhance environmental compliance.

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

Livestock production entities regardless of size, scope or species; Local citizens as they request information and education relevant to livestock production and the environment; Lending institutions, equipment suppliers, builders, academia, and other parties involved in the business of livestock production.

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

**1. Standard output measures**

| 2009 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Plan** | 200 | 0 | 0 | 0 |
| **Actual** | 725 | 500 | 0 | 0 |

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

Year: 2009
Plan: 0
Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2009 | Extension | Research | Total |
|---|---|---|---|
| **Plan** | 0 | 0 | |
| **Actual** | 0 | 0 | 0 |

## V(F). State Defined Outputs

### Output Target

### Output #1

#### Output Measure

- Standard evaluation of materials and workshops
  Not reporting on this Output for this Annual Report

### Output #2

#### Output Measure

- Database of individuals contacted with appropriate demographics

| Year | Target | Actual |
|---|---|---|
| 2009 | 50 | 50 |

### Output #3

#### Output Measure

- Materials that enhance the ability to improve environmental compliance including factsheet-type, multi-media type, manuals, and or books that allow the learner to access information in the most appropriate methods and turn the knowledge they gain into application within the enterprise in an effort to enhance environmental compliance.

| Year | Target | Actual |
|---|---|---|
| 2009 | 2 | 1 |

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

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | Determine detection, monitoring, and sampling systems that reliably indicate the impact and value of livestock enterprises in concert with the environment. Once the system(s) are identified to assess impact, programs and education materials targeted toward the key areas of focus will be developed, distributed, and training programs conducted. |
| 2 | Implementation and increased use of developed, science-based systems models and technology. |
| 3 | Protect the environment from degradation due to livestock production. |

## Outcome #1

### 1. Outcome Measures

Determine detection, monitoring, and sampling systems that reliably indicate the impact and value of livestock enterprises in concert with the environment. Once the system(s) are identified to assess impact, programs and education materials targeted toward the key areas of focus will be developed, distributed, and training programs conducted.

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 5 | 775 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
Protection of water, soil, and air resources in agricultural production is a priority for livestock and agronomic entities as well as the public sector they serve. Environmental compliance and compatibility in agricultural and livestock production will result in enhanced water, soil, and air quality and result in a positive influence on all of Ohio's citizens.

**What has been done**
Farm Science Review, manure application demonstration to protect water quality, touched 300 people over three days with educational material about stock piling manure to protect water quality.
Manure Science Review, touched 150 farmers, consultants and allied industry professionals with two full day hands-on nutrient management trainings focused on balancing manure nutrient with commercial fertilizer inputs on a field-by-field bases using the Nutrient Management Workbook developed by OSUE.
Nutrient Management Workbook training has touched 325 animal producers, integrators, consultants and allied industry professionals with hands-on workshops focused on balancing manure nutrients with commercial fertilizer on the farming operation. These three-hour training sessions develop nutrient management plans for each field in the farming operation that receive animal manure as well as identify appropriate setbacks for the environmentally sensitive areas within each field.

**Results**
Results indicate producers are clearly wishing to improve the effectiveness of manure supplied by livestock and commercial resources both as a reflection of judicious use based on crop use as well as economics of agronomic production. The importance of setback areas has been realized for the protection of water resources.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 112 | Watershed Protection and Management |
| 133 | Pollution Prevention and Mitigation |
| 302 | Nutrient Utilization in Animals |

| | |
|---|---|
| 307 | Animal Management Systems |
| 401 | Structures, Facilities, and General Purpose Farm Supplies |

**Outcome #2**

**1. Outcome Measures**

Implementation and increased use of developed, science-based systems models and technology.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 2 | 143 |

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

**Issue (Who cares and Why)**
Mortality disposal options are limited due to many environmental, accessibility, and or economic considerations. Effective disposal of common livestock mortality is essential to maintaining air, soil, and water acceptability.

**What has been done**
Implementation and increased use of developed, science based systems models and technology. 10 programs were held and 143 certificates issued in 2009.

**Results**
Mortality Composting Certification clinics are held throughout Ohio to provide appropriate and timely education to livestock and community-based individuals who have and wish to use composting as a environmentally friendly, cost effective recycling effort. 10 programs were held and 143 certificates issued in 2009.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 102 | Soil, Plant, Water, Nutrient Relationships |
| 112 | Watershed Protection and Management |
| 133 | Pollution Prevention and Mitigation |
| 141 | Air Resource Protection and Management |
| 302 | Nutrient Utilization in Animals |
| 307 | Animal Management Systems |
| 401 | Structures, Facilities, and General Purpose Farm Supplies |
| 404 | Instrumentation and Control Systems |
| 405 | Drainage and Irrigation Systems and Facilities |

## Outcome #3

### 1. Outcome Measures

Protect the environment from degradation due to livestock production.

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Condition Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 5 | 375 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
Management of waste materials from livestock operations is critical to long-term sustainability of the environment. Implications of non-compliance are tremendous as the citizens of Ohio rely on natural resources for daily needs. Livestock producers take environmental compliance seriously and have undergone additional training to help their cause.

**What has been done**
Manure research/demonstration plots included three wheat top-dress plots with liquid animal manure compared with commercial fertilizer. One runoff plot was conducted demonstrating that Ohio's setback recommendations for manure application on frozen and snow-covered conditions can minimize nutrient loss. Additional demonstrations have addressed the appropriate animal manure stockpiling techniques and how to minimize water quality impacts when stockpiles are in-appropriately located.

**Results**
Over 325 producers attended the nutrient workshops held in 2009. Over 50 persons were involved in Ventilation training to reduce gas emissions and conserve energy resources in livestock facilities.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 102 | Soil, Plant, Water, Nutrient Relationships |
| 112 | Watershed Protection and Management |
| 133 | Pollution Prevention and Mitigation |
| 141 | Air Resource Protection and Management |
| 302 | Nutrient Utilization in Animals |
| 307 | Animal Management Systems |
| 401 | Structures, Facilities, and General Purpose Farm Supplies |
| 404 | Instrumentation and Control Systems |
| 405 | Drainage and Irrigation Systems and Facilities |

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

**External factors which affected outcomes**

- Economy
- Public Policy changes
- Government Regulations
- Populations changes (immigration, new cultural groupings, etc.)

**Brief Explanation**

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

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}

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

**Program # 32**

**1. Name of the Planned Program**

Management & Sustainability of Forest Resources (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 |
|---|---|---|---|---|---|
| 123 | Management and Sustainability of Forest Resources | 30% | | 30% | |
| 124 | Urban Forestry | 10% | | 10% | |
| 125 | Agroforestry | 10% | | 10% | |
| 133 | Pollution Prevention and Mitigation | 10% | | 10% | |
| 135 | Aquatic and Terrestrial Wildlife | 10% | | 10% | |
| 136 | Conservation of Biological Diversity | 5% | | 5% | |
| 511 | New and Improved Non-Food Products and Processes | 15% | | 15% | |
| 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: 2009 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 3.5 | 0.0 | 1.3 | 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** |
| 146960 | 0 | 0 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 146960 | 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 curriculum

Conduct workshops

Develop fact sheets and bulletins

Produce newsletters

Provide web site for information and workshop registration

Conduct research in support of programming efforts

Partnering with other natural resource agencies and organizations to extend our impact

Conduct in-service workshops for professionals

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

Woodland owners/landowners - those individuals who own forest land or other natural areas and who are interested in learning more about their woodlands and how to manage them to best meet their needs

Natural resource professionals - foresters from state agencies and private industry, wildlife managers from state agencies, soil and water conservation district employees, any other group that works in the natural resource field

Forest industry - those individuals/companies/enterprises who utilize forest resources in the production of a marketable product including paper mills, saw mills, loggers, timber buyers, consulting foresters, Christmas tree producers, maple product producers, etc.

Homeowners - those homeowners interested in their tree resource around the home.

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

**1. Standard output measures**

| 2009 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Plan** | 6250 | 38000 | 0 | 0 |
| **Actual** | 5920 | 23987 | 0 | 1899 |

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

Year: 2009
Plan: 0
Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2009 | Extension | Research | Total |
|---|---|---|---|
| Plan | 0 | 0 | |
| Actual | 3 | 0 | 0 |

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

**Output Target**

**Output #1**

**Output Measure**

- Develop curriculum - We plan to continually update the curriculum to meet the changing needs of our clientele. As an example, curriculum development is currently in process for programs addressing ways to best utilize ash trees as they continue to die from Emerald Ash Borer. This curriculum could be used by homeowners and forester alike. Another example is the development of a program to meet the future continuing education requirements for those enrolled in the forestry tax programs in Ohio.

| Year | Target | Actual |
|---|---|---|
| 2009 | 1 | 3 |

**Output #2**

**Output Measure**

- Conduct workshops - Workshops will be developed and offered on an as needed basis to meet either professional educational needs or woodland owner needs. Typically we try to offer a wide variety, both in content and location around the state.

| Year | Target | Actual |
|---|---|---|
| 2009 | 25 | 18 |

**Output #3**

**Output Measure**

- Develop fact sheets and bulletins - Each year we work through a list of what needs to be done. Emerald Ash Borer has forced some items onto the back burner and we will have to see about getting some of those items back on track.

| Year | Target | Actual |
|---|---|---|
| 2009 | 3 | 3 |

**Output #4**

**Output Measure**

- Produce newsletters - The Ohio Woodland Stewards program produces the Ohio Woodland, Watersheds and Wildlife newsletter which is offered in a high quality paper and electronic format, 3 times annually.

| Year | Target | Actual |
|---|---|---|
| 2009 | 3 | 3 |

**Output #5**

**Output Measure**

- Provide web site for information dissemination and workshop registration - The Ohio Woodland Stewards website provides fact sheet and bulletin informational links along with electronic versions of the newsletter, programming calendar, links to supplemental websites, and online class and workshop registration. Visitors

to the site are tracked according to the web site server log

| Year | Target | Actual |
|---|---|---|
| 2009 | 1 | 1 |

**Output #6**

**Output Measure**

- Conduct research in support of programming efforts - research focusing on the impact of woodland management practices on the character of the resulting woodlands, the impact of EAB, the management and impact of selected wildlife species, and Christmas tree and maple production practices that increase the efficiency and economic returns of these enterprises.
  Not reporting on this Output for this Annual Report

**Output #7**

**Output Measure**

- Partnering with other natural resource agencies and organizations to extend our impact - Working closely with Ohio Department of Natural Resources, Division of Forestry, Wildlife and Soil and Water Conservation, the Ohio Forestry Association, and a variety of other Federal, State, and local agencies and organizations and commodity associations to more increase impact of educational programming.

| Year | Target | Actual |
|---|---|---|
| 2009 | 15 | 7 |

**Output #8**

**Output Measure**

- Conduct in-service workshops for professionals - These workshop topics are generated year to year at the request of several committees and organizations (forestry committee of the Ohio Federation of Soil & Water Conservation Districts etc.) The number will vary from year to year but typically there is at least one or two.

| Year | Target | Actual |
|---|---|---|
| 2009 | 2 | 2 |

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

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | A major goal is to provide information to our clients enabling them to make informed decisions concerning the management of their natural resources and, where appropriate, connect them with professionals who can provide individual assistance. |
| 2 | An increase in the number of woodland owners seeking professional assistance when marketing timber, an increase in the number of individuals receiving information on which to base management decisions concerning their forest resource based enterprise. |

## Outcome #1

### 1. Outcome Measures

A major goal is to provide information to our clients enabling them to make informed decisions concerning the management of their natural resources and, where appropriate, connect them with professionals who can provide individual assistance.

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 3000 | 2599 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
Current federal data shows an ever increasing fragmentation of our forests. As these lands change hands there is a continual need for educational programming to help them be better land stewards.

**What has been done**
Three new wildlife management courses were offered this year along with an expanded session on invasive species impacts.

**Results**
Sessions were well attended with lots of positive comments. In addition many of these landowners returned for other programming sessions.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 123 | Management and Sustainability of Forest Resources |
| 124 | Urban Forestry |
| 125 | Agroforestry |
| 133 | Pollution Prevention and Mitigation |
| 135 | Aquatic and Terrestrial Wildlife |
| 136 | Conservation of Biological Diversity |
| 511 | New and Improved Non-Food Products and Processes |
| 605 | Natural Resource and Environmental Economics |

## Outcome #2

### 1. Outcome Measures

An increase in the number of woodland owners seeking professional assistance when marketing timber, an increase in the number of individuals receiving information on which to base management decisions concerning their forest resource based enterprise.

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Action Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 400 | 150 |

### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**
Most private non-industrial woodland owners need technical information to effectively manage their woodlands. In tough economic times getting the most for their product is essential.

**What has been done**
One all day and several evening workshops on marketing timber were given throughout the year.

**Results**
150 people were in attendance and indicated they felt the information provided would make their timber sale more successful.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 123 | Management and Sustainability of Forest Resources |
| 124 | Urban Forestry |
| 125 | Agroforestry |
| 133 | Pollution Prevention and Mitigation |
| 135 | Aquatic and Terrestrial Wildlife |
| 136 | Conservation of Biological Diversity |
| 511 | New and Improved Non-Food Products and Processes |
| 605 | Natural Resource and Environmental Economics |

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

### External factors which affected outcomes

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

### Brief Explanation

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

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)

### Evaluation Results

{No Data Entered}

### Key Items of Evaluation

{No Data Entered}

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

**Program # 33**

**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 |
|---|---|---|---|---|---|
| 607 | Consumer Economics | 10% | | 0% | |
| 711 | Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources | 30% | | 0% | |
| 712 | Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins | 50% | | 0% | |
| 722 | Zoonotic Diseases and Parasites Affecting Humans | 10% | | 0% | |
| | **Total** | 100% | | 0% | |

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

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

| Year: 2009 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| Plan | 8.0 | 0.0 | 2.0 | 0.0 |
| Actual | 9.0 | 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** |
| 440882 | 0 | 0 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 440882 | 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**

1. Conducted food safety education classes with participants in the FNP and EFNEP program
2. Conducted ServSafe classes with food establishment managers and employees
3. Conducted Safe Food Handling for Occasional Quantity Cooks classes with volunteer food preparers

4. Conducted general food safety classes with youth
5. Provided research based information to consumers through various forms of media, phone calls, fact sheets and web pages

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

1. Food stamp or food stamp eligible families (FNP)
2. Low income families with young children (EFNEP)
3. Food establishment managers (ServSafe manager training)
4. Food service employees (ServSafe employee training)
5. Volunteer food preparers (general population) (OQC)
6. Youth (4-H)
7. General consumers (other formal or informal education)

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

**1. Standard output measures**

| 2009 | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|---|---|---|---|---|
| **Plan** | 16000 | 80000 | 500 | 0 |
| **Actual** | 10644 | 0 | 10611 | 0 |

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

Year: 2009
Plan: 0
Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

| 2009 | Extension | Research | Total |
|---|---|---|---|
| **Plan** | 3 | 0 | |
| **Actual** | 20 | 0 | 0 |

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

**Output Target**

**Output #1**

**Output Measure**

- Number of single-contact programs offered

| Year | Target | Actual |
|---|---|---|
| 2009 | 11 | 4964 |

**Output #2**

**Output Measure**

- Number of multiple-contact programs offered

| Year | Target | Actual |
|---|---|---|
| 2009 | 120 | 3700 |

**Output #3**

**Output Measure**

- Number of participants completing evaluation forms

| Year | Target | Actual |
|---|---|---|
| 2009 | 1650 | 15123 |

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

## V. State Defined Outcomes Table of Content

| O. No. | OUTCOME NAME |
|---|---|
| 1 | Percentage of adults and youth that demonstrate ability to practice personal hygiene, practice kitchen cleanliness, cook foods adequately, avoid cross-contamination, or keep foods at safe temperatures |
| 2 | Percentage of adults and youth who indicate intent to adopt one or more safe food handling practices |
| 3 | Percentage of adults and youth that demonstrate adoption of practice by handling behaviors associated with practicing personal hygiene, cooking foods adequately, avoiding cross-contamination, or keeping foods at safe temperatures. |
| 4 | Adults and youth will show a decrease in the number of illnesses caused by biological contamination of food (such as bacterial, viruses, parasites) |

## Outcome #1

### 1. Outcome Measures

Percentage of adults and youth that demonstrate ability to practice personal hygiene, practice kitchen cleanliness, cook foods adequately, avoid cross-contamination, or keep foods at safe temperatures

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 11 | 47 |

### 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 taxpayers $1-$7.2 billion in health care, quality of life, and work productivity cost emphasizing the need for food safety education.

**What has been done**
Ohio State University Extension offers numerous food safety education opportunities, from quality assurance programs for 4H youth to certification courses in ServSafe and HACCP. Both the EFNEP and Family Nutrition Program teach 20% of their classes on food safety. Food handlers in 4H and other volunteer programs complete the Safe Food Handling for Occasional Quantity Cooks classes as part of their volunteer training.

**Results**
There were 10,664 participants in all types of food education programs in 2009. Almost half (47%) reported on their evaluations that they had learn new information about one or more safe food handling skills or good agricultural practices that promote safe food.

Results from the Community Nutrition Education programs:
Learning new information; Planning change; Behavior Change
Washing hands with soap and water before preparing food: 96.5%; 84.7%; 18%
Use a thermometer to check if foods are fully cooked: 95.8%; 85.1%; 44%
Do not leave meat of leftovers at room temperature for more than 2 hours: 96.3%; 84.6%; 28%

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 607 | Consumer Economics |
| 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 |
| 722 | Zoonotic Diseases and Parasites Affecting Humans |

## Outcome #2

### 1. Outcome Measures

Percentage of adults and youth who indicate intent to adopt one or more safe food handling practices

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Knowledge Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 11 | 29 |

### 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 taxpayers $1-$7.2 billion in health care, quality of life, and work productivity cost emphasizing the need for food safety education.

**What has been done**
Ohio State University Extension offers numerous food safety education opportunities, from quality assurance programs for 4H youth to certification courses in ServSafe and HACCP. Both the EFNEP and Family Nutrition Program teach 20% of their classes on food safety. Food handlers in 4-H and other volunteer programs complete the Safe Food Handling for Occasional Quantity Cooks classes as part of their volunteer training.

**Results**
There were 10,664 participants in all types of food education programs in 2009. Over a quarter (29%) reported on their evaluations that they intended to adopt one or more safe food handling skills or good agricultural practices that promote safe food.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 607 | Consumer Economics |
| 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 |
| 722 | Zoonotic Diseases and Parasites Affecting Humans |

## Outcome #3

### 1. Outcome Measures

Percentage of adults and youth that demonstrate adoption of practice by handling behaviors associated with practicing personal hygiene, cooking foods adequately, avoiding cross-contamination, or keeping foods at safe temperatures.

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Action Outcome Measure

### 3b. Quantitative Outcome

| Year | Quantitative Target | Actual |
|---|---|---|
| 2009 | 7 | 12 |

### 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 taxpayers $1-$7.2 billion in health care, quality of life, and work productivity cost emphasizing the need for food safety education.

**What has been done**
Ohio State University Extension offers numerous food safety education opportunities, from quality assurance programs for 4H youth to certification courses in ServSafe and HACCP. Both the EFNEP and Family Nutrition Program teach 20% of their classes on food safety. Food handlers in 4-H and other volunteer programs complete the Safe Food Handling for Occasional Quantity Cooks classes as part of their volunteer training.

**Results**
There were 10,664 participants in all types of food education programs in 2009. Actual behavior change was reported by 12% of the participants on their evaluations. Changes were reported for the adoption of one or more safe food handling skills or good agricultural practices that promote safe food.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 607 | Consumer Economics |
| 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 |
| 722 | Zoonotic Diseases and Parasites Affecting Humans |

## Outcome #4

### 1. Outcome Measures

Adults and youth will show a decrease in the number of illnesses caused by biological contamination of food (such as bacterial, viruses, parasites)

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)

1. Evaluation Studies Planned

- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.

**Evaluation Results**

{No Data Entered}

**Key Items of Evaluation**

{No Data Entered}