

2016 Ohio State University Combined Research and Extension Plan of Work

Status: Accepted

Date Accepted: 05/06/2015

I. Plan Overview

1. Brief Summary about Plan Of Work

Ohio State University Extension (OSU Extension or OSUE) and the Ohio Agricultural Research and Development Center (OARDC) work collaboratively within the College of Food, Agricultural, and Environmental Sciences (CFAES) at The Ohio State University (OSU) to be engaged with stakeholders, and to deliver impacts that make a difference. Our goal over the next five-year period is to continue to "bring knowledge to life," while also addressing OSU and CFAES's strategic priorities.

Scientific advancements in agbioscience will continue to provide unprecedented opportunities for global economic, environmental, and societal achievements. OARDC is the singular research and development hub for agbioscience research in Ohio, and OSU Extension is the center for associated education and human capital development. Collectively, this capacity is targeted to realize new discoveries and advance knowledge acquisition by our clientele for the purpose of achieving job growth and economic prosperity that is sustainable over time.

OSU is part of a statewide initiative linking all State of Ohio higher education programs under a "One University" concept. Each college, department, and program within OSU is also expected to view and conduct itself as part of that whole. This concept, irrespective of the terminology or internal structure of each member institution, is dedicated to the discovery of new knowledge and the transmission of that knowledge in the classroom, laboratory, and extension/outreach settings in order to help meet society's needs and aspirations.

CFAES Dean and OSU Vice President, Dr. Bruce McPheron, is committed to the land-grant research and Extension mission and vision, and is leading our college's efforts statewide. OARDC and OSU Extension are administered through his office. Both functions are central to accomplishing the land-grant mission of The Ohio State University and fulfilling its academic plan. That mission is inclusive of an active state government agenda to grow Ohio economic sectors through research, development, and extension investments. Throughout this 2016-2020 planning period, the primary focus will be on research and Extension activities that generate and extend new knowledge resulting in job growth and economic recovery. Both are foundational for advancing social, economic, and environmental well-being. Likewise, the mission is inclusive of the National Institute of Food and Agriculture's (NIFA) agenda and priority areas.

Dr. Keith Smith, Associate Vice President and Director of OSUE and the Associate Dean of CFAES will be stepping down on June 30, 2015. Dr. Smith's tenure as Director of OSU Extension lasted for 23 years. In 2015, a nationally focused search committee will be formed to find a replacement Director. Certainly, OSU Extension may anticipate potential changes to the organizational structure and focus of programming efforts as the new Director begins to implement his or her vision for the future of our organization.

The food and agriculture bio-economy in Ohio is an enterprise generating over 100 billion dollars annually, employing over one million people, and depending in great part on the infusion of new knowledge from OSU's research, Extension, and development programs. The leadership provided by

CFAES during the planning period of 2016-2020 will be based on its active participation in the OSU Discovery Themes Initiative, adopted in 2012, that is intended to guide and advance program integration the University. The three themes are especially relevant to CFAES and include: (1) Health and Wellness; (2) Energy and Environment; and (3) Food Production and Security. These Discovery Themes provide Ohio State with an unprecedented opportunity to find durable solutions to three of today's--and tomorrow's--most compelling issues. The Discovery Themes will focus internal resources on critical societal needs and will accurately reflect OSU's character as a public, urban, land-grant research university with very high research activity.

OARDC and OSU Extension have already been working in parallels to the OSU Discovery Themes, integrating cutting-edge research, teaching excellence, and innovative outreach programs in three "signature areas" defined by CFAES as: (1) food security, production, and human health; (2) environmental quality and sustainability; and (3) advanced bioenergy and bio-based products. Thus, the integration of CFAES's lines of research and extension into the aforementioned Discovery Themes are being expedited by their commonality with the CFAES "signature areas."

OSU Extension will continue to manage program priorities throughout the 2016-2020 period via its "VP Conversations on the Future of Extension" project. The first part of this project was conducted in 2014 ("futuring"), and the second portion of the project, "visioning," will continue into 2015, and potentially beyond. The visioning portion of the project is "an aspirational exercise in leveraging internal culture, capabilities, resources, goals, and mission to offer successful products and services to customers and stakeholders in the future." The intent of the futuring / visioning process is to formally re-engage this line of thinking every 2-3 years. Informally, OSU Extension will continuously engage in evaluating needs as they arise.

This Plan of Work, CFAES's current and future strategic plans, and NIFA's national priorities all reflect common themes. To address these themes, our Planned Programs for 2016-2020 are designed to foster knowledge acquisition, dissemination, and scientific advancements to help mitigate the many financial, social, and environmental problems facing society today. Issues of economy, climate change, sustainable energy supplies, global food safety and security, human health issues such as hunger, obesity, nutrition, and disease can all be positively influenced by our planned research and Extension programs.

OARDC will make significant investments that are critical to anticipated outcomes and impacts for this planning period. Highlights are:

- OARDC will rebuild its faculty ranks with much of the growth related to the OSU Discovery Themes (Health and Wellness; Energy and Environment; Food Production and Security). New Discovery Themes faculty will be tenured or tenure-eligible. Hiring will be informed by significant faculty input and will involve a leveraged investment of central, local and capacity funds.
- OARDC has completed renovations/rebuilds from the 2010 tornado that struck the Wooster campus. Prominent among these are the replacement of 22,000 square feet of new greenhouse research space and completion of a new 38,000 square foot food, agricultural, and biological engineering building. In 2016, lighting and specific rewiring projects will complete all tornado-related construction. Current plans are focused on the upgrade/replacement of plant and animal field facilities. Discussions are ongoing with private industry to create public-private partnerships for these new facilities.
- OARDC will contribute research and solutions to CFAES' new and wide-ranging water quality initiative "Field to Faucet," which will seek end-to-end solutions that lead to production practices to reduce runoff components, such as phosphorus, that contribute to hazardous algal blooms and water quality issues. This program will not only impact Ohio waterways, but also Lake Erie and the Great Lakes system, which will create opportunities for regional partnerships.
- OARDC will emphasize programs in food safety and security in order to develop new markets,

discover new opportunities for producers, diversify crop production and participate in markets for high value crops. This would include organic and local food systems, as well as traditional food production systems across Ohio.

- OARDC will develop and integrate programs for food systems data analytics in order to collect data and interpret them to make informed decisions and develop educational programs based on the findings. It is anticipated that this effort will involve the integration of environmental and natural resource data as it applies to food systems and land use.

These investments support multi- and cross-disciplinary collaborations leading to impacts that truly reflect the capacity of agbioscience research to address complex problems. These collaborations also are central to CFAES's commitment to the One University concept.

OSU Extension will continue to focus on the following programming topics:

- shale gas leasing and extraction
- renewable energy sources (wind, solar)
- local foods
- healthy finances, relationships and people
- science / technology / engineering / mathematics (STEM) programming
- youth development
- nutrient management and water quality
- assuring quality care for animals
- plant systems management

OARDC and OSU Extension will continue to engage in research and extension work that addresses known / traditional areas where established needs exist, but we will also connect with our stakeholders to determine new areas of need throughout the planning period.

Note: The FTEs shown in this Plan of Work are based on programmatic assessments, and may not reflect actual FTEs expended.

Estimated Number of Professional FTEs/SYs total in the State.

Year	Extension		Research	
	1862	1890	1862	1890
2016	550.0	0.0	410.0	0.0
2017	552.0	0.0	410.0	0.0
2018	556.0	0.0	410.0	0.0
2019	558.0	0.0	410.0	0.0
2020	560.0	0.0	410.0	0.0

II. Merit Review Process

1. The Merit Review Process that will be Employed during the 5-Year POW Cycle

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

2. Brief Explanation

OARDC and OSU Extension will continue throughout 2016-2020 to place strong emphasis on merit review, with particular attention to stakeholder feedback to better meet research and programmatic needs. Research and extension efforts require both internal and external input, and review is essential at all levels.

Both OARDC and OSUE will continue to utilize various advisory committees at differing levels commensurate with the review and input required. Small internal competitive grants are peer reviewed by an internal panel of faculty and administrators representing all academic departments within the College. Panels of faculty, administrators, and leading stakeholders who have expertise in the area of the award review other larger, competitive grants. When needed, faculty members from outside of the College are used as reviewers. Combined panels of academics and non-academics are being used more extensively as OARDC and OSUE seek to move more research into Ohio communities.

Publications by OARDC and OSUE personnel are either blind peer-reviewed or peer reviewed/juried before publication either in print or via electronic media. OARDC encourages publishing in higher-tier peer reviewed journals and the tracking of citations of research publications. Scholarly findings are also expected to appear in trade journals, Extension media, and in public media, including all the newer social media. OSU Extension will continue to require all publications (whether electronic or print) that are intended for statewide (or broader) distribution to be submitted for blind peer review by a minimum of three people.

OSU Extension will continue to implement several levels of advisory committees including: the state Extension advisory committee (which will continue to provide feedback on statewide programmatic issues); county-level advisory committees (which will advise on local/county-level programmatic needs); and program area advisory committees (which will help identify needs within the OSUE program areas of agriculture and natural resources, family and consumer sciences, 4-H youth development, and community development).

Both internal and external reviews are central to this organization's assessment of the merits of its planned programs. Merit review will continue to be a strong emphasis throughout this planning period with the ultimate aim of assessing impacts on science and society.

III. Evaluation of Multis & Joint Activities

1. How will the planned programs address the critical issues of strategic importance, including those identified by the stakeholders?

To be relevant, the planned programs of CFAES, directed by OARDC and OSUE, must address our stakeholders' most pressing needs, as well as those that are articulated in local, state, and national planning documents. The issues of our stakeholders are largely addressed in the current CFAES strategic plan and in NIFA's priority areas. Throughout the 2016-2020 planning period, our organization will continue to use a stakeholder-based approach through individual and collective strategic planning exercises and needs assessments.

OARDC and OSUE both will maintain multiple levels of advisory committees, which act as partners with county, regional, and statewide groups to garner input and guidance. Each group is charged with identifying additional stakeholders, committee members, and others who may have a vested interest in the organization.

In 2014, OSU Extension began participating in a nationwide initiative, 'Extension Reconsidered.' The goal of the initiative is to engage a diverse range of participants in constructive and critical thought regarding the future of Cooperative Extension programs. OSU Extension is one of 13 land-grant universities participating in the initiative. In Ohio, the 'Community Reconsidered' initiative will also be active in early 2015. Deliberative conversations will take place in 13 Ohio counties. The target audience for these conversations is youth and young adults, ages 14-30. Results of this needs assessment-like activity will be shared with the new Extension director.

In OSU Extension, signature programs will continue to be evaluated annually to ensure they are addressing critical needs or issues relevant to a significant number of Ohioans. Signature programs will be reviewed by a committee and measured against pre-determined criteria (i.e., addresses a critical need for programming, has formal or informal curriculum materials, has impact data and evaluation tools to continue to evaluate program effectiveness, and is replicable across the state). Additionally, as signature programs are "graduated" (i.e., when a program has proven itself successful and sustainable), proposals for new programs will be reviewed by a committee and administrative cabinet to determine how accurately the proposed program will meet the signature program criteria.

Signature programs will continue to be the "broad strokes" of OSUE's programming efforts. Extension will continue to deliver programming that meets statewide needs, but will also continue to address needs that have national impacts. Two of OSUE's current signature programs are duplicated in multiple states. The 'Real Money. Real World.' curriculum has been purchased by Virginia and North Carolina, and in 2014 orders from Mississippi and North Carolina A&T were received. 'Dining with Diabetes' is offered in many states, including (but not limited to) Pennsylvania, West Virginia, Colorado, California, Wyoming, Michigan, and Tennessee.

Other signature programs, while uniquely developed in Ohio, certainly have the ability to impact worldwide issues. 'Nutrient Stewardship for Cleaner Water,' focuses on reducing phosphorus runoff from entering fresh water and creating harmful algal blooms, and 'Energize Ohio,' educates individuals on renewable energy sources and Marcellus shale gas. The 'Energize Ohio,' program has been developed in cooperation with a number of Extension organizations at universities, including (but not limited to): Michigan State University; Purdue University; Penn State University; West Virginia University; Colorado State University; and Cornell University.

OARDC research and OSUE programming reaches across the country and the world through websites, podcasts, webinars, and other forms of online media.

2. How will the planned programs address the needs of under-served and under-represented populations of the State(s)?

The under-served and under-represented stakeholder needs will continue to be addressed at all levels of administration at this institution throughout the 2016 - 2020 planning period. This commitment has been reaffirmed in the CFAES 2011-2016 strategic plan, as well as in OSU Extension's 2013 strategic plan and OARDC's current operational plans. Affirmation will be reflected in future documents. OARDC and OSUE have sought, and will continue to build linkages with a number of under-served groups.

Examples of under-served groups that have been recently engaged include: communities in regions with limited access to healthy, affordable food, i.e., "food deserts"; Somali communities (fresh goat meat initiative); multiple community-based programs with the Amish; and native Spanish-speakers, through a number of publications in Spanish. Websites will expand Spanish language sections. OSUE and OARDC jointly manage a research, development, and Extension center in southern Ohio (South Centers) that assists the economically depressed Appalachia region of Ohio. Faculty members also participate in the Summer Research Opportunities Program (SROP) that serves as a gateway for underrepresented students to enter graduate school. In the case of the Somali communities and fresh goat meat initiative, a request was directly made to provide Extension publications and programs, as well as aid in enhancing the supply of fresh goat meat for a new and increasing Somali immigrant population. In other cases, needs are identified by faculty and staff who engage with a population-for example, evaluating the effectiveness of daycare provided by the grandparents of children who come from rural, single working parent homes.

OSU Extension has been increasingly using technology-based platforms, including eXtension, webinars, and social media (such as Twitter and Facebook). Extension hopes to reach youth and other new audiences via technology. While Extension plans to maintain programming in "the traditional method" of face-to-face educational sessions, we also realize that the lifestyles of individuals are changing-therefore, we are diverting increasing attention to new delivery modalities. Extension will likely implement more asynchronous delivery methods, to allow for wider audience participation, and to meet schedules of many individuals. In early 2015, OSUE created an Educational Technology Unit after a successful two-year pilot project. The Educational Technology Unit will focus on pilot testing new educational technologies and strategies, as well as develop training to help integrate new delivery methods into the knowledge base of OSU Extension educators. The unit will continue well into the future, as technology is constantly evolving.

Research and Extension faculty and staff will continue to be involved in programs such as food networks, urban gardening, local fresh foods to local schools or food banks, and farm markets in urban areas as a means to make fresh food more available to urban populations, many who are underserved.

OARDC and OSUE have an active, well-supported college-wide diversity committee that works to ensure that all faculty, staff, and students within our college understand, appreciate, and respect diversity. CFAES recognizes that the first step in addressing the needs of the under-served and under-represented is to address these matters internally, in turn building a culture of acceptance and appreciation of diversity within our own ranks.

3. How will the planned programs describe the expected outcomes and impacts?

OSU Extension and OARDC will continue to evaluate programs based on outcomes and impacts by assessing new scientific knowledge gained, knowledge and behavioral changes of clientele, and economic / social / environmental or policy changes that occur as a result of research and programming efforts. The outcomes are expected to have major impacts in Ohio, nationally, and worldwide, especially as we seek to grow the economy, create jobs, improve food security, reduce world hunger, move more toward energy independence, and mitigate the impacts of climate change and other environmental problems.

OSU Extension educators will continue to implement the logic model when planning programs, as well as for determining evaluation tools to assess program effectiveness. Evaluation results from programming will be compared to the program's goals and expected outputs and outcomes. Opportunities for curriculum or delivery methods will be determined from both formal, assessment-based data, as well as informal data (such as changes in program attendance or verbal feedback from program participants). Many evaluation tools used by OSU Extension professionals ask questions regarding potential changes in the programming, as well as what participants liked best and least. This type of feedback helps drive the identification of changes in programming, which ultimately results in the updating of curriculum to most effectively meet the needs of our clientele.

OSU Extension will continue to use evaluation tools (e.g., pre-post, retrospective) in conjunction with programming efforts to assist in documenting program impact against pre-determined / expected program outcomes. Assessment tools typically employ both quantitative and qualitative questions.

4. How will the planned programs result in improved program effectiveness and/or

For the 2016-2020 planning period and into the future, effectiveness and efficiency will continue to be assessed at all levels of the organization. OSUE and OARDC will continue to have finite resources and will depend heavily upon state and competitive grant funding from extramural sources, in addition to federal base funds. OSUE and OARDC will continue to dedicate, at minimum, 25% of our formula funds to programming and research that serves multi-state and integrated activities. Continued and enhanced focus on assessing stakeholder needs while assessing the institution's capabilities to meet those needs that fall within the scope of our mission is a first step to ensuring program effectiveness.

Efficiencies are also gained by predetermining where scarce resources are to be targeted and what impacts are expected based on the inputs allocated. We are highly dependent on stakeholders, from businesses that help frame and commercialize product and service concepts, to the consumer. Our strategic plans and external program reviews will continue to provide additional insights into addressing the most pressing needs of our clientele. Maximizing effectiveness and efficiency throughout this planning period are critical to the success of this reporting institution and perhaps to the long-term well-being of agriculture experiment stations and state Extension programs nationwide.

OSUE also gains efficiencies using volunteers. 4-H advisors are adult volunteers who serve a critical role in Ohio 4-H programming; they collectively dedicate tens of thousands of hours to help make our youth development programming a success. Master Gardener Volunteers and Certified Crop Advisors are examples of Extension-trained volunteers and consultants (respectively) who carry the Extension message into communities and farm businesses in Ohio. In 2014, Ohio had approximately 540 Certified Crop Advisors and nearly 4,000 Master Gardeners. These two groups effectively magnified the reach of OSU Extension

programming efforts, by carrying the Extension message to Ohio citizens. OSU Extension's "Teaching the teachers," program for volunteers and Extension-trained consultants will continue to aid Extension in efficiently delivering our message and magnifying our reach.

IV. Stakeholder Input

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

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

Brief explanation.

Stakeholder input is central to our 2016-2020 planning effort. While our organization is guided by the strategic plans created by CFAES, OSUE, OARDC and the University as a whole, we continually seek stakeholder input. Each of these three entities have stakeholder Advisory Committees. In addition, OARDC has advisory committees of producers, processors and faculty that serve at each of our eight agricultural research stations in Ohio. These committees meet at least twice annually with administration to discuss research, outreach and educational needs within the industries they represent.

Extension will continue to implement multiple layers of advisory committees, seeking input for program planning, implementation, and evaluation. Additionally, Extension will conduct periodic needs assessments, soliciting feedback from clientele, stakeholders, and other Ohio citizens who may not have familiarity with Extension. OSUE and OARDC involve stakeholders in meetings with state legislators to discuss programmatic priorities and budgetary needs to ensure that we are focusing on the critical needs of Ohioans.

OSU Extension will continue to create stakeholder-based strategic plans to identify statewide priority programs. The process involves collaboration with local advisory committees; reviewing data about demographic, economic, and social trends in Ohio; and prioritization based on need and availability of resources. This is a proven process that will enable the creation of focused teams composed of campus, center and field specialists, as well as county educators, who will develop curriculum and evaluation strategies for statewide programs. These teams will identify specific target audiences whom they will regularly involve in evaluating programs and educational materials and engage in planning. Some teams may include members from external organizations (statewide agencies, organizations, commodity groups) who are excellent partners for enhancing program outreach and delivery.

Meaningful stakeholder input will continue to be central to this institution's success.

2(A). A brief statement of the process that will be 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.

Stakeholder relations are a key part of OARDC and OSU Extension's culture. Throughout the 2016-2020 planning period, we will continue to build on a history of successfully identifying and linking with stakeholders. The institution will continue to utilize faculty and staff, associates from support organizations, and political leaders to help identify individuals and groups with whom we should be interacting. These contacts will be logged and maintained. As new contacts are made, they will be asked to identify others who need to be included. Formal needs assessments and targeted surveys will be used to help identify individuals, groups, issues, and needs. Often, it is at our Extension programs, where active participation by faculty and staff in the community expands our institution's clientele list, knowledge of needs is gained, and feedback is obtained.

OARDC and OSU Extension are actively involved in planning and economic development at the county, regional, and statewide levels and will continue to be so throughout the 2016-2020 planning period. Local committees are expected to have a constitution and bylaws that identify the makeup of the committee. The membership of committees is reviewed during annual on-site, self-study diversity reviews to ensure that involvement is sought from a representative group of local citizens. Educators are encouraged to reach out to new and under-served target audiences to identify specific needs to be addressed. This occurs at the campus level as well, and will continue to occur.

CFAES has a large research arboretum on each of its two main agriculture campuses, Columbus and Wooster. These sites serve as teaching and research laboratories, but they also attract large numbers of visitors and volunteers annually and are used to help open channels of communications.

Statewide program teams (such as the Agronomic Crops team) will conduct program evaluation and needs assessments directly with users of their web-based resources to determine what information they need (during the growing season) and how they want to receive that information. For example, program evaluations have determined that information delivered in a timely manner from the Crop Observation Reporting Network (CORN) has resulted in an average savings of approximately \$10+ million annually in pesticide use. Such feedback is now leading OARDC and OSU Extension to grow their presence on social media. This planning period will see a marked advancement in the use of these and other new

stakeholder relations tools, such as blogs, and more time saving communication tools such as webinars and videoconferencing.

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

1. Methods for collecting Stakeholder Input

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

Brief explanation.

In order to collect adequate stakeholder input, multiple methods will be used in this planning period. Faculty and staff members all have stakeholders that they seek out for feedback, usually informally. The traditional stakeholders tend to be business and industrial partners, fellow research and extension institutions, and support organizations. We seek input in the initial planning and execution phases of our programs from federal, state, regional, and local governments and agencies, as well as advisory committees and friends groups, commodity groups, and special interest groups.

Informal, one-on-one, or small group interactions with research and extension personnel will be the dominant means of garnering input. This personal, face-to-face time provides high quality input. Stakeholder input is also gathered at large events, such as our annual Farm Science Review, and at state and county fairs. OSU Extension faculty and staff have the opportunity to interact with large, diverse groups of people at these venues. Such events are ideal to introduce our organization to those previously unaware of us, and to gather information and feedback from participants (whether established clientele or those just learning about Extension). At many large events, data, such as email addresses, are collected from event participants and the individuals are invited to join an Extension mailing list (which helps to expand our clientele list and maintain contact with individuals across the state).

OSU Extension also employs surveys (primarily electronic) to gather needs assessment data. Other methods of collecting stakeholder input may include telephone interviews, US Mail surveys, and focus groups.

3. A statement of how the input will be considered

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

Brief explanation.

OARDC and OSU Extension are customer-centered; thus, stakeholder input will continue to be sought throughout the 2016-2020 planning period. This strategy is clearly articulated in the CFAES strategic plan that guides research and extension programs. That plan explicitly calls for stakeholder input at all levels. Formal and informal inputs are required to meet client needs, as well as in fulfilling the land-grant mission. Client needs and their input are critical in the state-level budget process and the Plan of Work for federal base funding.

Input from stakeholders will continue to help build research and Extension programs that are impact oriented, fulfill society's needs, and contribute to national well-being. State, federal, and extramural supporters need to see constituency benefits in order to continue to justify funding decisions. Field-level interactions with stakeholders, in conjunction with sound theory and practice standards, will help to identify the majority of emerging issues. While strong, theoretical academic insight is important, issues related to food, agriculture, and environment most often manifest themselves in field / business locales and in our clients' daily work and social lives. Clients will continue to be true partners with faculty and staff in identifying emerging issues.

Issues and needs originating from producers, processors/manufacturers, distributors, and consumers will continue to direct and redirect both our Extension and research programs. Such issues will provide our scientists with their study questions. Once answered, their responses are framed for clients and other interested parties by OSU Extension in the form of educational programming. The programming will include intervention to effect change (knowledge, behavior, and / or economic / social / environmental / policy) and drive assessments of impact. Impacts will be periodically reviewed and measured against past program performance. Past performance, in conjunction with factors like program participation rates, will be used to determine the necessity of programming efforts.

Stakeholder input continues to influence how our institution positions itself in the marketplace and conducts business. As a public institution, it is imperative for society to see that our organizational activities reflect their aspirations and meet their needs.

Input will be considered at many levels of the organization. The Administrative Cabinet of OSU Extension will review input from surveys and strategic planning processes to determine funding and staffing needs. The State Extension Advisory

Committee will continue to meet 3-4 times a year to provide input on programmatic needs and proposed priorities. Extension administrators (Director, Associate Director) and others with statewide program leadership responsibility will continue utilizing a departmental accountability process with all CFAES departments 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 CFAES departments. Locally, Extension Advisory Committees and other programmatic committees will continue to assist educators in prioritizing programs annually. They will review information about local needs, evaluate the capacity of Extension to deliver programs, and guide the overall local programmatic vision. The OARDC Advisory Committee also meets 3-4 times annually and is equally as engaged in all aspects of our operation from budgeting to agenda setting. Meaningful stakeholder engagement will continue to be a key to our success in fulfilling our mission.

V. Planned Program Table of Content

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

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Climate Change

2. Brief summary about Planned Program

An understanding of the current and potential impacts of climate change is a basic requirement for delivering to society a secure supply of food, fiber, and other associated products and related services. Anthropogenic and naturally occurring effects on the climate have the potential to threaten that secure supply chain. Climate change will also continue to threaten sustainable ecosystems well beyond the 2016-2020 planning period.

OARDC's North Appalachian Experimental Watershed Research Station is one of the sites chosen for a comprehensive, USDA-supported \$20 million study aimed at keeping Midwest corn-based cropping systems resilient in the face of future climate uncertainties. This grant is in its fifth and final year. Activities include collecting data on carbon, nitrogen, and water movement, as well as evaluating the impact of cover crops in corn rotations with regard to nitrogen fertilization requirements. Likewise, CFAES has climate-related centers within academic departments, such as the Carbon Sequestration Center in the School of Environment and Natural Resources, which is focused on the role of carbon sequestration as a means to enhance soil quality and reduce atmospheric carbon.

Finally, OSU, along with Michigan State University, participated in the USDA-Agricultural Research Service (ARS) Midwest Climate Hub discussion on priorities impacting specialty crop production. The Climate Hub program was established in 2014 to assemble research on climate changes in different areas of the U.S., Midwest production systems, and soil and water resource vulnerabilities. This science-based information provides the foundation for development of decision support tools and information resources to assist farmers, crop advisors and other land managers. The Midwest Climate Hub is also engaged in building collaborative public and private partnerships to increase climate resilient systems for agriculture.

OSU Extension will provide parallel programs in this Planned Program to advance knowledge, promote adoption and change, and develop human capital. OARDC and OSU Extension faculty and staff will engage in appropriate levels of outreach, engagement, and consultation, with both internal and external stakeholders.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
132	Weather and Climate	70%		25%	
133	Pollution Prevention and Mitigation	20%		65%	
605	Natural Resource and Environmental Economics	10%		10%	
	Total	100%		100%	

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Climate change is a global problem, but a specific subset of its challenges are already affecting the Great Lakes region, and will likely continue to affect the region for some time. For example, excessive winter and spring moisture increases runoff into tributaries and Lake Erie resulting in additional silt, phosphorus and other components in watersheds. Climate change can affect the safety of drinking water; increase the number and/or severity of droughts and floods; cause a decrease in crop and timber yield over time, and impact the migration of both native and invasive species.

Climate change and its related impacts affect many factors that influence the daily lives of the general public, such as infrastructure, public health, agriculture, and water quality. For example, in 2014, the polar vortex conditions during the winter months caused great losses to Ohio's wine grape industry, with estimated losses of \$12 million.

The research by agricultural experiment stations and companion Extension programs are mandatory to meet domestic demands to reduce and/or mitigate the impacts of climate change. Such research directly supports OARDC and OSU Extension's broader goals of production efficiency, economic viability, environmental stewardship, and social acceptability of technologies and products introduced. OARDC and OSU Extension address direct needs of all their constituency groups by regularly interacting with them, and understanding and assessing their needs. The results of assessments and interactions with constituency groups inform future priorities, goals, and program direction.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Climate change research is a client-oriented program designed to meet society's needs for information and solutions. Given the political nature of this topic and, at times, the conflicting results from multiple predictive models, an unbiased research and Extension program is essential. As we address problems and needs within our stakeholder communities, the organization becomes better prepared to take advantage of emerging opportunities and more rapidly address problems within these areas.

Other key assumptions are:

- The issues within this program have been identified by our stakeholder business partners, and/or via a growing body of scientific literature;
- The identified issues reflect the priorities of stakeholders, and warrant allocation of resources;
- The understanding of this planned program and how society utilizes and depends on the associated research is key to present and future decision-making in the face of climate change;
- All citizens directly benefit from this program;
- The effort is supported by an advanced research and Extension program;
- Research and Extension education in this program are demanded by society and required to meet current and future needs of society.

It is further assumed that base federal funding will continue to be available to support climate change research and the scientific staff members who carry out the lines of inquiry noted within the knowledge areas for this program. Likewise, it is assumed that federal base funding will continue to be leveraged to attract state and extramural funds.

2. Ultimate goal(s) of this Program

OSU Extension and OARDC's ultimate goal for this program is to develop an agricultural system that maintains high productivity in the face of climate change. This planned program is designed to contribute to biological, chemical, physical, engineering, economic, and social research that will inform the process to build a sustainable production system that is resilient to the risks created by climate change. OSU Extension and OARDC, through the creation of partnership networks that involve stakeholders, will continue to meet society's growing demand for science based answers to climate change related to food, agricultural, and environmental sciences enterprises.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2016	2.0	0.0	1.0	0.0
2017	2.0	0.0	1.0	0.0
2018	2.0	0.0	1.0	0.0
2019	2.0	0.0	1.0	0.0
2020	2.0	0.0	1.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Translational/applied climate change research
- Laboratories, pilot plants, a feedstock processing plant, greenhouses, and research plots and stations will all be used for relevant experiments
- Infrastructure and facilities will be improved over time as program needs warrant
- Educational programming offered
- One-on-one consultations
- Webinars

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Education Class • Workshop • Group Discussion • Other 1 (webinar) 	<ul style="list-style-type: none"> • Web sites other than eXtension • Other 1 (webinar archives)

3. Description of targeted audience

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

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

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of participants attending educational programs
 - number of webinars / online educational and research sessions
 - number of acres impacted as a result of educational events on the management of natural resources
 - number of individuals receiving one-on-one consultation or assistance
 - number of people completing non-formal educational events on water quality and quality of surface water and groundwater supplies (OSUE)
- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Create strategies / technology within our program mission to reduce atmospheric pollution that can contribute to global climate change (OARDC)
2	Proportion of climate webinar participants who indicate they have learned new information and would share their new knowledge with others (OSUE)
3	Advance knowledge of how climate change affects crops (OARDC)

Outcome # 1

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation

4. Associated Institute Type(s)

- 1862 Research

Outcome # 2

1. Outcome Target

Proportion of climate webinar participants who indicate they have learned new information and would share their new knowledge with others (OSUE)

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 132 - Weather and Climate

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

Advance knowledge of how climate change affects crops (OARDC)

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 132 - Weather and Climate

4. Associated Institute Type(s)

- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Other (Social Acceptance of the issue)

Description

Climate change is a multi-dimensional, political, and socially debated topic; thus, a shift in any or all of these factors can affect outcomes. Climatic extremes, coupled with the migration of pests and diseases that are often climate related, can impact outcomes. As the food, fiber, and environmental economies adjust to global climate change, including flood and weather patterns that are highly inconsistent with the norm, there will be other confounding changes in public policy, environmental regulations, demand for action/inaction, new predictive models, and a lack of worldwide consensus on how to respond/react/lead. Evaluation can lessen the burden of these uncertainties 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, all may affect outcomes.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

OARDC has developed and incorporated protocols for documenting success in achieving goals as an integral part of the approval and funding process for this planned program. Each department, center, lab group, and individual faculty member has techniques for garnering feedback and ascribing value to their processes and products. Given that much of the research work of OARDC faculty and staff does not focus on group-level dynamics, many of the more formalized evaluation techniques are not appropriate. The techniques that OARDC continues to use, most of them being qualitative surrogate measures, are:

- Informal and formal feedback from stakeholders in terms of needs, willingness to participate, willingness to advocate for OARDC, ease of participation/inclusion, willingness to support, and overall level of satisfaction with OARDC processes and products;
 - Feedback from the OARDC Advisory Committee that ranges from helping to determine needs of our constituencies to feedback on commercialization of a new patented product;
 - Elected state and federal officials' support for OARDC in terms of base budgets, new initiatives, and their willingness to help us link with new stakeholders
 - Support from USDA, feedback from NIFA regarding our federal reports, and feedback and support

we receive from other federal agencies;

- Accountability measures required by extramural grants and contracts and our level of attainment of those required metrics;
- Impacts reported by individual CFAES departments in their OARDC budget requests as part of our differential funding model, as well as individual faculty member's impact statements;

For this planned program, OSUE will use the following evaluation methods:

- Pre-post;
- Retrospective;
- Exit slips;
- Case studies;
- Electronic and mail surveys;

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Sustainable Energy

2. Brief summary about Planned Program

Non-renewable energy is still a primary fuel source in the United States; and consumers remain highly dependent on fluctuating crude oil imports to supplement domestic sources for the creation of energy and other petroleum-based products. OARDC and OSU Extension, and multiple partners, are exploring new opportunities for adding value to bio-based products beyond traditional food and fiber markets. These efforts include commercialization of new products in the form of sustainable energy and advanced materials, as well as educating the public on renewable energy alternatives.

With OSU's focus on three University-wide Discovery Themes (Health and Wellness; Energy and Environment; and Food Production and Security), OARDC's research priorities will expand in these areas for the 2016-2020 planning period. One such project that addresses multiple issues of sustainability within these themes is OARDC's bioenergy crop research. All across Ohio, a variety of grasses, shrubs and trees, known as "bioenergy crops" are being grown and analyzed for their suitability to different regions of the state, their biomass yield and their potential to become value-added crops for farmers.

The sustainable energy plan of work for Extension is centered on the 'Energize Ohio' renewable energy curriculum. 'Energize Ohio,' an Ohio State University Extension signature program, provides non-biased, research-based information to address critical energy issues impacting Ohioans. The program is designed to enhance community leaders' and local residents' knowledge of energy drivers and development in order to promote best practices and informed decision-making on the implementation of sustainable energy strategies in Ohio's communities, businesses, and farms. Renewable energy topics currently addressed include large-scale renewable energy development, youth renewable energy education, on-farm renewable energy, and distributed renewable energy development.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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	40%		90%	
608	Community Resource Planning and Development	60%		10%	
	Total	100%		100%	

V(C). Planned Program (Situation and Scope)**1. Situation and priorities**

The United States is highly dependent on fluctuating crude oil imports to supplement its domestic sources for the creation of energy. Due to the rising costs of crude oil and the eventuality of declining supplies of crude oil, bio-based substitutes for petroleum-based energy and other products are in demand, as are other forms of sustainable energy.

Renewable energy accounted for 6.2% of U.S. electricity generation in 2013. Since 2000, total renewable energy consumption in the United States has increased by 58%. Between 2014 and 2016, the Energy Information Administration (EIA) expects continued growth in both utility-scale wind and solar power generation. Utility-scale solar capacity is expected to increase by more than 60% or 6 gigawatts, and utility-scale wind capacity is expected to increase by 16%, representing 15 gigawatts of new capacity. Homeowners, farm owners / operators, and business owners are increasingly seeking out safe, economic energy generation alternatives.

OARDC and OSU Extension's role is to inform the process. This line of research by agricultural experiment stations and companion extension programs nationwide are mandatory to meet domestic demand for new and innovative sources of sustainable energy. Such research directly supports OARDC and OSU Extension's broader goals of production efficiency, economic viability, environmental stewardship, and social acceptability of technologies and products introduced. OSU Extension and OARDC address direct needs of all their constituency groups by regularly interacting with them and understanding their needs.

Scientists working in bio-based (advanced materials) products have formed strong partnerships with industry to ensure that research results are translated into development of commercialized products and processes that are in demand by consumer groups. Job growth is also very important. Without a growing body of knowledge in this area to create plentiful supplies of sustainable energy and advanced materials while creating jobs and new industries, opportunities will be missed and society will not be well served. This 2016 -2020 planning period will also see the growth of research and extension programs related to Ohio generated shale oil and gas.

With a growing body of literature and a well-developed network of industrial partners, clientele, supporters, and companion agencies and organizations, OSU Extension and OARDC are well positioned to continue to lead positive change in adding sustainable energy and advanced bio-materials research and education.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Sustainable energy and advanced materials research is a client-oriented program designed to meet society's needs for alternative (advanced) energy and bio-based products in a sustainable manner. As we address problems and needs within our stakeholder communities, the organization becomes better prepared to take advantage of emerging opportunities or to more rapidly address problems within these areas.

The emerging development of shale oil and gas in Ohio is assumed to create new demands on OARDC and OSU Extension. Other key assumptions are:

- the issues within this program have been identified by our stakeholders / business partners and other clientele, and / or via a growing body of scientific literature;
- Priorities among stakeholders are important and warrant allocation of resources;
- the understanding of this planned program and how society utilizes and depends on associated research is key to present and future decision-making in developing alternatives for some petroleum-based products;
- all citizens directly benefit from a secure and plentiful supply of non-petroleum based products and processes that this program will generate;
- the program is supported by an advanced research and Extension program and is required for commercialized products to emerge;
- these lines of inquiry are necessary to inform human enterprises;
- research and Extension education in this program are demanded by society and required to meet current and future needs of society, especially as we move towards energy independence and as crude oil reserves decline.

It is further assumed that base federal funding will continue to be available and leveraged to support this planned program and the scientific staff who carry out the lines of inquiry noted within the knowledge area for this program. Likewise, it is assumed that federal base funding will be leveraged to attract state and extramural funds.

2. Ultimate goal(s) of this Program

Goals for this planned program include:

- Building a system for sustainable energy and advanced materials;
- The creation of partnership networks that involve all stakeholders at the appropriate point in the process (value chain) necessary to make these research and extension efforts true partnerships with fully vested partners;
- Meeting society's growing demand for alternatives to petroleum based products where demand, and

economic and technological realities warrant;

- Meeting as yet undetermined needs of society as crude oil supplies decline;
- To effectively utilize the plentiful supply of biomass in Ohio and the region, including waste stream materials that have conversion potential;

To effectively utilize Ohio agriculture's capacity to produce plants that have the desired attributes required by new bio-based industries for manufacturing alternative products.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2016	2.0	0.0	2.0	0.0
2017	2.0	0.0	2.0	0.0
2018	3.0	0.0	2.0	0.0
2019	3.0	0.0	2.0	0.0
2020	3.0	0.0	2.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Throughout the planning period, research and Extension activities will inform sustainable energy programs. Laboratories for experiments, pilot plants, a feedstock processing plant, greenhouses, and research plots and stations throughout the state will support this program. All functional laboratories and sites will be improved over time as program needs warrant. OSU Extension will provide renewable energy programs to advance knowledge, promote adoption and change, develop human capital, support economic development, and create sustainable energy planning activities. The outreach from community-scale renewable energy education is planned to continue into the future, while new program development is underway for on-farm solar energy applications. OARDC and OSU Extension faculty and staff will engage in appropriate levels of outreach and consultation, with both internal and external stakeholders, to ensure the research has the greatest chance of effecting change within society.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Education Class • Workshop • Group Discussion • One-on-One Intervention • Demonstrations 	<ul style="list-style-type: none"> • Web sites other than eXtension • Other 1 (Factsheets) • Other 2 (Social media)

3. Description of targeted audience

Targeted audiences include, but are not limited to:

- Business, industry, and residents that have expressed a need for sustainable energy and advanced materials information that is derived through new research, extracted from on-going research, or mined 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 research, but also the adoption of research findings by industrial partners;
- Fellow agencies or support organizations who will not only use the information but will also be brokers for embedding it into other groups to encourage change;
- Populations who have not requested the information but will likely benefit from the knowledge, e.g. community leaders, general public;
- Other scientists and scientific groups;
- Political entities;
- Other education, outreach, and Extension personnel;
- Students from elementary school to post doctorate studies;
- News organizations.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- number of educational workshops / seminars on "Sustainable Energy" topics (OSUE)
- number of visitor sessions to the "Energize Ohio" website (OSUE)
- number of attendees at on-farm photovoltaic solar energy development workshops (OSUE)

- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Annually the program will report, in conjunction with industrial partners, non-proprietary research gains made to the consuming public to garner interest in adoption of new products and processes when released.
2	By 2018, the program will contribute at least two alternatives to a petroleum-based product or process that meets client needs with an acceptable point of purchase price.
3	Support, through research, the building of biobased development that annually, beginning in 2013, utilizes Ohio and the region's plentiful supply of biomass, including waste steam materials in such manner as to improve the economy.
4	Number of on-farm alternative energy projects completed (OSUE)
5	Complete plan for community, business, or farm energy activity (OSUE)
6	Proportion of participants who indicated they know more about energy as a result of the "Energize Ohio" program (OSUE)
7	Proportion of participants who indicated that they plan to use the materials and / or information from the "Energize Ohio" program in making decisions related to energy at their home, farm, or business (OSUE)
8	Proportion of "Energize Ohio" participants who indicated that the program provided valuable information that they would recommend to others (OSUE)
9	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. (OARDC)

Outcome # 1

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 511 - New and Improved Non-Food Products and Processes

4. Associated Institute Type(s)

- 1862 Research

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 511 - New and Improved Non-Food Products and Processes

4. Associated Institute Type(s)

- 1862 Research

Outcome # 3

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 511 - New and Improved Non-Food Products and Processes

4. Associated Institute Type(s)

- 1862 Research

Outcome # 4

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 511 - New and Improved Non-Food Products and Processes

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 5

1. Outcome Target

Complete plan for community, business, or farm energy activity (OSUE)

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 608 - Community Resource Planning and Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 6

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 7

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 8

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 9

1. Outcome Target

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. (OARDC)

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect 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)

Description

Supply and demand for petroleum products, refining costs, transportation costs / impacts, and shifting projections of world reserves of crude oil and natural gas, as well as U.S. access to these, will likely continue to be critical external factors. New sources of oil and gas from Ohio's oil shales will also continue to be an external factor. Economic shifts, such as cost of processing equipment or production costs, public policy shifts, regulations, and shifts in demand will impact outcomes. Product trends, advertising agendas, and public perceptions about regional petroleum reserves, are also external factors that may affect outcomes. 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 will affect outcomes.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

OARDC has developed and incorporated protocols for documenting success in achieving goals as an integral part of the approval and funding process for this planned program. Each department, center, lab group, and individual faculty member has techniques for garnering feedback and ascribing value to their processes and products. Given that much of the research work of OARDC faculty and staff does not focus on group-level dynamics, many of the more formalized evaluation techniques are not appropriate. The techniques that OARDC continues to use, most of them being qualitative surrogate measures, are:

- Informal and formal feedback from stakeholders in terms of needs, willingness to participate, willingness to advocate for OARDC, ease of participation/inclusion, willingness to support, and overall level of satisfaction with OARDC processes and products;
- Feedback from the OARDC Advisory Committee that ranges from helping to determine needs of our constituencies to feedback on commercialization of a new patented product;
- Elected state and federal officials' support for OARDC in terms of base budgets, new initiatives, and their willingness to help us link with new stakeholders;
- Support from USDA, feedback from NIFA regarding our federal reports, and feedback and support we receive from other federal agencies;
- Accountability measures required by extramural grants and contracts and our level of attainment of those required metrics;
- Impacts reported by individual CFAES departments in their OARDC budget requests as part of our differential funding model, as well as individual faculty member's impact statements.

For this planned program, OSUE will use the following evaluation methods:

- Pre-post;
- Retrospective;
- Exit slips;
- Case studies;
- Electronic and mail surveys.

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Childhood Obesity

2. Brief summary about Planned Program

Obesity is of major health concern nationwide, with approximately one third of adults and 17% of children in the US classified as obese (CDC, 2011 data). Obesity health-related costs in the US are approximately \$190 billion annually (2012 data). Obesity is a concern from both the perspective of society and from a research-Extension perspective. The food plants and animals we grow, process, and provide for consumption have human health issues associated with them.

While not all of the following activities are explicitly reported in this planned program, OSU Extension is addressing the topic of childhood obesity through programs such as 'Choose It! Use It!', 'Simple Suppers', and 'Farm to School.' These programs all have similar aims -- teaching children how to make balanced, proportionate, and nutritious choices when eating, and to exercise to help maintain a healthy weight.

This Planned Program is focused, through research and extension programming, on reducing threats to human health from obesity. While the program is not large, it is of important to both the research and extension portfolios, and is funded by both OARDC and OSU Extension in two colleges. Given that obesity is linked to multiple areas reported throughout this POW, outcomes and impacts affecting obesity will occur in Planned Programs other than this one.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

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

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Obesity rates for adults have doubled and rates for children have tripled in the last three decades. American society is characterized by environments that promote increased food intake of non-healthy foods and of physical inactivity according to the US Center for Disease Control (CDC). More than one third of U.S. adults and 17% of U.S. children, or over 72 million people, are obese. Obesity rates among all groups in society, irrespective of age, sex, race, ethnicity, socioeconomic status, education level, or geographic region, have increased markedly according to the CDC.

While obesity affects all populations in the US, according to the CDC, the under-served are most impacted, with African-Americans having 51% higher prevalence of obesity when compared to Caucasians, and Hispanics had 21% higher obesity prevalence than non-Hispanic Caucasians. Obesity has physical, psychological, and social consequences in adults and children. Obesity is related to diabetes and psychological problems such as poor self-esteem. Children and adolescents are developing obesity-related diseases, such as type 2 diabetes, that were once seen only in adults. Obese children are more likely to have risk factors for cardiovascular disease, including high cholesterol levels, high blood pressure, and abnormal glucose tolerance according to the CDC. One study of 5 to 17 year olds found that 70% of obese children had at least one risk factor for cardiovascular disease and 39% of obese children had at least two risk factors.

Obesity is a major economic burden on the U.S. health care system. In 2012, obesity-related health care costs, reported in the Journal of Health Economics, totaled an estimated \$190 billion, or 21% of annual medical spending in the United States.

OSU Extension will continue to offer programs such as 'Choose It! Use It!' and 'Simple Suppers', which teach children how to make wise food choices, or how to help prepare healthy meals at home with family. Additionally, OSU Extension will continue to be involved in the Farm to School initiative, which aims to bring healthy, locally grown food to school cafeterias. There are currently slightly more than a quarter of Ohio school districts participating in the initiative; OSUE aspires to increase that value during the 2016-2020 planning period.

OARDC and OSUE will continue to monitor research on childhood obesity rates and causes, as well as obtain feedback from stakeholders, the community, and advisory groups for local programming needs related to 'childhood obesity' programming.

Research can provide science based solutions for healthier foods and lifestyles and Extension

education can help individuals adopt healthy eating and physical activity behaviors that are the keys to preventing obesity.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Throughout this planning period, OSU Extension and OARDC will continue to support client-oriented research and Extension activities related to obesity. As we address problems and needs within our stakeholder communities, the organization becomes better prepared to take advantage of emerging opportunities or to more rapidly address problems related to obesity. Key assumptions are:

1. the issues within this program have been identified by our stakeholder communities, and/or via the scientific literature, reflect society's more important issues, and warrant allocation of resources;
2. the understanding of this planned program and how society utilizes and depends on the associated research and Extension programs are key to present and future decision-making regarding obesity;
3. all citizens directly benefit from a healthy lifestyle supported by an advanced research and Extension program; these lines of inquiry will provide necessary knowledge to inform human enterprises;
4. obesity-related research and Extension education are demands by society to meet current and future needs;
5. base federal funding will continue to be available and leverage for extramural grants to support this Planned Program and the scientific staff who carry out these lines of inquiry.

Likewise, it is assumed that the federal base funding will be leverage for continuing to attract state and extramural funds.

2. Ultimate goal(s) of this Program

The ultimate goal of 'Childhood Obesity' related programming is to conduct research which can be translated into public education programming. The end product of the research and programming will be well-informed individuals who can make the best decisions about their health and well-being.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2016	8.0	0.0	0.5	0.0

2017	9.0	0.0	0.5	0.0
2018	9.0	0.0	0.5	0.0
2019	10.0	0.0	0.5	0.0
2020	10.0	0.0	0.5	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> ● Education Class ● Workshop ● Group Discussion ● Demonstrations 	<ul style="list-style-type: none"> ● Public Service Announcement ● Newsletters ● eXtension web sites ● Web sites other than eXtension

3. Description of targeted audience

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

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- number of educational sessions held
 - number of participants attending educational events related to 'Childhood Obesity' that can be defined as under-served (i.e. individuals whose needs have not been addressed in past events)
- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	To better understand human decision making; specifically with reference to how individuals make food consumption decisions.
2	Apply new knowledge to programs at the field level with a goal of significant long term weight loss and overall improvement of health in those who participate.
3	To identify research activities such as new data sources, improved techniques for data analysis, and improved hypotheses for obesity research questions.
4	Number of participants who learned new information from this program. (OSUE)
5	Number of participants who plan to increase their level of daily physical activity. (OSUE)
6	Number of participants who plan to increase their consumption of fruits and vegetables (OSUE)

Outcome # 1

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 702 - Requirements and Function of Nutrients and Other Food Components
- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 702 - Requirements and Function of Nutrients and Other Food Components
- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 702 - Requirements and Function of Nutrients and Other Food Components
- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle

4. Associated Institute Type(s)

- 1862 Research

Outcome # 4

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 702 - Requirements and Function of Nutrients and Other Food Components
- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 5

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 724 - Healthy Lifestyle

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 6

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle

4. Associated Institute Type(s)

- 1862 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Obesity is a complex topic to address in that it encompasses a range of variables, including food quality, socio-emotional elements, access to healthy foods, economics, and the decisions of individuals in food choice. Shifts in these variables impact all aspects of people's lives -- psychologically, socially, and physically.

Within this program area, public monies and the fluctuations in appropriations, have dramatic (both positive and negative) affect on human well-being, as do levels of government support for obesity education. Likewise, public policy and the public's priorities and perceptions, as influenced by popular culture and trends/fads, are major external factors impacting this program, as well as food and lifestyle choices made by individuals. The level of importance placed on social science research impacts our ability to compete for limited dollars, and thus impacts the extent to which research can be carried out. Factors such as the availability of base funding to ensure a core faculty and staff, availability of extramural funds, and programmatic demands that often exceed resources, will affect outcomes.

Other factors such as population changes, including migrant populations entering the community

and workforce, and new populations who have recently immigrated into the area, may result in groups that are ill-prepared to sustain themselves to the extent they can purchase healthy foods and/or have access to public education/assistance programs that promote healthy eating and lifestyle choices.

Additionally, learning styles, disabilities, one's background /education, social status, and similar variables affect individual and family eating habits and lifestyle choices. These variables can affect how one learns and how they will use any new knowledge gained. Often, individual traits are well inculcated into an individual's psyche and behavior and change is often slow.

OSU Extension and OARDC are committed to working in this complex program throughout 2016-2020.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

For this planned program, OSUE will use the following evaluation methods:

- Pre-post;
- Retrospective;
- Exit slips;
- Case studies;
- Electronic and mail surveys.

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Food Safety

2. Brief summary about Planned Program

Most research and nearly all education about foodborne illnesses focus on bacteria, such as Salmonella, E. coli, Listeria and Campylobacter. However, viruses (including human norovirus, hepatitis A virus, and rotavirus) account for more than two out of three foodborne illnesses worldwide. Further studies on the role of microbes in foodborne diseases and their impacts is a new focus of OARDC grants and parallel extension work reflected in this planning period.

OARDC and OSU Extension lead programs that advance food preservation and protect against pathogens, and will continue to do so throughout this planning period. Food safety is of major concern locally, nationally, and throughout the world. Due to the complexity of food systems, a robust research and Extension program is required to meet societal needs for a safe food supply.

Building upon CFAES' cutting edge capabilities in agricultural and health sciences the Food Industry Center, among other programs, connects a network of research experts with innovative ways to protect the safety of foods here and abroad. This collaborative, multi-disciplinary approach between plant and animal scientists provides a holistic look at food safety. The Center addresses key issues such as: food pathogens; effective pasteurization and packaging; and ozone fresh eggs that are free of Salmonella.

OSU Extension has long-standing programs in place to educate the public based on findings from new research, including ServSafe courses (for educating those in the food service industry about safe food handling), home food preservation (canning and freezing), and 'Occasional Quantity Cooks' (to educate those who occasionally need to cook for very large groups of people). As we enter this 2016 - 2020 planning period, Food Safety is, and will continue to be, a high priority of CFAES research and extension programming at OSU.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

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

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Food safety programs work to reduce the incidence of foodborne illness and provide a safer food supply by addressing and eliminating the causes. Development of methods to control or eliminate viruses and bacteria that cause foodborne illnesses pre- and post-harvest will result in a safer food supply and restore consumer confidence in our food production and processing capabilities. A safe food supply is central to the security of all nations and is central to advancing world peace. Without a safe food supply, individual rights, sound governments, and economic stability and security will be threatened nationally and worldwide, as will be the natural environment that provides for sustainable food systems.

Throughout the planning period, OARDC and OSU Extension will continue to evaluate current programming and research endeavors via assessments, feedback from advisory committees and other stakeholders.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

A client-oriented research and development program in food safety is critical to meeting society's needs. As we address food safety problems and needs within our stakeholder communities, our organization becomes better prepared to take advantage of emerging opportunities or to more rapidly address problems within these areas.

The issues within this program have been identified by our stakeholder communities, and/or via the scientific literature. The understanding of this planned program and how society utilizes and depends on the associated research is key to present and future decision-making related to providing safe food domestically and worldwide. All citizens directly benefit from a safe, secure, and plentiful food supply supported by an advanced research and Extension program. We assume that base federal funding will continue to be available as well as extramural grants to support this Planned Program and the scientific staff who carry out the lines of inquiry. Likewise, it is assumed that federal base funding will continue to be leveraged to secure state funds.

2. Ultimate goal(s) of this Program

The ultimate goal of OARDC and OSU Extension in supporting food safety programming and research is to reduce the incidence of foodborne illness and provide a safer food supply.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2016	7.0	0.0	1.5	0.0
2017	7.0	0.0	1.5	0.0
2018	8.0	0.0	1.5	0.0
2019	8.0	0.0	1.5	0.0
2020	8.0	0.0	1.5	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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

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

Specific activities of food safety education for consumers will include:

- Conducting food safety education classes;
- Conducting ServSafe classes with food establishment managers and employees;
- Conducting Safe Food Handling for Occasional Quantity Cooks classes with volunteer food preparers;

Providing research-based information to consumers through various forms of media, including phone calls,

fact sheets, social media, news releases, and web pages.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> ● Education Class ● Workshop ● Demonstrations 	<ul style="list-style-type: none"> ● Public Service Announcement ● Newsletters

3. Description of targeted audience

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

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

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of educational sessions held
- Individual instruction on food safety through phone calls
- number of home canners (pressure of boiling water) tested
- number of participants attending local food preservation educational sessions

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

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

Outcome # 1

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

4. Associated Institute Type(s)

- 1862 Research

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

4. Associated Institute Type(s)

- 1862 Research

Outcome # 3

1. Outcome Target

Reduce food borne pathogens in the food supply chain.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

4. Associated Institute Type(s)

- 1862 Research

Outcome # 4

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 5

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 6

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 502 - New and Improved Food Products

4. Associated Institute Type(s)

- 1862 Research

Outcome # 7

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 8

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

4. Associated Institute Type(s)

- 1862 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Food safety can be impacted by all sectors of agbioscience: physical, chemical, biological, social, economic, and environmental. Climatic extremes can affect food safety to the extent that the growth and dispersion of pests and pathogens are climate related. Climatic extremes may also impact the quantity and quality of food supplied as well as the timely distribution of food before contamination becomes an issue. Economics related to the cost of production and processing, public policy shifts, regulatory factors, and shifts in demand might impact outcomes. Food trends, food advertising agendas, new biological and chemical threats, and public nutritional health-related issues are also external factors that may affect outcomes. Factors such as the availability of base funding to ensure a core faculty and staff, availability of extramural funds, and programmatic demands that often exceed resources will also affect outcomes.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

OARDC has developed and incorporated protocols for documenting success in achieving program goals as an integral part of the approval and funding process this planned program. Each department, center, program, lab group, and individual faculty member has techniques for garnering feedback and ascribing value to their processes and products. Given that much of the research work of OARDC faculty and staff does not focus on group-level dynamics, many of the more formalized evaluation techniques are not appropriate. The techniques that OARDC continues to use, most of them being qualitative surrogate measures, are:

- Informal and formal feedback from stakeholders in terms of needs, willingness to participate, willingness to advocate for OARDC, ease of participation/inclusion, willingness to support, and overall level of satisfaction with OARDC processes and products;
- Feedback from the OARDC Advisory Committee that ranges from helping to determine needs of our constituencies to feedback on commercialization of a new patented product;
- Elected state and federal officials' support for OARDC in terms of base budgets, new initiatives, and their willingness to help us link with new stakeholders
- Support from USDA, feedback from NIFA regarding our federal reports, and feedback and support we receive from other federal agencies;
- Accountability measures required by extramural grants and contracts and our level of attainment of those required metrics;
- Impacts reported by individual CFAES departments in their OARDC budget requests as part of our

differential funding model, as well as individual faculty member's impact statements.

For this planned program, OSUE will use the following evaluation methods:

- Pre-post;
- Retrospective;
- Exit slips;
- Case studies;
- Electronic and mail surveys.

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Global Food Security and Hunger

2. Brief summary about Planned Program

Global food security will continue to be a high priority item across our nation and the world. The U.S. Department of Agriculture recently reported that more than one in six Ohio households faced "food insecurity" from 2010-2012. Because Ohio enjoys one of the strongest agricultural economies in the nation, this level of food insecurity is surprising. Changing this trajectory will require a broad set of solutions, and Ohio's agricultural community stands ready to play a key role. There are opportunities to develop new markets, discover new opportunities for producers, diversify crop production, and participate in markets for high value crops. Food deserts are not limited to inner cities, but are also found in Ohio's most rural areas. The benefits of finding solutions to the food insecurity problem are extensive - from improved health and nutrition to job creation and economic advancement.

Due to the complexity of food systems, a robust research and Extension program is required to meet societal needs for a secure food supply and reduce hunger worldwide. OARDC and OSU Extension recognize that global food security is also a local issue, as reflected by specialists who study maximizing fruit and vegetable production in limited spaces; that is, comparing methods of urban farming in empty, abandoned parking lots, in giant-sized pots, in raised beds on top of blacktop, and in trenches cut right through pavement. Findings from such studies will serve as foundations for improved human nutrition and health in urban environments and such environments will continue to be a major focal area for OARDC and OSU Extension.

Additionally, it is important that the college not only have the ability to interpret large data sets, but also understand how to use the findings in educational programs that benefit producers and consumers. Farmers rely on data to make decisions - we know, for example, that there are significant data that can help them solve the water quality problems in Ohio; we know that there are data that will help everyone understand food deserts; and we know that there are data to help inform how young people best learn. The challenge is to have the means not only to collect these data, but also to interpret them to make informed decisions and develop educational programs based on the findings.

As baby boomers enter their retirement years, as cancer and heart concerns grow, and as obesity continues as a national problem, each incremental improvement we make in health care will have a major impact on society. OARDC research and OSU Extension programs will also continue to address how to make food safer and more functional (include or eliminate components that impact human health), lengthen its shelf life, and provide expertise to medical researchers and food companies on how to protect food from pathogens. OARDC and OSU Extension staff will continue to work diligently throughout this planning period to move this new knowledge into business, industry, and homes, both in the US and abroad.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

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

V(C). Planned Program (Situation and Scope)**1. Situation and priorities**

As world population continues to increase, demand for quality food products will likewise increase. Advanced studies in systems related to food security are critical to providing a sustained and secure flow of food in the producer - processor - distributor - consumer chain. Assuring that all interests are informed by the best food science available is an expectation of OARDC and OSU Extension. Research by agricultural experiment stations and companion Extension programs is essential to meet domestic and global food demands. This planned program directly supports OARDC and OSU Extension's broader goals of production efficiency, economic viability, environmental stewardship, and social acceptability of technologies and products introduced.

OARDC and OSU Extension address the direct needs of all their constituency groups by regularly interacting with them to understand their requirements. OSU scientists also network with other research and extension units, and with organized groups of producers, processors, distributors, and consumers. Demand for their expertise, methods, and products is high. Without a growing body of knowledge in this area to create plentiful, high quality, and secure global food systems, opportunities will be missed and society will not be well served. With a sound body of literature, and a well-developed network of industrial partners, clientele, supporters, and companion agencies and organizations, OSU Extension and OARDC are well positioned to create positive change in the science and services essential to sustained food security.

Effective research in food security requires modern laboratories, access to the facilities of industrial partners, and interactions with consumers who are the ultimate evaluators of proposed outcomes. Faculty and staff in this program must provide the knowledge and technologies needed by stakeholders to inform production, processing, distribution, and consumer choices. OSU Extension has the capacity and expertise to promote knowledge acquisition, advance the adoption of new techniques, support new approaches for achieving global food security, and assist with the development of required skills and human capital.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

A client-oriented research, Extension, and development program in food security and hunger is critical to meeting society's demands in this area. As we continue to address problems and needs within our stakeholder communities, the organization will become better prepared to take advantage of emerging opportunities and to more rapidly address problems within these areas.

Other key assumptions are:

- World hunger is expected to increase with global population;
- The issues within this program have been identified by our stakeholder communities, and/or via the scientific literature, and warrant allocation of resources;
 - The understanding of this planned program and how society utilizes and depends on associated research is key to present and future decision-making in the provisioning of food both domestically and worldwide;
 - All citizens directly benefit from a safe, secure, and plentiful food supply supported by an advanced research and Extension program;
 - Lines of inquiry will provide necessary knowledge to inform human enterprises;
 - Food systems research and education are demanded by society and are necessary to meet current and future needs;

It is further assumed that base federal funding will continue to be available and successfully leveraged for extramural grants to support this Planned Program and the scientific staff who carry out its lines of inquiry. Likewise, it is assumed that federal base funding will be leveraged to attract state funds.

2. Ultimate goal(s) of this Program

Food security research and Extension programs will, in cooperation with other parallel areas:

- Advance the study and improvement of the quality, functionality, and preparation/preservation of food, (including relevant methodologies, techniques, and processes);
- Provide the necessary research and Extension programs to improve and develop new foods, advance

research frontiers in food quality, and contribute to the understanding and development of functional foods, including pharmaceutical-grade nutrients;

Research and Extension will grow fundamental knowledge about human nutritional requirements to foster human health, fight hunger, and better understand the relationship between foods consumed and physical and psychological impacts.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2016	12.0	0.0	4.0	0.0
2017	12.0	0.0	4.0	0.0
2018	14.0	0.0	4.0	0.0
2019	15.0	0.0	4.0	0.0
2020	15.0	0.0	4.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

This planned program will advance broad global food security goals and will include both basic and applied research with associated outreach and Extension programs. Research will include microbial studies, packaging and shelf life, food taste tests, and analyses of consumer preferences and behavior. Laboratories, pilot plants, farms, and multiple business sites will be available throughout Ohio to permit data gathering and to continue long-term experiments. All functional laboratories and sites will be improved over time as program needs warrant. Extension will continue to have the capacity to advance knowledge acquisition, promote adoption strategies, and help build human capital to promote global food security and reduce hunger worldwide. OARDC and OSU Extension faculty and staff will engage in appropriate levels of outreach, engagement, and consultation with both internal and external stakeholders.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods

- | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none">• Education Class• Workshop• Group Discussion• One-on-One Intervention• Demonstrations• Other 1 (field days) | <ul style="list-style-type: none">• Public Service Announcement• Newsletters• TV Media Programs• eXtension web sites• Web sites other than eXtension• Other 1 (newspaper articles)• Other 2 (trade and commodity magazines) |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

3. Description of targeted audience

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

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

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- total number of participants attending educational programs of one teaching hour or more (OSUE)
 - Total number of workshops offered to producers and agribusiness leaders on topics related to global food security and hunger (OSUE)
 - Total number of volunteers (committee members, teachers/trainers, unpaid staff, etc.) in the planning and implementation of events related to global food security and hunger (OSUE)
 - number of community gardens associated with local and community food systems programming and demonstrations (OSUE)
 - number of participants in community gardening efforts associated with local and community food systems programming and demonstrations (OSUE)
 - number of volunteer hours associated with community gardens and local community food systems programming (OSUE)
 - percentage of total program participants that are considered to be under-represented (OSUE)
 - percentage of total program participants that are considered to be under-served (OSUE)
- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

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	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.
3	Advance and document improvements in quality and quantity of food stocks to meet global food security and hunger goals.
4	Number of new local / regional food systems (community gardens, farmers markets, food banks) established following an OSUE educational program or guidance by an OSUE professional or volunteer (OSUE)
5	Number of schools purchasing Ohio produced food as part of the Ohio Farm to School program (OSUE)
6	Participate in the creation of a standardized model and protocols for studying functional foods for the purpose of providing consumers with more informed functional choices that are currently available (OARDC).
7	Number of producers becoming certified following 'Fertilizer Applicator Certification' training (OSUE)

Outcome # 1

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 501 - New and Improved Food Processing Technologies
- 502 - New and Improved 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

4. Associated Institute Type(s)

- 1862 Research

Outcome # 2

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 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

4. Associated Institute Type(s)

- 1862 Research

Outcome # 3

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 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
- 702 - Requirements and Function of Nutrients and Other Food Components
- 703 - Nutrition Education and Behavior

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 4

1. Outcome Target

Number of new local / regional food systems (community gardens, farmers markets, food banks) established following an OSUE educational program or guidance by an OSUE professional or volunteer (OSUE)

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 503 - Quality Maintenance in Storing and Marketing Food Products
- 607 - Consumer Economics
- 704 - Nutrition and Hunger in the Population
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 5

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 6

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 501 - New and Improved Food Processing Technologies
- 502 - New and Improved Food Products
- 503 - Quality Maintenance in Storing and Marketing Food Products
- 607 - Consumer Economics
- 701 - Nutrient Composition of Food
- 702 - Requirements and Function of Nutrients and Other Food Components
- 703 - Nutrition Education and Behavior
- 704 - Nutrition and Hunger in the Population
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

4. Associated Institute Type(s)

- 1862 Research

Outcome # 7

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Major limitations possibly affecting outcomes include global political conflicts and the costs of supply, distribution, and storage of raw and processed foodstuffs. Production and processing costs, public policy shifts, new and revised regulations, and shifts in demand will also impact outcomes. Food trends, food advertising agendas, new biological and chemical threats, and health-related issues are also external factors that may affect outcomes. In developing countries, the availability of basic technologies and inputs, such as seeds or livestock, fertilizers, irrigation water, labor, and a secure farming environment may be limiting factors. Evaluation can lessen the burden of uncertainty by seeking feedback throughout the life of the program. Factors such as the availability of base funding to ensure a core faculty and staff, the availability of extramural funds, and programmatic demands that often exceed resources could affect outcomes.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

OARDC has developed and incorporated protocols for documenting success in achieving program goals

as an integral part of the approval and funding process for this planned program. Each department, center, program, lab group, and individual faculty member has techniques for garnering feedback and ascribing value to their processes and products. Given that much of the research work of OARDC faculty and staff does not focus on group-level dynamics, many of the more formalized evaluation techniques are not appropriate. The techniques that OARDC continues to use, most of them being qualitative surrogate measures, are:

- Informal and formal feedback from stakeholders in terms of needs, willingness to participate, willingness to advocate for OARDC, ease of participation/inclusion, willingness to support, and overall level of satisfaction with OARDC processes and products;
- Feedback from the OARDC Advisory Committee that ranges from helping to determine needs of our constituencies to feedback on commercialization of new patented products;
- Elected state and federal officials' support for OARDC in terms of base budgets, new initiatives, and their willingness to help us link with new stakeholders;
- Support from USDA, feedback from NIFA regarding our federal reports, and feedback and support we receive from other federal agencies;
- Accountability measures required by extramural grants and contracts and our level of attainment of those required metrics;
- Impacts reported by individual CFAES departments in their OARDC budget requests as part of our differential funding model, as well as individual faculty member's impact statements.

For this planned program, OSUE will use the following evaluation methods:

- Pre-post;
- Retrospective;
- Exit slips;
- Case studies;
- Electronic and mail surveys.

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Soil, Air and Water (OARDC Led)

2. Brief summary about Planned Program

During this planning period, with an additional investment of resources, CFAES and OARDC will initiate its Field to Faucet (F2F) program to find sustainable solutions for protecting Ohio's water resources from Lake Erie to the Ohio River. Mid- to long-term research programs are needed to provide the science that identifies best nutrient management practices. Our scientists will examine distressed watersheds statewide to discover differences and commonalities among them that provide cause and effect explanations, and we will use those results to develop science-based education through OSU Extension. Another essential investment for long-term success in sustaining a safe water supply is supporting Ohio's youth via 4-H, FFA and other school and community-based programs. Successful educational programs targeting new ideas and practices are essential to establishing an expectation of conscious efforts and best practices to assure safe water for the future.

Understanding the processes and mechanisms by which carbon can be accumulated and stored in soils, wetlands and living plants, is a continuing area of importance to a fuller comprehension of how soil, water and air systems are integrated in the phenomenon of climate change. With such knowledge, it should be possible to proactively develop management systems to better deal with the risks associated with climate change.

Mitigation of negative effects from odors, carbon loading and other related air quality issues, is critical to lines of inquiry that are being pursued. Knowledge from these inquiries provides a basis for extending information to help address rural-urban interface conflicts.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

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

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

As demand increases for natural resources, greater understanding of conservation and wise use of soil, water, and air resources are crucial. Environmental shifts, such as climate change, can have dramatic effects on soil, air, and water resources. These shifts can lead to unresolved conflicts, all having social, economic, and environmental consequences.

Rural and urban communities use this information to protect their natural resource bases and to address rural-urban interface needs and conflicts. The research and extension education programs resulting from this program ensure that resource conflicts are avoided or managed, and that growth and development can occur within reasonable social and environmental bounds. The challenges lie in applying established research to new and emerging issues, such as energy independence. While a number of areas, such as soil microbial ecology and plant nutrition still require extensive laboratory experiments, it is the on-farm and in-watershed fieldwork, where stakeholders live and work, that provides some of the richest opportunities for researchers and extension specialists to engage in situational analyses and priority setting.

2. Scope of the Program

- In-State Research
- Multistate Research
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

This Planned Program will continue to be a primary focus for OARDC throughout this planning period. The program assumes that by understanding the scientific underpinnings (both basic and applied) of soil, water, and air sciences, independently and collectively, we can address existing and emerging problems and needs within our stakeholder communities.

Key assumptions are:

- The issues within this program that have been identified within our stakeholder communities and/or within the scientific literature reflect the most important societal needs and warrant allocation of resources;
- An understanding of soils, soil-water-air systems, and how society utilizes and depends on soil resources is key to present and future decision-making in managing our food and fiber systems, sustaining environmental services, and mitigating the impacts of global climate change;
- Commodity groups, processors, and consumers depend on a relatively stable climate, and on soil, water, air and associated nutrient research for plant and animal production;
- Research related to water and accessibility of water for plant and animal nutrition, human enterprises, and environmental services is important to society and will be utilized for enhanced decision-making by stakeholders and all citizens;
- Research and education related to conservation of water, and landscape-scale best management practices in water projects, is demanded by society to meet current and future needs;
- Air-related research--as well as air resources (including sequestration of airborne carbon) for plant and animal production, human health, and mitigation of climate change--is a high priority among all sectors within our industry.

It is further assumed that base federal funding will continue to be available to support this planned program and the scientific staff members who carry out the lines of inquiry noted within relevant knowledge. Likewise, it is assumed that federal base funding will continue to be leveraged to attract state and extramural funds.

2. Ultimate goal(s) of this Program

- OARDC will extend its Field to Faucet (F2F) initiative to find sustainable solutions that protect Ohio's water resources from Lake Erie to the Ohio River.
- Our scientists will examine distressed watersheds statewide to discover differences and commonalities among them that provide cause and effect explanations, and we will use those results to provide science-based education through OSU Extension.
- We will support Ohio's youth via 4-H, FFA and other school and community-based programs, to engage them in educational programs to learn new ideas and practices, and to establish an expectation of conscious efforts and best practices to assure safe water for their future.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2016	0.0	0.0	4.0	0.0

2017	0.0	0.0	4.0	0.0
2018	0.0	0.0	4.0	0.0
2019	0.0	0.0	4.0	0.0
2020	0.0	0.0	4.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

On-going OARDC soil, air, and water research activities include both basic and translational/applied agbioscience. Both laboratory and multiple field sites/research stations are available throughout Ohio to permit data gathering and to continue long-term experiments, such as no-till plots. National and international studies are also being supported as evidenced by programs such as OARDC's carbon sequestration center. All functional laboratories and sites will continue to be improved over time as program needs and resources warrant. OARDC faculty and staff will continue to engage in appropriate levels of outreach and consultation with both internal stakeholders, such as fellow extension personnel, and with external stakeholders.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> ● Group Discussion ● Demonstrations 	<ul style="list-style-type: none"> ● Public Service Announcement ● Newsletters ● Web sites other than eXtension

3. Description of targeted audience

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

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

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	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	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.
3	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.
4	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.
5	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.

Outcome # 1

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 133 - Pollution Prevention and Mitigation

4. Associated Institute Type(s)

- 1862 Research

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 133 - Pollution Prevention and Mitigation

4. Associated Institute Type(s)

- 1862 Research

Outcome # 3

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 103 - Management of Saline and Sodic Soils and Salinity
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation
- 141 - Air Resource Protection and Management

4. Associated Institute Type(s)

- 1862 Research

Outcome # 4

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 132 - Weather and Climate
- 141 - Air Resource Protection and Management

4. Associated Institute Type(s)

- 1862 Research

Outcome # 5

1. Outcome Target

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. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 103 - Management of Saline and Sodic Soils and Salinity
- 104 - Protect Soil from Harmful Effects of Natural Elements
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation
- 141 - Air Resource Protection and Management

4. Associated Institute Type(s)

- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect 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)

Description

Climatic extremes, coupled with the spread of pests and diseases that are often climate related, can impact outcomes. As the food, fiber, and environmental economies adjust to the global marketplace, in conjunction with public policy shifts, regulatory changes, and shifts in demand, outcomes will be impacted. Evaluation can lessen the burden of uncertainty by seeking feedback throughout the life of

the program. Factors such as the availability of base funding to ensure a core faculty and staff, extramural funding, competitive funding, and programmatic demands exceeding resources, will impact outcomes. Throughout the 2016-2020 period, external factors will continue to expand, such as the recent shale oil and gas-drilling program in Ohio that could have environmental implications for soil, air, and water resources in Ohio.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

OARDC's Planned Programs have incorporated protocols for documenting success in achieving program goals as an integral part of the approval and funding process. Each department, center, program, lab group, and individual faculty member has techniques for garnering feedback and ascribing value to their processes and products. Given that much of the research work of OARDC faculty and staff does not focus on group-level dynamics, many of the more formalized evaluation techniques are not appropriate. The techniques that OARDC continues to use, most of them being qualitative surrogate measures, are:

- Informal and formal feedback from stakeholders in terms of needs, willingness to participate, willingness to advocate for OARDC, ease of participation/inclusion, willingness to support, and overall level of satisfaction with OARDC processes and products;
- Feedback from the OARDC Advisory Committee that ranges from helping to determine needs of our constituencies to feedback on commercialization of a new patented product;
- Elected state and federal officials' support for OARDC in terms of base budgets, new initiatives, and their willingness to help us link with new stakeholders
- Support from USDA, feedback from NIFA regarding our federal reports, and feedback and support we receive from other federal agencies;
- Accountability measures required by extramural grants and contracts and our level of attainment of those required metrics;
- Impacts reported by individual CFAES departments in their OARDC budget requests as part of our differential funding model, as well as individual faculty member's impact statements.

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Natural Resources and Environmental Systems (OARDC Led)

2. Brief summary about Planned Program

Natural resources and the environment will continue to be central to the OARDC research mission, with support from OSU Extension, throughout this 2016-2020 planning period. Faculty members working within this planned program create science-based knowledge and foster environmental sustainability by promoting discovery and leadership through a comprehensive approach to better understand and address environmental and natural resource challenges locally, regionally and globally. This program delivers expertise in various aspects of aquatic and water resources, environmental social sciences, forestry, rural sociology, soil science, and wildlife ecology.

Research programs in this Planned Program focus both on individual components as defined in the selected knowledge areas, and collective community and landscape scale functions. Ohio's landscapes are managed primarily in small tracts under intense population or production pressures. Thus, a continued understanding of the science of managing in such complex landscapes is critical to providing a sound resource base to meet human and wildlife needs, while seeking to protect Ohio's biological diversity, some of which has regional and national importance, e.g. migratory routes for songbirds, hawks, ducks, and geese. The latter two are important to the hunting industry, while songbirds and hawks are important non-game species and contribute to Ohio's tourism industry.

One-third of Ohio's land area is forested. Forest sustainability is an important research area and requires an understanding of biology, silviculture, management and modeling, and forest products, both from forest science and horticultural science perspectives. These activities include the conservation of biological diversity through on-site efforts to protect resources, as well as seed bank and germplasm programs.

In partnership with the Ohio Department of Natural Resources and USDA, and other partners at the federal, state and local levels, OARDC will continue to advance studies in traditional fisheries and wildlife programs for game and non-game programs, as well as conservation biology programs for the protection and restoration of natural systems. Human-wildlife interactions will also be studied. An ever-growing area of advanced/sustainable energy and bio-based products will continue to be highly dependent on the success of this program, especially as a producer of biomass.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

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

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Society demands sustainable, natural resources-based commodities and environmental services, particularly in terms of forest-related goods and services, and especially in the area of fish and wildlife resources. As transportation costs remain high, the demand for local resource utilization is expected to increase demand for agriculture experiment station research in this area and companion extension programming. In a highly urbanized state such as Ohio, OARDC has a heightened obligation to meet this demand and to aid in conserving resources, as well as generating economic return and creating jobs that are directly or indirectly dependent on sustainable resource management practices.

The research generated from this program is important to Ohio citizens and public organizations, especially environmental organizations, hunters, fishers, birdwatchers and hikers. Rural and urban communities use this knowledge to protect and wisely use their natural resource base. All environmental resources are issues of concern from both regulatory and aesthetic points of view.

2. Scope of the Program

- In-State Research
- Multistate Research
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Within the planning period, OARDC lines of inquiry will provide necessary information to inform human enterprises while protecting environmental services. This is an important area of study for society and the outcomes will be utilized for enhanced decision-making by industry, stakeholder agencies, and all citizens. Research and education related to conservation of natural resources, and landscape-scale best management practices, are demanded by society to meet current and future needs.

It is assumed that base federal funding will continue to be available to support work and the scientific staff who carry out the lines of inquiry noted within the knowledge areas for this program. Likewise, it is assumed that the federal base funding will be leveraged to attract additional state and extramural funds.

2. Ultimate goal(s) of this Program

OARDC's goals for this planned program are:

- Advance our understanding of forest biology and ecology, as well as advance knowledge of silvicultural techniques, horticultural techniques, forest systems modeling, outdoor recreation management, and wood manufacturing;
 - Expand knowledge of how to use the forest resource base while conserving diversity and expanding environmental services such as clean air and water from forests;
 - Support federal, state, and local agendas in seeking to conserve and utilize aquatic and terrestrial wildlife resources in a sustainable manner while managing associated conflicts, such as removal of longstanding dams and the resulting impact on aquatic and land ecosystems;
 - Engage in scientific inquiries at the genetic, species, community, and landscape scale levels to investigate biological and physical components, including the influences of human enterprises, for the purpose of meeting wildlife needs in Ohio and the region;
 - Study conflicts leading to negative interactions at the human-wildlife interface for the purpose of mitigating negative effects on wildlife population and on human enterprises, e.g. wildlife depredation and urban-wildlife conflicts;
 - Understand the system in such manner as to inform both on-site (e.g. community, watershed) and landscape scale decisions necessary to meet individual, stakeholder group, and societal needs;
 - Support international, national, state and local agendas for advancing natural resources and environmental systems research to insure a sustained flow of goods and services that will meet intergenerational demands.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2016	0.0	0.0	1.5	0.0
2017	0.0	0.0	1.5	0.0
2018	0.0	0.0	1.5	0.0
2019	0.0	0.0	1.5	0.0
2020	0.0	0.0	1.5	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Group Discussion • Demonstrations 	<ul style="list-style-type: none"> • Newsletters • Web sites other than eXtension

3. Description of targeted audience

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

- Specific individuals or groups who have expressed a need for natural resources and environmental research knowledge that is to be derived through new research, extracted from on-going research, or mined 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 for embedding it into other 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;
- Political entities;
- Extension personnel;
- Students from pre-school to post doctorate studies;
- News organizations;
- Business groups such as Ohio Farm Bureau;
- Community groups such as watershed collations.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Increase the scientific understanding necessary to maintain flow of environmental goods and services through conservation actions commensurate with regional demand, i.e. Buffer zones in forest riparian zones, reforestation, CREP, carbon sequestration in forests and grassland biomass, outdoor recreation opportunities, urban forest zones.
2	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.
3	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.
4	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.
5	Improve the biodiversity and utilization of land use in rural and urban environments.

Outcome # 1

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 121 - Management of Range Resources
- 122 - Management and Control of Forest and Range Fires
- 123 - Management and Sustainability of Forest Resources
- 124 - Urban Forestry
- 125 - Agroforestry
- 134 - Outdoor Recreation
- 135 - Aquatic and Terrestrial Wildlife
- 136 - Conservation of Biological Diversity

4. Associated Institute Type(s)

- 1862 Research

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 121 - Management of Range Resources
- 122 - Management and Control of Forest and Range Fires
- 123 - Management and Sustainability of Forest Resources
- 124 - Urban Forestry
- 125 - Agroforestry
- 134 - Outdoor Recreation
- 135 - Aquatic and Terrestrial Wildlife
- 136 - Conservation of Biological Diversity

4. Associated Institute Type(s)

- 1862 Research

Outcome # 3

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 121 - Management of Range Resources
- 123 - Management and Sustainability of Forest Resources
- 134 - Outdoor Recreation
- 135 - Aquatic and Terrestrial Wildlife
- 136 - Conservation of Biological Diversity

4. Associated Institute Type(s)

- 1862 Research

Outcome # 4

1. Outcome Target

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.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 121 - Management of Range Resources
- 122 - Management and Control of Forest and Range Fires
- 123 - Management and Sustainability of Forest Resources
- 124 - Urban Forestry
- 125 - Agroforestry
- 134 - Outdoor Recreation
- 135 - Aquatic and Terrestrial Wildlife
- 136 - Conservation of Biological Diversity

4. Associated Institute Type(s)

- 1862 Research

Outcome # 5

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 131 - Alternative Uses of Land
- 136 - Conservation of Biological Diversity

4. Associated Institute Type(s)

- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect 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.)

Description

External factors affecting outcomes include the following: public policy shifts; new regulations and laws; shifts in demand; climatic extremes; pests and diseases; and exotic species, such as the Emerald Ash Borer and Asian long-horned beetle.

Factors such as the availability of state and federal base funding to ensure a core faculty and staff, availability of extramural funds, and programmatic demands that often exceed resources, individually and collectively, will also affect outcomes.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

OARDC's Planned Programs have incorporated protocols for documenting success in achieving program goals as an integral part of the approval and funding process. Each department, center, program, lab group, and individual faculty member has techniques for garnering feedback and ascribing value to their processes and products. Given that much of the research work of OARDC faculty and staff does not focus on group-level dynamics, many of the more formalized evaluation techniques are not appropriate. The techniques that OARDC continues to use, most of them being qualitative surrogate measures, are:

- Informal and formal feedback from stakeholders in terms of needs, willingness to participate, willingness to advocate for OARDC, ease of participation/inclusion, willingness to support, and overall level of satisfaction with OARDC processes and products;
- Feedback from the OARDC Advisory Committee that ranges from helping to determine needs of our constituencies to feedback on commercialization of a new patented product;
- Elected state and federal officials' support for OARDC in terms of base budgets, new initiatives, and their willingness to help us link with new stakeholders
- Support from USDA, feedback from NIFA regarding our federal reports, and feedback and support we receive from other federal agencies;
- Accountability measures required by extramural grants and contracts and our level of attainment of those required metrics;
- Impacts reported by individual CFAES departments in their OARDC budget requests as part of our differential funding model, as well as individual faculty member's impact statements.

V(A). Planned Program (Summary)

Program # 8

1. Name of the Planned Program

Plants Systems (OARDC Led)

2. Brief summary about Planned Program

Faculty members working within the Plant Systems program educate students, professionals and other stakeholders in all aspects of plant disease, plant health management, and entomology, and communicate unbiased information to urban and rural citizens. Part of the unique mission of this planned program is the scientific investigation of environmental and biotic agents that cause plant diseases. In addition, insects are used as model systems to further fundamental understanding of molecular biology, physiology, genetics, ecology and evolution. The knowledge obtained in the pursuit of this mission provides the means to discover, develop, and apply innovative strategies for the environmentally sound and economically viable management of plant diseases and pests.

Plant diseases represent a significant threat to the economic stability of agricultural industries and to quality of life issues for the citizens of Ohio and for people worldwide. Plant diseases are a significant threat to human and animal life, resulting in malnutrition, famine, unsafe food and economic hardships. Programs on plant-microbe interactions, integrated pest management, and plant health management are the focus to respond to these threats.

OARDC manages six outlying research stations dedicated to production agriculture for field crops, fruits and vegetables. For example, the Northwest Agricultural Research Station is an integral site for row-crop production research in Ohio. The station is located in Wood County, which ranks number one in Ohio for soybean and wheat production and number two for corn production. Nearby counties also rank highly, therefore its location makes it a logical choice to study the challenges facing producers of these valuable commodities. The Northwest Station serves as a key site for the development of soybean and wheat varieties, with many breeding and screening nurseries located on-site.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

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

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

OARDC provides the best science available on plant-based food systems when informing producers, processors, distributors and consumers. The science behind the system is not only critical for the provisioning of food worldwide; it is also a major economic driver. Corn and soybeans collectively add \$5.58 billion to Ohio's economy each year, with \$1.76 billion in annual soybean exports. As prices increase worldwide for food and alternatives to petroleum, the return on investment will be strong.

Much of OARDC's interactions are with organized groups of producers, processors, and consumers. Without a growing body of knowledge to create efficiency and security in plant-based food systems, opportunities will be missed and society will be underserved. With over 100 years of research history, a robust body of literature, and a well-developed network of clientele, supporters, and companion agencies and organizations, including OSU Extension, OARDC is well-positioned to continue to affect positive change in this Planned Program.

Effective research requires a mixture of laboratories, greenhouses, controlled study fields, a statewide network of research stations, and on-farm research sites to maximize knowledge. Emerging threats, the need for a stronger and more secure food and fiber supply, as well as an international demand to reduce world hunger, now requires more advanced facilities, such as OARDC's new bio-security lab.

2. Scope of the Program

- In-State Research
- Multistate Research
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Within the planning period, OARDC lines of inquiry will provide necessary information to inform human enterprises related to plant systems science. This is an important area of study for society and will be utilized for enhanced decision-making by stakeholders and all citizens. Research and education related to plant systems, and landscape-scale best management practices, are demanded by society to meet current and future food and fiber needs. These issues are often manifested at the community level and those stakeholders who are most vested will become involved; others' involvement will be limited, yet they will reap the benefits of a sound basic and applied research programs.

It is further assumed that base federal funding will continue to be available to support planned activities and the scientific staff members who carry out the lines of inquiry noted within the knowledge areas for this program. Likewise, it is assumed that federal base funding will continue to be leveraged to attract additional state and extramural funds.

2. Ultimate goal(s) of this Program

OARDC's goals for this planned program are to:

- Generate new knowledge related to plant genomes, markers, structures, and similar areas of studies consistent with the demands of other scientists and stakeholders who will apply this knowledge to their areas of plant breeding, growth, and development;
- Advance the science of germplasm preservation, acquisition, and information systems to the extent that the genetic resources targeted for acquisition are preserved and that targeted plant systems in Ohio and the region can be considered secure;
- Enrich the gene pool and gene pool knowledge to the extent that breeding programs have materials with the desired traits on-demand to move forward with releasing varieties, etc.
- Provide the necessary data, including cultural practices, seed quality assurance, breeding, and other biological and physical investigations necessary to support pre-harvest practices that achieve the prerequisite yield, disease resistance, and other characteristics to retain Ohio's status as a top soybean and corn producer;
- Participate in modeling and sampling of crop data, including remote sensing, for the purpose of deriving systems that are cost effective and cost efficient for producers;
- Evaluate production management systems, including organics, sustainable agriculture initiatives, small-scale farming/niche market systems for the purpose of increasing efficiency and effectiveness, thus making innovative farming systems more attractive to stakeholders;
- Support OSU Extension's Master Gardening program by providing the green industry research necessary to advance the development of materials and field trails required to keep the program viable;
- Employ an integrated approach to protecting plants from harmful insects and other invertebrates, pathogens, vertebrates, and weeds to the extent that the research is required to mitigate impacts that have significant negative economic or environmental consequences.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2016	0.0	0.0	22.5	0.0
2017	0.0	0.0	22.5	0.0
2018	0.0	0.0	22.5	0.0
2019	0.0	0.0	22.5	0.0
2020	0.0	0.0	22.5	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> ● Education Class ● Workshop ● Demonstrations 	<ul style="list-style-type: none"> ● Public Service Announcement ● Newsletters

3. Description of targeted audience

OARDC's 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 mined from scientific literature. Often those requests are communicated to OARDC by an intermediary such as a staffer at USDA, NRCS, or a county extension agent;
- Related agencies or support organizations who will not only use the information but will also be brokers for embedding it into other groups to encourage change;
- Populations who have not requested the information but will likely benefit from that information, e.g. home gardeners;
- Other scientists and scientific groups;
- Political entities;

- Extension personnel;
- Students from pre-school to post doctorate studies;
- News organizations.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

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	Enrich the gene pool and knowledge thereof in disease/pest resistance, and gene recombination and interaction studies
3	Enrich the gene pool and knowledge thereof in the areas of molecular studies to better understand how immune systems in plants inhibit diseases and how bacteria perturb the immune system.

Outcome # 1

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 202 - Plant Genetic Resources
- 204 - Plant Product Quality and Utility (Preharvest)
- 205 - Plant Management Systems

4. Associated Institute Type(s)

- 1862 Research

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 202 - Plant Genetic Resources
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 204 - Plant Product Quality and Utility (Preharvest)
- 205 - Plant Management Systems
- 206 - Basic Plant Biology
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Diseases and Nematodes Affecting Plants
- 213 - Weeds Affecting Plants
- 214 - Vertebrates, Mollusks, and Other Pests Affecting Plants
- 216 - Integrated Pest Management Systems

4. Associated Institute Type(s)

- 1862 Research

Outcome # 3

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 202 - Plant Genetic Resources
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 204 - Plant Product Quality and Utility (Preharvest)
- 205 - Plant Management Systems
- 206 - Basic Plant Biology
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Diseases and Nematodes Affecting Plants
- 213 - Weeds Affecting Plants
- 214 - Vertebrates, Mollusks, and Other Pests Affecting Plants
- 216 - Integrated Pest Management Systems

4. Associated Institute Type(s)

- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect 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.)

Description

Pests, pathogens, diseases, weeds, and climate change, among other factors can affect outcomes within plant systems. As food, fiber, and environmental economies continually adjust to the global marketplace, in conjunction with public policy shifts, new regulations, and shifts in demand, outcomes will be impacted. Production agriculture is very sensitive to these shifts. Research that is well conducted and forward looking, in conjunction with evaluation to identify opportunities and problems can have returns throughout the life of the program.

Factors such as the availability of state and federal base funding to ensure a core faculty and staff, availability of extramural funds, and programmatic demands that often exceed resources will also affect outcomes.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

OARDC's Planned Programs have incorporated protocols for documenting success in achieving goals as an integral part of the approval and funding process. Each department, center, program, lab group, and individual faculty member has techniques for garnering feedback and ascribing value to their processes and products. Given that much of the research work of OARDC faculty and staff does not focus on group-level dynamics, many of the more formalized evaluation techniques are not appropriate. The techniques that OARDC continues to use, most of them being qualitative surrogate measures, are:

- Informal and formal feedback from stakeholders in terms of needs, willingness to participate, willingness to advocate for OARDC, ease of participation/inclusion, willingness to support, and overall level of satisfaction with OARDC processes and products;
- Feedback from the OARDC Advisory Committee that ranges from helping to determine needs of our constituencies to feedback on commercialization of a new patented product;
- Elected state and federal officials' support for OARDC in terms of base budgets, new initiatives, and their willingness to help us link with new stakeholders
- Support from USDA, feedback from NIFA regarding our federal reports, and feedback and support we receive from other federal agencies;
- Accountability measures required by extramural grants and contracts and our level of attainment of those required metrics;
- Impacts reported by individual CFAES departments in their OARDC budget requests as part of our differential funding model, as well as individual faculty member's impact statements.

V(A). Planned Program (Summary)

Program # 9

1. Name of the Planned Program

Animals Systems (OARDC Led)

2. Brief summary about Planned Program

The food animal industry is a key contributor to the food, agricultural, and environmental economies in Ohio. OARDC research is central to this industry. Through research efforts detailed in this planned program, OARDC helps position CFAES and OSU as leaders in developing and disseminating new knowledge in the biological sciences for producing food, companion and service animals. We are interdisciplinary in our approach and responsive to current societal issues such as animal health, food safety, biomass utilization, and environmental sustainability.

OARDC is heavily invested in programs, facilities, and stakeholder networks at the local, state, regional and national levels that support this planned program. The program consists of multiple levels of research ranging from investigations at the genetic level to studying all aspects of food animal production, including aquaculture. The program positions Ohio as a major contributor to both basic and applied animal sciences, and substantially contributes to food security at national and global levels.

CFAES completed an internal assessment of all animal facilities in May 2014 and made recommendations to administration as to where improvements were needed. The College is now engaged in a plan to develop new facilities for equine, swine, beef cattle and dairy in the next 5-7 years. A new approach to utilizing public-private partnerships to finance these new facilities will be used.

Genetic research provides a foundation for the program with inquiries from the genome-level through gene pool studies. Nutrition and reproduction are major areas of emphasis demanded by stakeholders and by the state of academic understanding of the food animal system. Emphasis will continue to be placed on pre-harvest programs to reduce risks to producers, processors, and consumers, and to ensure high yields of quality products. New hires will place an added emphasis on animal welfare and nutrient management programs. Improved and new facilities are being planned to enhance these program areas of emphasis. Producers, processors, and distributors in this program are well organized and heavily reliant on OARDC for scientific information. The organization will continue to be actively engaged in the process of research from needs identification to summative assessments to outcomes and impacts. OARDC research is widely disseminated by OSU Extension, ensuring that timely research is distributed in a way that leads to meaningful impacts for targeted stakeholder groups.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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 (Situation and Scope)**1. Situation and priorities**

OARDC provides the best science available on animal-based food systems when informing producers, processors, distributors and consumers. The science behind the system is not only critical for maintaining the global supply of food animals; it is also a major economic driver in Ohio. OARDC addresses the direct needs of all our food animal constituency groups by interacting with them to understand their needs.

Much of OARDC's interactions are with organized groups of producers, processors, distributors, and consumers. Without a growing body of knowledge to create efficiency and security in the animal-based food systems, opportunities will be missed and society will be underserved. With over 100 years of research history in the US, a robust body of literature, and a well-developed network of clientele, supporters and companion agencies and organizations, including OSU Extension, OARDC is well-positioned to continue to affect positive change in this Planned Program.

2. Scope of the Program

- In-State Research
- Multistate Research
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

By understanding the basic and applied science related to how animal systems are maintained and managed, and how food and the associated economies function, OARDC seeks to meet society's demands for a secure supply of food animals. As we address problems and needs within our stakeholder communities, the OARDC becomes better prepared to take advantage of emerging opportunities and to rapidly address problems within these areas.

Other key assumptions are:

- The topics within this program that have been identified within our stakeholder communities and/or within the scientific literature reflect the most important issues and warrant allocation of resources;
- The understanding of this planned program and how society utilizes and depends on the associated research is key to present and future decision-making in provisioning of food animals;
- All citizens directly or indirectly benefit from a safe, secure, and plentiful animal based food system. These lines of inquiry will provide necessary data to inform human enterprises;
- Research and education related to food animal systems is a demand by society that is required to meet current and future needs.

It is further assumed that base federal funding will continue to be available to support planned work and the scientific staff members who carry out the lines of inquiry noted within the knowledge areas for this program. Likewise, it is assumed that federal base funding will continue to be successfully leveraged to attract additional state and extramural funds.

2. Ultimate goal(s) of this Program

OARDC's goals for this planned program are to:

- Provide the necessary research to enhance nutrient utilization for the purpose of production efficiency, economic viability, competitiveness, and animal health within the industry and provide consumers with greater value and quality of products at reduced environmental costs;
 - Focus on improving management systems--including modeling, decision-making, humane care and treatment of animals--for multiple farm types;
 - Continue to address demand from stakeholders for information to aid in improving the quantity and quality of animal products in a cost effective, humane, environmentally friend manner that is socially acceptable;
 - Continue focused research on animal diseases to ensure that society has a safe and secure animal based food supply, and that human and animal health, business enterprises, and environmental and food security are not compromised, locally or globally.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2016	0.0	0.0	9.5	0.0
2017	0.0	0.0	9.5	0.0
2018	0.0	0.0	9.5	0.0
2019	0.0	0.0	9.5	0.0

2020	0.0	0.0	9.5	0.0
------	-----	-----	-----	-----

V(F). Planned Program (Activity)

1. Activity for the Program

OARDC's on-going research activities seek to advance food animal and global food security goals. Laboratories, animal enclosures, farms, and multiple field sites/research stations are available throughout Ohio to permit data gathering and to continue long-term experiments. Ohio on-farm research is conducted as part of this program as are national and international studies. Effective research requires a mixture of laboratories, animal enclosures, and on-farm research to maximize knowledge. Emerging threats now require advanced facilities such as OARDC's biosecurity lab, which is particularly needed for the study infectious animal diseases. OARDC's biosecurity lab will be fully functional throughout this planning period. All functional laboratories and sites are improved over time as program needs warrant. OARDC faculty and staff engage in appropriate levels of outreach and consultation, with both internal stakeholders, such as fellow extension personnel, and with external stakeholders.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Group Discussion • Demonstrations 	<ul style="list-style-type: none"> • Newsletters • Web sites other than eXtension

3. Description of targeted audience

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

- Specific individuals or groups who have expressed a need for food animal systems information that is to be derived through new research, extracted from on-going research, or is derived from scientific literature. Often those requests are communicated to OARDC by an intermediary such as a staffer at USDA, NRCS, Ohio Department of Agriculture, or a county extension agent;
- Related agencies or support organizations who will not only use the information but will also be brokers for embedding it into other 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 from pre-school to post doctorate studies;
- News organizations;
- Business groups such as Farm Bureau or commodity groups.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Improve reproduction efficiency and enhanced application of new technologies over the next five years to fully meet the competitive demands faced by OARDC's stakeholders in areas such as early maturation, estrus, fertility, and ovulation
2	Increase dietary research and nutrition utilization for the purpose of increased growth and quality of products commensurate with consumer demand.
3	Meet the demand of fellow scientists and stakeholders within ten years for materials relating to genetics and breeding, including id of molecular markers for improved animal health and reproductively, and increased quality and quantity of products
4	Improve management for multiple animal farm types, including organics, that will produce higher yields for and lower costs to the producer and consumer
5	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
6	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 Target

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. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 303 - Genetic Improvement of Animals
- 304 - Animal Genome
- 305 - Animal Physiological Processes
- 307 - Animal Management Systems
- 308 - Improved Animal Products (Before Harvest)
- 311 - Animal Diseases

4. Associated Institute Type(s)

- 1862 Research

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 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

4. Associated Institute Type(s)

- 1862 Research

Outcome # 3

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 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

4. Associated Institute Type(s)

- 1862 Research

Outcome # 4

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 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

4. Associated Institute Type(s)

- 1862 Research

Outcome # 5

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 305 - Animal Physiological Processes
- 307 - Animal Management Systems
- 311 - Animal Diseases

4. Associated Institute Type(s)

- 1862 Research

Outcome # 6

1. Outcome Target

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. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 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

4. Associated Institute Type(s)

- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect 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.)

Description

Animal diseases, climatic extremes, public policy shifts, and shifts in demand are all external factors affecting outcomes. Human values and environmental sensitivities of the general public to animal production and processing are also external factors that may affect outcomes. Evaluations relating to animal care norms and protocols can be effective in informing the process; however, uncertainty is a constant factor in the animal industry.

Factors such as the availability of state and federal base funding to ensure a core faculty and staff, availability of extramural funds, and programmatic demands that often exceed resources will also affect outcomes.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

OARDC's Planned Programs have incorporated protocols for documenting success in goals as an integral part of the approval and funding process. Each department, center, program, lab group, and individual faculty member has techniques for garnering feedback and ascribing value to their processes and products. Given that much of the research work of OARDC faculty and staff does not focus on group-level dynamics, many of the more formalized evaluation techniques are not appropriate. The techniques that OARDC continues to use, most of them being qualitative surrogate measures, are:

- Informal and formal feedback from stakeholders in terms of needs, willingness to participate, willingness to advocate for OARDC, ease of participation/inclusion, willingness to support, and overall level of satisfaction with OARDC processes and products;
 - Feedback from the OARDC Advisory Committee that ranges from helping to determine needs of our constituencies to feedback on commercialization of new patented products;
 - Elected state and federal officials' support for OARDC in terms of base budgets, new initiatives, and

their willingness to help us link with new stakeholders;

- Support from USDA, feedback from NIFA regarding our federal reports, and feedback and support we receive from other federal agencies;
- Accountability measures required by extramural grants and contracts and our level of attainment of those required metrics;
- Impacts reported by individual CFAES departments in their OARDC budget requests as part of our differential funding model, as well as individual faculty member's impact statements.

V(A). Planned Program (Summary)

Program # 10

1. Name of the Planned Program

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

2. Brief summary about Planned Program

Research and extension activities within the Food, Agricultural, and Biological Engineering Planned Program will continue to contribute to all units within CFAES. The OARDC fostered technologies and engineering solutions from this Planned Program support food safety and food security research, climate change initiatives, and sustainable energy efforts, as well as research programs that are seeking to advance human health and advance safety in agricultural work places. For the 2016-2020 period, this Planned Program will continue to support other CFAES programs and advance the collective mission of the organization. Even though our engineering facility on the Wooster campus was destroyed by the 2010 tornado, programmatic recovery is now complete with a new replacement building.

The faculty group working in this planned program advance science, teach principles and applications, and disseminate knowledge of engineering needed to efficiently produce, distribute and process biological products (food, feed, fiber and fuel) while conserving natural resources, preserving environmental quality, and ensuring the health and safety of people and domestic food animals.

Specific research emphasis in this program will be placed on the following:

- Bio-products and bio-engineering, including the development of biorefinery processes for the production of fuels, chemicals, polymers, and materials from lignocellulosic biomass, research into renewable energy systems, and food and bioprocess engineering;
- Air quality and bioenvironmental engineering control, including the measurement, modeling, and mitigation of indoor production environments, as well as air quality and emissions of Concentrated Animal Feeding Operations (CAFOs);
- Precision agriculture, including the development of nutrient management strategies and technologies to improve the efficiency of fertilizer placement and enable on-farm evaluations of success.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

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

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

OARDC will provide the best available engineering science to support the sustained and secure flow of food and fiber to/from producers, processors, distributors, and consumers while assuring that their interests are informed, in Ohio and beyond. The engineering science behind food and fiber systems is critical for provisioning of food worldwide, and it is a central component of agbioscience. Engineering directly supports OARDC goals of production efficiency, economic viability, environmental stewardship, and social acceptability of practices introduced.

Effective research requires a mixture of laboratories, animal enclosures, plant support facilities, statewide research stations, on-farm/in-factory support facilities, and engineered processes to advance knowledge. Faculty and staff in this program provide research that leads to state-of-the-art systems and facilities. Likewise, they provide the knowledge and technologies needed by stakeholders to make decisions regarding adoption of state-of-the-art facilities and processes. Emerging threats now demand advanced facilities such as the new OARDC biosecurity laboratory that has been constructed on our Wooster campus; systems and facilities engineers will continue to be critical to such planning efforts.

2. Scope of the Program

- In-State Research
- Multistate Research
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

A client oriented research and development program by food, agricultural and biological engineers is

critical to meeting society's demands in this area. As we address problems and needs within our stakeholder communities, our organization builds capacity and becomes better prepared to serve, to take advantage of emerging opportunities, and to rapidly address stakeholder problems.

Other key assumptions are:

- The topics and goals of this program that have been identified within our stakeholder communities and/or within the scientific literature reflect the most important issues and warrant allocation of resources;
- The understanding of this planned program and how society utilizes and depends on the associated research is key to present and future decision-making for providing food, fiber, and environmental services;
- All citizens directly or indirectly benefit from a safe, secure, and plentiful food system supply support by state of the art engineering;
- These lines of inquiry will provide information necessary to inform human enterprises;
- Engineering research and education are demanded by society and are needed to meet current and future needs.

It is further assumed that base federal funding will continue to be available to support planned activities and the scientific staff members who carry out the lines of inquiry noted within the knowledge areas for this program. Likewise, it is assumed that federal base funding will continue to be successfully leveraged to attract state and extramural funds.

2. Ultimate goal(s) of this Program

OARDC's goals for this planned program are to:

- Help develop unique systems for converting bio-based products into sustainable energy and advanced materials;
- Develop enhanced technologies to support integrated plant growth systems (e.g. fertigation, monitoring, control);
- Improve systems to aid small farmers in taking advantage of alternatives to traditional commodity crops, e.g. hydroponics for vegetables and flowers;
- Improve mechanical devices and instrumentation needed by stakeholders such as improved pesticide applicators, including biological pesticides;
- Develop improved systems to aid in meeting new, yet to emerge, or novel needs such as bioreactors to treat landfill waste biologically or the reduction of axle loads of farm equipment to prevent compaction of agricultural soils.
- Inform the process of collecting, storing, processing, and distributing waste products from plant and animal agriculture;
- Join with ecological engineers to determine improved strategies for ecological based engineered systems for waste management, e.g. constructed wetlands, multistage farm ditches;
- Carry out studies to determine and aid rural residents, businesses, and industries in utilizing effective on-site waste disposal systems;
- Provide college-wide leadership in waste-to-energy research and extension programming;
- Increase the understanding and mitigation of hazards to human health related to accidents and exposure to safety risks within the agriculture and natural resource sectors.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2016	0.0	0.0	1.5	0.0
2017	0.0	0.0	1.5	0.0
2018	0.0	0.0	1.5	0.0
2019	0.0	0.0	1.5	0.0
2020	0.0	0.0	1.5	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Workshop • One-on-One Intervention • Demonstrations 	<ul style="list-style-type: none"> • Public Service Announcement • Newsletters

3. Description of targeted audience

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

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

- Students from pre-school to post doctorate studies;
- News organizations;
- Business groups such as small town administrators, county commissioners, or commodity groups.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Provide appropriate facilities design and engineering processes commensurate with stakeholders demand, including fellow research units demands, to the extent that they have all the information necessary for making adoption decisions
2	Develop enhanced systems to support integrated plant growth systems that will annually result in increased productivity at reduced costs for the industry
3	Improve mechanical devices and instrumentation needed by stakeholders
4	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
5	Advance the knowledge of ecological based engineered systems for waste management to the extent that, where cost effective and appropriate, they will be adopted over mechanical systems

Outcome # 1

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 401 - Structures, Facilities, and General Purpose Farm Supplies
- 402 - Engineering Systems and Equipment
- 403 - Waste Disposal, Recycling, and Reuse
- 404 - Instrumentation and Control Systems
- 405 - Drainage and Irrigation Systems and Facilities

4. Associated Institute Type(s)

- 1862 Research

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 401 - Structures, Facilities, and General Purpose Farm Supplies
- 402 - Engineering Systems and Equipment
- 403 - Waste Disposal, Recycling, and Reuse
- 404 - Instrumentation and Control Systems
- 405 - Drainage and Irrigation Systems and Facilities

4. Associated Institute Type(s)

- 1862 Research

Outcome # 3

1. Outcome Target

Improve mechanical devices and instrumentation needed by stakeholders

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 401 - Structures, Facilities, and General Purpose Farm Supplies
- 402 - Engineering Systems and Equipment
- 403 - Waste Disposal, Recycling, and Reuse
- 404 - Instrumentation and Control Systems
- 405 - Drainage and Irrigation Systems and Facilities

4. Associated Institute Type(s)

- 1862 Research

Outcome # 4

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 401 - Structures, Facilities, and General Purpose Farm Supplies
- 402 - Engineering Systems and Equipment
- 403 - Waste Disposal, Recycling, and Reuse
- 404 - Instrumentation and Control Systems
- 405 - Drainage and Irrigation Systems and Facilities

4. Associated Institute Type(s)

- 1862 Research

Outcome # 5

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 401 - Structures, Facilities, and General Purpose Farm Supplies

- 402 - Engineering Systems and Equipment
- 403 - Waste Disposal, Recycling, and Reuse
- 404 - Instrumentation and Control Systems
- 405 - Drainage and Irrigation Systems and Facilities

4. Associated Institute Type(s)

- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect 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.)

Description

Economic shifts such as interest rates to borrow money for facilities, housing foreclosures, public policy shifts, new regulations, shifts in demand, and issues such as climate change will affect outcomes. Human values and conflicts, e.g. urban-rural issues such as environmental sensitivities to agricultural processes and location concerns related to facilities by the populace, are also external factors that affect outcomes. Climate change may dictate new and different types of structures, equipment, and processes.

Factors such as the availability of state and federal base funding to ensure a core faculty and staff, availability of extramural funds, and programmatic demands that often exceed resources will also affect outcomes.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

OARDC's Planned Programs have incorporated protocols for documenting success in achieving goals as an integral part of the approval and funding process. Each department, center, program, lab group, and individual faculty member has techniques for garnering feedback and ascribing value to their processes and products. Given that much of the research work of OARDC faculty and staff does not focus on group-level dynamics, many of the more formalized evaluation techniques are not appropriate. The techniques that OARDC continues to use, most of them being qualitative surrogate measures, are:

- Informal and formal feedback from stakeholders in terms of needs, willingness to participate, willingness to advocate for OARDC, ease of participation/inclusion, willingness to support, and overall level of satisfaction with OARDC processes and products;

- Feedback from the OARDC Advisory Committee that ranges from helping to determine needs of our constituencies to feedback on commercialization of new patented products;
- Elected state and federal officials' support for OARDC in terms of base budgets, new initiatives, and their willingness to help us link with new stakeholders;
- Support from USDA, feedback from NIFA regarding our federal reports, and feedback and support we receive from other federal agencies;
- Accountability measures required by extramural grants and contracts and our level of attainment of those required metrics;
- Impacts reported by individual CFAES departments in their OARDC budget requests as part of our differential funding model, as well as individual faculty member's impact statements.

V(A). Planned Program (Summary)

Program # 11

1. Name of the Planned Program

Economics and Social Dimensions (OARDC Led)

2. Brief summary about Planned Program

The Economics and Social Dimensions Planned Program will continue to support OARDC and OSU Extension's full range of planned programs for meeting the needs of our stakeholders throughout this 2016-2020 planning period. The broad goals of this program are to generate knowledge and distribute impartial information through the application of social, economic, educational, and business principles to the challenges of agriculture, the food system, the environment, and economic development. This program will continue to contribute to both basic and translational/applied understandings within CFAES's four-element paradigm of production efficiency, economic viability through value added, social acceptability of our contributions, and environmental compatibility of products and practices emanating from our planned programs. Stakeholder demand is strong for knowledge regarding production economics, management strategies, and associated business related information, as well as social and education findings relevant to clientele in a state with a \$100-billion agricultural sector.

Without a sound research and extension program to inform social and financial aspects, Ohio's food, natural resource, and agricultural industry would be at risk. Understanding of market economics, because of both traditional market forces and the new global economy, are more critical than ever as producers, processors, and distributors factor into the multiple forces that govern the business risks they take and the decisions they make. Programs that advance the understanding of how rural individuals and communities utilize their resources to effectively participate in the agriculture economy are central to understanding the phenomena of human capital. Rapid changes in sociological parameters and in technologies influence how individuals, families, and communities organize and behave.

The new global economy has added emphasis to this program's long history of international trade and development research. Ohio has both strong export and import markets for agriculture products, thus the need to allocate resources to advance the understanding of and practices within international efforts. Generating sound applied knowledge, and providing our stakeholders the best social and economic science based information available, requires that science to be rooted in strong theory and methodology.

To that end, this program devotes a portion of its effort to advancing theoretical understandings and improved research methodologies. Advances in areas such as experimental economics and decision theory continue to support research that helps reduce risk, promote sustainability, and improve profitability. Understanding the economics and social impacts of domestic programs and policies emanating from government is necessary to aid stakeholders in their decision making, and to inform those who make policy as to how to create policies that will yield the desired impacts. Decision theory research and other social dimensions research helps to ensure that the people side of the equation is well-informed. Economic and social inquiry, whether focused on profitability, on human capital, or on maintaining environmental services and associated amenity values, have a long history of providing the science behind the agriculture and natural resource scene and will continue to have impact well beyond this planning period.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
601	Economics of Agricultural Production and Farm Management	0%		10%	
602	Business Management, Finance, and Taxation	0%		10%	
603	Market Economics	0%		10%	
604	Marketing and Distribution Practices	0%		5%	
605	Natural Resource and Environmental Economics	0%		5%	
606	International Trade and Development Economics	0%		5%	
607	Consumer Economics	0%		5%	
608	Community Resource Planning and Development	0%		5%	
609	Economic Theory and Methods	0%		10%	
610	Domestic Policy Analysis	0%		5%	
611	Foreign Policy and Programs	0%		5%	
801	Individual and Family Resource Management	0%		5%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	0%		5%	
805	Community Institutions and Social Services	0%		5%	
901	Program and Project Design, and Statistics	0%		5%	
903	Communication, Education, and Information Delivery	0%		5%	
	Total	0%		100%	

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Research related to sociological and economic theory, policy and practice, and associated extension programs--especially in human capital development--are critical to maintaining and growing an effective

and efficient food, agriculture, and natural resources industry. More than 11 million people live in the relatively small state of Ohio, with high rates of agriculture sector activity, from production to processing to consumption, and have major land use/rural-urban interface issues. This situation makes for a complex social and business climate within the agbioscience sector. As these are coupled with shifting market forces, shifting populations, and new economies, the research output and associated impacts from this program are pivotal to success. How well we understand the use of capital, human capital, and other social and economic resources will greatly influence the long-term outcomes and impacts of all programs within this Plan of Work.

Agriculture experiment stations and extension programs have a heightened obligation to understand the multiple dimensions of social and economic issues to increase both quality and quantity of products and services that are important to the citizens they serve. Individuals, families, and communities, as well as businesses, related agencies, etc. involved in the food and fiber industry need the research information that is generated through this program. Programs regarding how people sustain their enterprises within the rural landscape, as well as how they learn, make decisions, and organize for these enterprises, both personal and corporate, are important from an applied perspective. OSU Extension is charged with communicating this knowledge.

Work in these knowledge areas is well-grounded theoretically with an extensive peer-reviewed literature base. The challenges lie in applying what is known to new and emerging issues and generating lines of research as needed to ensure that the citizens of Ohio's needs are met and that lack of knowledge does not become an impediment to food and fiber production.

2. Scope of the Program

- In-State Research
- Multistate Research
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Understanding agbioscience related social and economic factors from both basic and applied perspectives of how agriculture-related human enterprises function and are maintained is important. Knowledge of these areas is prerequisite to maintaining the human enterprise of agriculture. As the social and economic problems within these stakeholder communities are addressed, the organization grows and becomes better prepared to take advantage of emerging opportunities or to more rapidly address problems within these areas.

Key assumptions for this program are:

- Social and economic topics within this program have been identified by our stakeholder communities, and/or via the scientific literature, and reflect the most important issues, thus warranting allocation of resources;
- The understanding of this planned program and how society utilizes and depends on the associated research is key to present and future decision-making in provisioning of food, fiber, and environmental services;
- All citizens directly benefit from this area of inquiry;
- These lines of inquiry will provide necessary information to inform human enterprises while protecting

both the individual and corporate estate;

- This is an important area of study for society and will be utilized for enhanced decision-making by stakeholders and all citizens;
- Research and education related to the multiple facets of economics are demanded by society to meet current and future needs.

It is further assumed that base federal funding will continue to be available to support planned activities and the scientific staff members who carry out the lines of inquiry noted within the knowledge areas for this program. Likewise, it is assumed that federal base funding will continue to be successfully leveraged to attract additional state and extramural funds.

2. Ultimate goal(s) of this Program

OARDC's goals for this planned program are to:

- Advance knowledge regarding social and economic choices related to protection, management, size/scale/growth factors, and overall sustainability required to support Ohio's agriculture industry and to meet stakeholder demand;
 - Grow the understanding of agribusiness management and associated systems necessary to support Ohio's agriculture industry and meet stakeholder demand;
 - Expand the knowledge base of market economics, including but not limited to domestic trade, regulation, supply and demand, and market performance and analyses;
 - Develop and expand applicable knowledge of the social and economic dimensions of natural resources and environmental-systems commensurate with demand from multiple stakeholders for multiple outcomes, e.g. profit, preservation, esthetics;
 - Explore and advance theoretical and applied economics of international trade and development as it relates to Ohio and national needs;
 - Enhance understanding of domestic economic policy analysis, and related sociological concerns, in terms of government policy impact on agriculture and natural resources;
 - Grow and extend knowledge related to individuals, families, groups, and organizations as it relates to all aspects of human systems and associated capital.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2016	0.0	0.0	7.0	0.0
2017	0.0	0.0	7.0	0.0
2018	0.0	0.0	7.0	0.0
2019	0.0	0.0	7.0	0.0
2020	0.0	0.0	7.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> ● Education Class ● Workshop ● Demonstrations 	<ul style="list-style-type: none"> ● Public Service Announcement ● Newsletters

3. Description of targeted audience

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

- Specific individuals or groups who have expressed a need for social, educational, and economic findings related to some aspect of human capital that is to be derived through new research, extracted from on-going research, or mined from scientific literature;
- Fellow academic units that rely on scientists in this program for support information and for the approaches/measures they generate;
- Other scientists and scientific groups;
- Political entities;
- Extension personnel;
- Students from junior high school to post doctorate studies;
- News organizations;
- Business groups and industry groups.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Business management knowledge, including policy analysis, in targeted areas, e.g. risk management, weather insurance, impacts of land use shifts, grant management that are necessary for and result in increased profitability for stakeholders.
2	Market economies and efficiencies studies relating to factors such as pricing, finance, supply and demand, exchange rates, trade policies, etc. ensuring that stakeholders are informed and their identified needs.
3	Advance basic and theoretical knowledge in sociological, educational, and human capital dimensions related to food, agriculture and environment topics
4	Advance human capital and sociological studies that will inform strategies for expanding and strengthening individual and family well-being, community stability, and agricultural workforce leading to improved quality and quantity of life.
5	Study rural education 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.

Outcome # 1

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management
- 602 - Business Management, Finance, and Taxation
- 603 - Market Economics
- 605 - Natural Resource and Environmental Economics
- 606 - International Trade and Development Economics
- 607 - Consumer Economics
- 609 - Economic Theory and Methods
- 610 - Domestic Policy Analysis

4. Associated Institute Type(s)

- 1862 Research

Outcome # 2

1. Outcome Target

Market economies and efficiencies studies relating to factors such as pricing, finance, supply and demand, exchange rates, trade policies, etc. ensuring that stakeholders are informed and their identified needs.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management
- 602 - Business Management, Finance, and Taxation
- 603 - Market Economics
- 604 - Marketing and Distribution Practices
- 605 - Natural Resource and Environmental Economics
- 606 - International Trade and Development Economics
- 607 - Consumer Economics
- 608 - Community Resource Planning and Development
- 609 - Economic Theory and Methods

- 610 - Domestic Policy Analysis
- 611 - Foreign Policy and Programs

4. Associated Institute Type(s)

- 1862 Research

Outcome # 3

1. Outcome Target

Advance basic and theoretical knowledge in sociological, educational, and human capital dimensions related to food, agriculture and environment topics

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 605 - Natural Resource and Environmental Economics
- 801 - Individual and Family Resource Management
- 803 - Sociological and Technological Change Affecting Individuals, Families, and Communities
- 805 - Community Institutions and Social Services
- 901 - Program and Project Design, and Statistics
- 903 - Communication, Education, and Information Delivery

4. Associated Institute Type(s)

- 1862 Research

Outcome # 4

1. Outcome Target

Advance human capital and sociological studies that will inform strategies for expanding and strengthening individual and family well-being, community stability, and agricultural workforce leading to improved quality and quantity of life.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management
- 803 - Sociological and Technological Change Affecting Individuals, Families, and Communities
- 805 - Community Institutions and Social Services
- 901 - Program and Project Design, and Statistics
- 903 - Communication, Education, and Information Delivery

4. Associated Institute Type(s)

- 1862 Research

Outcome # 5

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management
- 803 - Sociological and Technological Change Affecting Individuals, Families, and Communities
- 805 - Community Institutions and Social Services
- 901 - Program and Project Design, and Statistics
- 903 - Communication, Education, and Information Delivery

4. Associated Institute Type(s)

- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect 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.)

Description

Shifts in social and economic dimensions impact all aspects of people's lives. Within this program area, public monies, and the fluctuations in appropriations of such, can have dramatic (both positive and negative) effects on human well-being, as do levels of government regulations. Likewise, public policy, priorities, and perceptions, in addition to popular culture and trends/fads, education, and family are major external factors affecting this program. Priority of economic research for limited dollars, and the

resulting competition, affects the extent to which research can be carried out. Other factors such as economic conditions and the needs of migrant populations entering the community and workforce are also impacts. Additionally, how society is organized, makes decisions, is educated, moves from locale to locale, etc. all affect the food, agricultural, and environmental matrix. Weather related factors impact the conditions and attributes that are being studied by creating uncertainty that cannot be controlled.

Factors such as the availability of state and federal base funding to ensure a core faculty and staff, availability of extramural funds, and programmatic demands that often exceed resources will also affect outcomes.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

OARDC's Planned Programs have incorporated protocols for documenting success in achieving goals as an integral part of the approval and funding process. Each department, center, program, lab group, and individual faculty member has techniques for garnering feedback and ascribing value to their processes and products. Given that much of the research work of OARDC faculty and staff does not focus on group-level dynamics, many of the more formalized evaluation techniques are not appropriate. The techniques that OARDC continues to use, most of them being qualitative surrogate measures, are:

- Informal and formal feedback from stakeholders in terms of needs, willingness to participate, willingness to advocate for OARDC, ease of participation/inclusion, willingness to support, and overall level of satisfaction with OARDC processes and products;
- Feedback from the OARDC Advisory Committee that ranges from helping to determine needs of our constituencies to feedback on commercialization of a new patented product;
- Elected state and federal officials' support for OARDC in terms of base budgets, new initiatives, and their willingness to help us link with new stakeholders;
- Support from USDA, feedback from NIFA regarding our federal reports, and feedback and support we receive from other federal agencies;
- Accountability measures required by extramural grants and contracts and our level of attainment of those required metrics;
- Impacts reported by individual CFAES departments in their OARDC budget requests as part of our differential funding model, as well as individual faculty member's impact statements.

V(A). Planned Program (Summary)

Program # 12

1. Name of the Planned Program

Human Health (OARDC Led)

2. Brief summary about Planned Program

Human health, as it relates to food and environment, is a major concern from both the agricultural experiment station's research perspective, and from that of cooperative extension programs. Agricultural crops (both plant and animal), their residues, renewable natural resources, and the related manufacturing processes and food products, all have human health and safety risks associated with them.

The goal of this planned program is to reduce threats to human health and improve societal well-being within OARDC's and OSU Extension's sphere of influence. Faculty members working in OARDC focus their efforts on emerging pathogens, zoonoses, and microbial contamination of food and the environment as they often threaten agricultural productivity, sustainability, and public health worldwide. Our mission is to protect and enhance animal and public health through research, education and outreach; and to support the animal industries in economically producing safe, wholesome food in an environmentally and socially responsible manner. Emerging and re-emerging zoonotic diseases, for example, are considered an important threat to public health.

One group of scientists, in conjunction with a number of other OSU colleges, studies the diagnosis, epidemiology, pathogenesis, and control of zoonotic diseases in the animal reservoir and the environment. Development of new sensitive tests for astroviruses facilitates the diagnosis of the disease, epidemiology of the infection, and a variety of other studies. Studies are also being initiated on emerging animal and plant diseases such as avian influenza viruses, soybean rust, and sudden oak death. While these are emerging diseases that threaten American agriculture, they may also harbor a possible threat to public health.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
502	New and Improved Food Products	0%		5%	
703	Nutrition Education and Behavior	0%		5%	
721	Insects and Other Pests Affecting Humans	0%		20%	
722	Zoonotic Diseases and Parasites Affecting Humans	0%		50%	
723	Hazards to Human Health and Safety	0%		10%	
724	Healthy Lifestyle	0%		10%	
	Total	0%		100%	

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

The science behind advancing human health, including healthy lifestyles, has immediate consequence and importance for insuring a safe, stable society, and for protecting the U.S. economy from unnecessary losses. OARDC and OSU Extension address direct requirements of their constituency groups by regularly interacting with them to understand their needs. Without a growing body of knowledge to help protect society, opportunities will be missed for social and economic security, and society will be underserved. OARDC and OSU Extension are well positioned to continue to affect positive change in this planned program. To meet growing demand for better human health, scientists must continue to make advances in techniques and processes that are associated with food systems. Due to the complexity of the problems, research and extension programs are integrated in multiple academic departments across multiple colleges at The Ohio State University.

2. Scope of the Program

- In-State Research
- Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

A client oriented research, development, and outreach program in the human health and well-being sector is critical to meeting society's needs in this area. As we address problems and needs within our stakeholder communities, the organization will become better prepared to take advantage of emerging opportunities and more rapidly address associated problems.

Other key assumptions are:

- The topics and goals within this program have been identified by our stakeholder communities and/or via the scientific literature, reflect the most important issues, and warrant allocation of resources;
- The understanding of this planned program and how society utilizes and depends on safety research

and associated extension programs is key to present and future decision-making, both domestically and worldwide;

- All citizens directly benefit from advanced human health research and extension programs;
- These lines of inquiry are necessary to inform human enterprises.

It is further assumed that base federal funding will continue to be available to support planned activities and the scientific staff members who carry out lines of inquiry noted within the knowledge areas for this program. Likewise, it is assumed that the federal base funding will continue to be successfully leveraged to attract additional state and extramural funds.

2. Ultimate goal(s) of this Program

OARDC's goals for this planned program are to :

- Advance the study of insects, ticks and mites to protect human health, including methods of control;
- Better understand the means and methods related to the transmission of zoonotic diseases to humans, including prevention;
- Grow fundamental and applied knowledge as to animal reservoirs for zoonotics.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2016	0.0	0.0	1.5	0.0
2017	0.0	0.0	1.5	0.0
2018	0.0	0.0	1.5	0.0
2019	0.0	0.0	1.5	0.0
2020	0.0	0.0	1.5	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

To fulfill the goals of the Human Health Planned Program, OARDC will support both basic and applied research initiatives. Effective research requires a mixture of laboratory and gathering places for subjects to maximize research knowledge. Emerging threats now require more advanced facilities such as a biosecurity lab, particularly needed in the study of infectious animal diseases that may directly impact humans. All functional laboratories and research sites are improved over time as program needs warrant. OARDC faculty and staff will engage in appropriate levels of outreach, engagement, and consultation with both internal stakeholders, such as fellow extension personnel, and with external stakeholders.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension	
Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Education Class • Workshop • Demonstrations 	<ul style="list-style-type: none"> • Newsletters • Web sites other than eXtension

3. Description of targeted audience

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

- Specific individuals or groups who have expressed a need for health, obesity, and safety information that is to be derived through new research, extracted from on-going research, or mined from scientific literature;
- Fellow academic units that rely 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;
- Other scientists and scientific groups;
- Health workers and organizations;
- Political entities;
- Extension personnel;
- Students from pre- school to post doctorate studies;
- News organizations;
- Business groups and industry groups.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Release studies on insects, ticks, and mites to protect human health that will provide a set of alternatives leading to health gains with lowered risks, and within economic realities, for the affected populations.
2	Advance the understanding of means and methods related to transmission of zoonotic diseases to humans, including prevention, that meets consumer demand/health threat, as or before such emerges.
3	Reduce through research, development, and outreach the exposure to biohazards, pathogens, and similar to the extent that annually such are reduced per capita with an overall time and economic savings to those who may be affected.
4	Create a growing base of knowledge that supports improving human health as it relates to food, environment, and lifestyle
5	Expand utilization of products with known functionality or nutraceutical value and give consumers greater informed choices, including the bioavailability of the desired substance in food, than they presently have.

Outcome # 1

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 721 - Insects and Other Pests Affecting Humans
- 722 - Zoonotic Diseases and Parasites Affecting Humans

4. Associated Institute Type(s)

- 1862 Research

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 721 - Insects and Other Pests Affecting Humans
- 722 - Zoonotic Diseases and Parasites Affecting Humans

4. Associated Institute Type(s)

- 1862 Research

Outcome # 3

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 723 - Hazards to Human Health and Safety

- 724 - Healthy Lifestyle

4. Associated Institute Type(s)

- 1862 Research

Outcome # 4

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Research

Outcome # 5

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 502 - New and Improved Food Products
- 724 - Healthy Lifestyle

4. Associated Institute Type(s)

- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect 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.)

Description

Multiple factors play a major role in encouraging the growth and spread of pests and diseases that can be transmitted to humans. Shifts in economy can influence government or society in terms of general abilities to attend to human health matters. Access to health care, both real and due to political positions and education regarding healthy lifestyles also affects outcomes. Within this program area public monies, and the fluctuations in appropriations of such, have dramatic effects on human health, as do levels of regulations. Likewise, public policy and the public's priorities and perceptions, especially regarding risks, are major external factors impacting this program.

The priority of this research for limited dollars and the resulting competition impact the extent of research that can be carried out. Another 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 diseases 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 is a factor that is beyond the researchers' control. Willingness to pay by consumers for additional food safety is also an external factor. Factors such as the availability of base funding to ensure a core faculty and staff, availability of extramural funds, and programmatic demands that often exceed resources will affect outcomes.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

OARDC's Planned Programs have incorporated protocols for documenting success in achieving goals as an integral part of the approval and funding process. Each department, center, program, lab group, and individual faculty member has techniques for garnering feedback and ascribing value to their processes and products. Given that much of the research work of OARDC faculty and staff does not focus on group-level dynamics, many of the more formalized evaluation techniques are not appropriate. The techniques that OARDC continues to use, most of them being qualitative surrogate measures, are:

- Informal and formal feedback from stakeholders in terms of needs, willingness to participate, willingness to advocate for OARDC, ease of participation/inclusion, willingness to support, and overall level of satisfaction with OARDC processes and products;
- Feedback from the OARDC Advisory Committee that ranges from helping to determine needs of our constituencies to feedback on commercialization of new patented products;
- Elected state and federal officials' support for OARDC in terms of base budgets, new initiatives, and their willingness to help us link with new stakeholders;
- Support from USDA, feedback from NIFA regarding our federal reports, and feedback and support

we receive from other federal agencies;

- Accountability measures required by extramural grants and contracts and our level of attainment of those required metrics;
- Impacts reported by individual CFAES departments in their OARDC budget requests as part of our differential funding model, as well as individual faculty member's impact statements.

V(A). Planned Program (Summary)

Program # 13

1. Name of the Planned Program

Advancing Employment and Income Opportunities (Extension)

2. Brief summary about Planned Program

Innovation, entrepreneurship, and an understanding of local and regional economics are keys to sustainable economic growth in Ohio. Formal and informal educational efforts involving individuals and groups of all sizes will focus on community economics, small businesses, job development, and wealth creation throughout the state. In many cases, the efforts aim to engage community stakeholders in local applied research designed to create knowledge that empowers local development officials and the community at large to act on development issues of strategic economic importance.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : No

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
602	Business Management, Finance, and Taxation	15%		0%	
608	Community Resource Planning and Development	60%		0%	
801	Individual and Family Resource Management	25%		0%	
	Total	100%		0%	

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Innovation, entrepreneurship, and an understanding of local and regional economics are keys to sustainable economic growth in Ohio. Communities, individuals and families must find ways to thrive in the rapidly changing economic environment. OSU Extension will continue to help communities enhance their well-being through a wide range of community development programming. 'Advancing Employment and Income Opportunities' programming will focus on the following development topics: community economics, organizational, community leadership, and participatory community planning. Therefore, community leaders and residents need to develop new strategies for addressing these changes. OSU Extension will continue to help analyze local economies and identify economic trends and opportunities for change and growth.

2. Scope of the Program

- In-State Extension
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

- Individuals and communities desire to learn and apply new strategies for capitalizing on opportunities
- OSU Extension faculty and staff possess great expertise
- OSUE faculty and staff will teach community leaders and citizens
- OSUE instruction will include integrated activities based on research
- Additional services provided by OSUE will include: providing technical assistance, coaching, facilitating and forming coalitions
 - Communities and leaders will be able to implement new strategies as a result of skills and knowledge gained through the programming efforts of OSUE professionals

2. Ultimate goal(s) of this Program

The goal of all OSU Extension programming related to 'Advancing Employment and Income Opportunities' is to empower communities, individuals and families to create, expand, and retain economic opportunities.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2016	10.0	0.0	0.0	0.0
2017	10.0	0.0	0.0	0.0
2018	12.0	0.0	0.0	0.0
2019	12.0	0.0	0.0	0.0
2020	14.0	0.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- On-site workshops
- Meetings
- Curriculum development and maintenance
- Educational programming

- Development and maintenance of online resources
- Establishment of collaborative partnerships
- One-on-one client consultations
- Volunteer organizational efforts

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Education Class • Workshop • Group Discussion • One-on-One Intervention • Demonstrations 	<ul style="list-style-type: none"> • Newsletters • Web sites other than eXtension

3. Description of targeted audience

- Community leaders
- Economic development professionals
- Community residents (families and individuals)
- Business owners/operators

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
 - Number of patents submitted
 - Number of peer reviewed publications
- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- number of formal 'Business Retention and Expansion' training workshops
- number of one-on-one 'Business Retention and Expansion' consultations
- number of volunteers who have participated in 'Advancing Employment and Income Opportunities' programming
- number of volunteer hours contributed to planning and implementing 'Advancing Employment and Income Opportunities' programming
- number of volunteers who have participated in 'Business Retention and Expansion' programming
- number of volunteer hours contributed to planning and implementing 'Business Retention and Expansion' programming
- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	number of community plans developed and adopted (BR&E)
2	number of jobs created
3	number of jobs retained
4	number of local leaders and community residents that have indicated they are using knowledge gained from 'Business Retention and Expansion' programming to make better informed community decisions

Outcome # 1

1. Outcome Target

number of community plans developed and adopted (BR&E)

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 602 - Business Management, Finance, and Taxation
- 608 - Community Resource Planning and Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

number of jobs created

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 602 - Business Management, Finance, and Taxation
- 608 - Community Resource Planning and Development
- 801 - Individual and Family Resource Management

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

number of jobs retained

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 608 - Community Resource Planning and Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 4

1. Outcome Target

number of local leaders and community residents that have indicated they are using knowledge gained from 'Business Retention and Expansion' programming to make better informed community decisions

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 608 - Community Resource Planning and Development

4. Associated Institute Type(s)

- 1862 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Limited resources and / or other competing programmatic emphases may limit the extent to which planned program efforts in this area can be undertaken. Changes in the economy and population changes (immigration, emigration) will affect local economies. The success of a local economy is strongly dependent upon its citizens having enough personal wealth to continue to participate in and drive the economy.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

The following are planned evaluation types for the 'Advancing Employment and Income Opportunities' program:

- After only (post-program)
- Retrospective (post-program)
- During (during program)

- Case study

The following are planned data collection methods for the 'Advancing Employment and Income Opportunities' program:

- Sampling
- Whole population
- On-site surveys
- Unstructured interviews
- Case study
- Observation

V(A). Planned Program (Summary)

Program # 14

1. Name of the Planned Program

Enhancing Agriculture and the Environment (Extension)

2. Brief summary about Planned Program

Ohio's diverse agricultural, horticultural, and forestry industries contribute more than \$100 billion to the state's economy every year. OSU Extension (OSUE) will assist a variety of clients with technology, marketing, and educational support. The efforts of OSUE professionals will advance Ohio's position in the global marketplace. OSUE also will work to enhance and sustain the environment and natural areas in the state, balancing economic advancement with environmental sustainability. Several examples of the services OSUE provides to clients follow:

- help farmers strengthen their businesses, adopt new technology, and improve efficiency while protecting the environment;
- work closely with the Ohio Department of Agriculture and other state agencies to serve as the educational branch of 4R Nutrient Stewardship programming in efforts to help control nutrient runoff and decrease the harmful algae blooms in Ohio's waterways and watershed;
- work to educate farmers, landowners and homeowners to identify, control, and / or eradicate invasive species attacking our crops, landscapes and natural resources;
- help to 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;
- protect Ohio's natural environment through by working with landowners in managing woodlands and preserving streams and other water resources, such as Lake Erie;
- works with homeowners and individuals to enhance the value of their homes and communities by applying and sharing research-based yard and garden information, through the consultation of Master Gardener volunteers;
- work with Ohio's citizens and business owners impacted by bed bugs through education on preventing, identifying, and eliminating bed bugs in the home and business environment through educations publications/resources, presentations, and programs.

Ohio State University Extension will continue to evolve with the economy and needs of our clients and stakeholders. OSUE currently has several signature programs related to 'Enhancing Agriculture and the Environment': 'Local Foods' and 'Nutrient Stewardship for Cleaner Water'. 'Local Foods' is designed to strategically build food literacy and skills around four themes: Food Production, Food & Family, Food and Business, and Food and Community. 'Nutrient Stewardship for Cleaner Water' will help advance crop yields while minimizing the offsite loss of nutrients which can lead to the degradation of water quality. 'Nutrient Stewardship for Cleaner Water' will continue to teach ways of increasing nutrient utilization efficiency via in-field and edge-of-field best management practices that limit off-site movement of nutrients while increasing crop yields through small plot, on-farm research and education. Both the 'Local Foods' and 'Nutrient Stewardship for Cleaner Water' signature programs will continue into the foreseeable future.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	10%		0%	
112	Watershed Protection and Management	15%		0%	
123	Management and Sustainability of Forest Resources	5%		0%	
133	Pollution Prevention and Mitigation	10%		0%	
205	Plant Management Systems	15%		0%	
216	Integrated Pest Management Systems	15%		0%	
307	Animal Management Systems	10%		0%	
601	Economics of Agricultural Production and Farm Management	10%		0%	
602	Business Management, Finance, and Taxation	10%		0%	
	Total	100%		0%	

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Collectively, Ohio's diverse commercial agricultural, horticultural, and forestry industries contribute more than \$100 billion annually to Ohio's economy. Global economic forces, competition for land use, and urban / suburban sprawl will continue to challenge the aforementioned industries to strategically position their businesses to remain sustainable into the future. Transitional agriculture commodity production will continue its bi-modal distribution in farm size and scale with a very small percentage of farm production units contributing an increasing share of total gross production. Small / mid-size farms will continually need to become more entrepreneurial by differentiating their commodities and evaluating direct and other marketing alternatives. Continued growth and evolution of Ohio's "green industry" (nursery / landscape, turfgrass, and floriculture) will present unique opportunities for new university investments in research and Extension personnel at the state, regional and county levels to provide timely research-based information.

Ohio is a densely populated state with many metropolitan areas, as well as a rural landscape increasingly occupied by homeowners seeking the amenities of country living. Growing metropolitan areas and division of land into small plots for home construction places heavy demands on the state's fixed land base and other elements of the natural environment, especially water. These factors of growth lead to

increased competition among individuals and interest groups regarding the multiple alternative uses of the state's natural resources. Ohioans will continue to be concerned with overarching issues, including global climate change, invasive species, and farm-land preservation.

Programming in this area has a documented history of strong learning and behavior outcomes and impacts. Evaluation has been, and will continue to be, a regular component of 'Enhancing Agriculture and the Environment' programming. Evaluation results will continue to inform educators, advisory groups, and the organization about both the successes and areas for improvement in relation to 'Enhancing Agriculture and the Environment' programming. Future programming priorities will be identified and set by reviewing evaluation data as well as stakeholder feedback.

2. Scope of the Program

- In-State Extension
- Multistate Extension
- Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

OSU Extension has a sector of professionals focused on the area of Agriculture and Natural Resources. Within this program area, multi-disciplinary teams will continue to conduct applied research and identify the most efficient means to disseminate research-based information. OSUE professionals will utilize electronic newsletters, face-to-face programs, field days and satellite series as means of reaching our clientele with educational information. Newly identified teams and working groups will be developed as needs and issues are identified by clientele groups.

OSU Extension works in collaboration with others having a stake in the natural environment, including individuals, volunteer groups, community leaders, business leaders, elected and appointed officials, and non-government organizations to identify, develop, and deliver educational programs that target the many natural resource use and restoration issues faced by communities and regions. Extension and its partners provide the educational basis for maintaining and improving the natural resource base while simultaneously striking a balance with sustainable yields from our land, water, forest, and mineral resources.

2. Ultimate goal(s) of this Program

The ultimate goal of 'Enhancing Agriculture and the Environment' programming is to ensure the sustainable management of Ohio's farm, forest, and water resources, to provide a long-term, quality supply of water, food and forest products.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2016	45.0	0.0	0.0	0.0

2017	45.0	0.0	0.0	0.0
2018	46.0	0.0	0.0	0.0
2019	46.0	0.0	0.0	0.0
2020	47.0	0.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Enhance the adaptation of production techniques through utilization of on-farm research to work directly with producers to evaluate practices to enhance productivity and profitability;
- conduct workshops and training sessions for livestock haulers, food animal veterinarians, livestock producers, consultants and integrators;
- conduct tax education workshops for practitioners, attorneys, CPAs, CFPs;
- conduct 'Pesticide Applicator Training' for private and commercial license holders;
- conduct 'Fertilizer Applicator Certification Training';
- organize and conduct 'Small Farm Conference' and 'Small Farm College' series;
- organize and conduct 'Transitioning Your Farm Business to the Next Generation' workshops;
- organize and conduct 'Women in Agriculture' / 'Annie's Project' seminars;
- organize and conduct '4R Nutrient Management' programming;
- organize and conduct meetings, seminars, conferences, programs and activities for the 'Local Foods' signature program (this program will continue to address the critical need for outreach education around the broad topic of local food systems);
 - organize and conduct educational workshops, training sessions, and seminars for Master Gardener Volunteers;
 - organize, plan and conduct seminars, workshops, and meetings to assist landowners, foresters, and loggers in managing Ohio's natural resources in economically viable and environmentally friendly ways.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Education Class • Workshop • Group Discussion • One-on-One Intervention • Demonstrations • Other 1 (Conferences) 	<ul style="list-style-type: none"> • Public Service Announcement • Newsletters • TV Media Programs • Web sites other than eXtension

3. Description of targeted audience

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

- Ohio citizens;

- commercial green-industry companies;
- consumer horticulture advocates;
- commodity/farm advocacy groups;
- federal / state and agricultural / environmental agencies;
- state-wide consumer groups;
- volunteer groups;
- community leaders;
- business leaders;
- elected and appointed officials;
- non-government organizations;
- tax practitioners and preparers and certified public accountants;
- female agricultural or agricultural-related business owners / partners;
- pesticide application license holders;
- Ohio farmers;
- livestock haulers;
- livestock producers;
- manure haulers and applicators;
- fertilizer applicators;
- forest landowners;
- professional foresters and loggers;
- banks / financial & lending institutions, especially those in rural communities.

Included in the reporting of the NIFA planned program, 'Enhancing Agriculture and the Environment', OSU Extension has a number of programs that have more specific audiences, which are detailed separately below.

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

- Ohio citizens
- Community leaders and officials
- Master gardeners

eXtension "Ask a Master Gardener" - Ohio targets the following audiences:

- New and beginning gardeners
- Gardeners with distressed gardens, plants, new / unusual problems with plants and / or diseases

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

- Ohio citizens
- Community leaders and officials
- Certified naturalists

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

- Local and State Departments of Health
- Business owners
- Community leaders
- Government Officials
- Citizens of Ohio

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
 - Number of patents submitted
 - Number of peer reviewed publications
- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- number of volunteers involved in delivery and implementation of 'Enhancing Agriculture and the Environment' programming
- number of multi-state partnerships
- number of 'Crop Observation and Recommendation Network' (CORN) newsletters distributed
- number of participants attending regional / local agronomy meetings
- number of local / on-farm research project sites
- number of participants in local field days
- number of 'Weed Control Guide for Ohio and Indiana' distributed
- number of 'Corn, Soybean, Wheat, and Alfalfa Field Guide' distributed
- number of people participating in an OSUE 'Local Foods' program, activity, conference, or workshop
- number of individuals taught about disease identification, control, and scouting or other key weed control concepts
- number of people attending 'New and Small Farm College' events
- number of people attending the 'Small Farm Conference and Trade Show'
- number of 'Ohio Agronomy Guide' media distributed
- number of food animal producers that complete 'Livestock Mortality Composting' training
- number of program participants that are considered to be under-represented
- number of program participants that are considered to be under-served
- number of volunteer hours worked
- number of new Master Gardener Volunteers
- number of direct contacts through the 'Nutrient Stewardship for Cleaner Water' signature program
- number of people attending the 'Farm Science Review' event
- number of Certified Crop Advisers (CCAs) in Ohio

- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	number of people (agronomic crops, fruit, and vegetable producers) that demonstrated an increase in <u>plant-based food biosecurity / biosafety knowledge</u>
2	total number of people indicating an increased knowledge of current practices and emerging <u>technology in conservation tillage as a result of attending the Conservation Tillage Conference</u>
3	Number of Schedule "F" tax forms filed by tax practitioners that participated in OSU Income Tax <u>Schools.</u>
4	Total number of farms and agribusinesses that began using transitioning planning this year as a result of <u>OSUE transition planning workshops</u>
5	Total number of participants in an agronomic meeting, workshop, or field day that indicated they will <u>implement at least 1 new management practice based on information received</u>
6	number of crop production acres that will implement best management practices for nutrient <u>management</u>
7	number of crop production acres that implement weed resistance management strategies
8	Total number of Ohio crop acres (agronomic, vegetable and fruit crops) where appropriate utilization of <u>integrated pest management (IPM) practices occur</u>
9	number of individuals who plan to implement on their farm one of the learning outcomes from OSUE <u>programming related to: disease identification and control, scouting, or key weed control concepts</u>
10	number of farmers reporting positive changes in management and / or profitability of their farm as a <u>result of information from farm financial analysis</u>
11	reported economic impact of cost savings, increased yield, or other increased profitability from use of <u>CORN newsletter, reported as total dollars</u>
12	number of acres of forest land impacted by OSU Extension programming

Outcome # 1

1. Outcome Target

number of people (agronomic crops, fruit, and vegetable producers) that demonstrated an increase in plant-based food biosecurity / biosafety knowledge

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 112 - Watershed Protection and Management
- 123 - Management and Sustainability of Forest Resources
- 133 - Pollution Prevention and Mitigation
- 205 - Plant Management Systems
- 216 - Integrated Pest Management Systems

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

total number of people indicating an increased knowledge of current practices and emerging technology in conservation tillage as a result of attending the Conservation Tillage Conference

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 112 - Watershed Protection and Management
- 123 - Management and Sustainability of Forest Resources
- 133 - Pollution Prevention and Mitigation
- 205 - Plant Management Systems
- 216 - Integrated Pest Management Systems
- 601 - Economics of Agricultural Production and Farm Management

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 602 - Business Management, Finance, and Taxation

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 4

1. Outcome Target

Total number of farms and agribusinesses that began using transitioning planning this year as a result of OSUE transition planning workshops

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management
- 602 - Business Management, Finance, and Taxation

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 5

1. Outcome Target

Total number of participants in an agronomic meeting, workshop, or field day that indicated they will implement at least 1 new management practice based on information received

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 205 - Plant Management Systems
- 216 - Integrated Pest Management Systems

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 6

1. Outcome Target

number of crop production acres that will implement best management practices for nutrient management

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 133 - Pollution Prevention and Mitigation

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 7

1. Outcome Target

number of crop production acres that implement weed resistance management strategies

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 205 - Plant Management Systems
- 216 - Integrated Pest Management Systems

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 8

1. Outcome Target

Total number of Ohio crop acres (agronomic, vegetable and fruit crops) where appropriate utilization of integrated pest management (IPM) practices occur

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 216 - Integrated Pest Management Systems

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 9

1. Outcome Target

number of individuals who plan to implement on their farm one of the learning outcomes from OSUE programming related to: disease identification and control, scouting, or key weed control concepts

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 133 - Pollution Prevention and Mitigation
- 205 - Plant Management Systems
- 216 - Integrated Pest Management Systems

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 10

1. Outcome Target

number of farmers reporting positive changes in management and / or profitability of their farm as a result of information from farm financial analysis

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management
- 602 - Business Management, Finance, and Taxation

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 11

1. Outcome Target

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

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 112 - Watershed Protection and Management
- 133 - Pollution Prevention and Mitigation
- 205 - Plant Management Systems
- 216 - Integrated Pest Management Systems

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 12

1. Outcome Target

number of acres of forest land impacted by OSU Extension programming

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 123 - Management and Sustainability of Forest Resources

4. Associated Institute Type(s)

- 1862 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Extension has historically been very responsive to extreme climatic events. In Ohio, these events include flooding, drought, tornados, ice storms, and extreme cold. We will be responsive to our clientele and all partners to provide programming to help alleviate the impacts of these events.

Changes in the economy also affect Extension programming in that we help producers remain financially solvent and help them adapt to changes in economic conditions. OSUE remains flexible in finding multiple funding sources so that appropriations changes do not have as dramatic an affect as they may otherwise have.

Public policy and government regulations are constantly changing. OSUE provides information and works with partner agencies to ensure that producers understand the changes in regulations and can manage their business affairs appropriately.

The population of Ohio is changing. As Ohio becomes an increasingly urban state, OSUE is creating new programs, and adapting old ones to help meet the needs of this ever changing and growing clientele base.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

The following are planned evaluation study types for the 'Enhancing Agriculture and the Environment' program:

- After only (post program)
- Retrospective (post program)
- Pre-post

The following are planned data collection methods for the 'Enhancing Agriculture and the Environment' program:

- Sampling
- Mail survey
- On-site survey
- Case study
- On-line survey

V(A). Planned Program (Summary)

Program # 15

1. Name of the Planned Program

Preparing Youth for Success (Extension)

2. Brief summary about Planned Program

As Ohio's economy continues the shift from an industrial to a knowledge base, its young people and volunteers supporting them will need advanced skills to be successful. OSU Extension, through 4-H and other programming efforts, will continue to provide resources and support for volunteers who deliver educational programs focused on critical issues affecting youth.

Programming in the 'Preparing Youth for Success' planned program will continue to include activities such as:

- workshops
- face-to-face events
- curriculum development, as needs arise
- media and website creation and updating
- hosting county and state fair
- day and overnight camping events
- educational youth programming
- in-school and after-school enrichment programs, with heavy emphasis on science, technology, engineering, and math

The goal of 'Preparing Youth for Success' (and 4-H related programming) will continue to be the same as it was in 1902, when 4-H first took root: "the development of youth as individuals and as responsible, productive members of the community in which they live."

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : No

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

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

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

It is the mission of 4-H to empower youth to reach their full potential by working and learning in partnership with caring adults. The Ohio 4-H program seeks to promote positive youth development, facilitate learning, and engage youth in educational programs in order to enhance their quality of life. 'Preparing Youth for Success' programming has the potential to benefit individuals, households, communities, and society. The educational priorities are: (1) science, technology, engineering and mathematics tied to scientific learning, inquiry, and discovery; and (2) citizenship tied to the activities of people within institutions, government and communities.

There is opportunity to build human and social capital in individual neighborhoods and communities by creating sustainable volunteer-led groups that promote youth contribution. 'Preparing Youth for Success' programs will continue to use multiple modalities for delivering programming, including (but not limited to): face-to-face events (both with peers and adults), large group events (such as club meetings, camping, and fair), and individual work time (preparing for projects at fair through workbook activities).

Programming in this area has a documented history of strong learning and behavior outcomes and impacts. Evaluation has been, and will continue to be, a regular component of 'Preparing Youth for Success' programming. Evaluation results will continue to inform educators, advisory groups, and the organization about both the successes and areas for improvement in relation to 'Preparing Youth for Success' programming. Future programming priorities will be identified and set by reviewing evaluation data as well as stakeholder feedback.

2. Scope of the Program

- In-State Extension
- Multistate Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

1. Young people will need to be involved in meaningful learning experiences, with peer groups and strong adult role models.
2. Research will continue to support positive youth development practices; 'Preparing Youth for

Success' programming will continue to incorporate the most up-to-date research in the most effective way for reaching youth.

3. Demands on family time will continue to be a factor in the programs youth choose or in which they are able to participate; program delivery methods will be altered as needed to help accommodate youth participation in consideration of family obligations.

4. There will continue to be external risk factors that influence youth and the need for programs that address those factors.

5. Youth will face an increasing amount of choices and opportunities in all facets of their lives; programming must compete with

6. 'Preparing Youth for Success' programming will continue to need a caring, dedicated base of volunteers willing to help implement youth programming (club advisors / leaders, camp counselors, fair judges, etc)

It is expected that the program will continue to have strong outputs and outcomes. Delivery methods will likely change or be modified, as technology and the ways in which youth engage with the world around them change.

2. Ultimate goal(s) of this Program

Extension youth-oriented educational programs foster a practical understanding and application of science, technology, engineering, math and other life skills that will lead to a more prepared young person pursuing a post-secondary education, entering the workforce, and becoming productive citizens of their communities.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2016	88.0	0.0	0.0	0.0
2017	90.0	0.0	0.0	0.0
2018	90.0	0.0	0.0	0.0
2019	90.0	0.0	0.0	0.0
2020	90.0	0.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct workshops
- Face to face and virtual meetings
- Develop curriculum
- Provide training to professionals, volunteers and youth
- Media and web site creations
- Partnering with businesses and other organizations
- Fair (county and state)

- Camping
- Conduct educational programs with youth
- Conduct in-school and after-school enrichment

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Education Class • Workshop • Group Discussion • One-on-One Intervention • Demonstrations 	<ul style="list-style-type: none"> • Public Service Announcement • Newsletters • TV Media Programs • eXtension web sites • Web sites other than eXtension • Other 1 (Pod Casts) • Other 2 (Emerging social media technology)

3. Description of targeted audience

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

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- number of youth enrolled/engaged in organized community 4-H clubs
- number of youth enrolled/engaged in after school 4-H programs
- number of youth participating in special interest and short-term programs
- number of youth participating in school enrichment programs
- number of youth participating in 4-H overnight camping programs
- number of youth participating in 4-H day camping programs
- number of adult volunteers contributing to 4-H programming and events
- number of teen volunteers contributing to 4-H programming and events
- number of youth participating in "Assuring Quality Care for Animals" sessions
- number of adult volunteers contributing to the planning and implementation of the 'Real Money. Real World.' financial literacy program
- Number of youth participating in the "STEM Pathways" signature program

- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	number of youth indicating an increase in understanding of decision making processes
2	number of youth who have indicated the intention to practice improved basic life skills
3	number of youth who have participated in 4-H programs and indicated that they now possess <u>transferrable workforce skills</u>
4	number of participants who increased awareness about what it costs to maintain a household (RMRW)
5	number of participants who increased awareness about how spending impacts other choices and <u>opportunities (RMRW)</u>
6	number of participants who increased awareness about how the type of job they have affects how <u>much money they will make (RMRW)</u>
7	number of 'Real Money. Real World.' participants who indicated an intent to get more education or <u>training after high school (RMRW)</u>
8	number of participants who increased feeling of importance about waiting to have children until <u>financially ready (RMRW)</u>
9	number of 'Real Money. Real World.' participants who indicated they would develop a plan for their <u>money that includes both needs and wants (RMRW)</u>
10	number of 'Real Money. Real World.' participants who indicated they learned how to make wise <u>financial decisions (RMRW)</u>
11	number of youth participants who increased their knowledge of producing quality and safe animal products for consumers through responsible animal handling, care, and welfare (Assuring Quality Care for Animals)

Outcome # 1

1. Outcome Target

number of youth indicating an increase in understanding of decision making processes

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

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

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

number of youth who have participated in 4-H programs and indicated that they now possess transferrable workforce skills

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 4

1. Outcome Target

number of participants who increased awareness about what it costs to maintain a household (RMRW)

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 5

1. Outcome Target

number of participants who increased awareness about how spending impacts other choices and opportunities (RMRW)

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 6

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 7

1. Outcome Target

number of 'Real Money. Real World.' participants who indicated an intent to get more education or training after high school (RMRW)

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 8

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 9

1. Outcome Target

number of 'Real Money. Real World.' participants who indicated they would develop a plan for their money that includes both needs and wants (RMRW)

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 10

1. Outcome Target

number of 'Real Money. Real World.' participants who indicated they learned how to make wise financial decisions (RMRW)

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 11

1. Outcome Target

number of youth participants who increased their knowledge of producing quality and safe animal products for consumers through responsible animal handling, care, and welfare (Assuring Quality Care for Animals)

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Economy and changes in appropriations may change the number of Extension staff which are employed in Ohio, which will ultimately effect the level of programming available within this planned program. Competing (external) programs may also detract from our current clientele base.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

The following are planned evaluation studies for the 'Preparing Youth for Success' program:

- After only (post program)
- Retrospective (post program)

The following are planned data collection methods for the evaluation studies of the 'Preparing Youth for Success' program:

- Sampling
- Mail survey
- Observation
- Web-based surveys
- End-of-event exit slips

V(A). Planned Program (Summary)

Program # 16

1. Name of the Planned Program

Strengthening Families & Communities (Extension)

2. Brief summary about Planned Program

Individuals and families face a wide range of challenges in their daily lives. OSU Extension research and programming will bring solutions to targeted statewide issues through signature programs and other educational events that deliver the latest research-based information in creative and innovative ways. 'Strengthening Families & Communities' programming will focus on a full range of topics designed to teach people how to apply practical information to their daily lives in order to make informed choices about family financial management, healthy lifestyles, nutrition, and family relationships.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : No

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
703	Nutrition Education and Behavior	50%		0%	
724	Healthy Lifestyle	20%		0%	
801	Individual and Family Resource Management	20%		0%	
802	Human Development and Family Well-Being	10%		0%	
	Total	100%		0%	

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

As determined through the use of statewide clientele surveys and focus groups, three key issues for residents of Ohio and the nation are economic stability, healthy lifestyles, and educational success. The nature of these complex key issues requires programming that is holistic and multidisciplinary. OSU Extension will focus teaching and outreach programming to engage with stakeholders to address these critical issues. Based upon local success, we will replicate programming across the state and advance the progress achieved in initial programming implementation. We will build upon our experience and success to further address the needs of Ohioans.

OSU Extension will focus the skills and abilities of personnel in nine multi-county Extension Education and

Research Areas to deliver the latest knowledge, while maintaining an emphasis on local programming needs. The research and educational technologies we support empower people and communities to solve problems and improve their lives. Specifically, Extension works to improve the quality of life for all Ohio citizens. Strengthening the lives and communities of Ohio through research-based educational programming (activities at the core of OSU Extension's mission) are keys to the long-term competitive sustainability of Ohio's high standard of living.

OSUE will continue to monitor research on topics related to 'Strengthening Families and Communities' as well as obtain feedback from stakeholders, the community, and advisory groups for local and state programming needs.

2. Scope of the Program

- In-State Extension
- Multistate Extension
- Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

OSU Extension has a strong history of helping to identify and meet community needs. Our team of campus- and field-based faculty and staff work collaboratively to design and implement research-based, non-biased educational curricula and programming. We have several fully developed programs that target a range of clientele. Each is tailored to meet the larger environmental and developmental needs of the target audience. Particular attention is given to ensuring that the program materials are immediately relevant, contextually grounded, and based on sound pedagogical theories. The Conceptual Programming Model (CPM) guides the development of our programming. The CPM specifies that organizational and social conditions be assessed to determine programming opportunities, focusing attention on the importance of understanding audience needs, delineating outcomes to be achieved, designing appropriate, audience-responsive learning activities to achieve those outcomes, and specifying evaluation methods to document impact. Further, it assumes that program planners will draw upon necessary principles and tenants from relevant theories (e.g., Behavioral, Cognitive, Affective, Communications, Human Development, Economic, Psychological, Social, etc). Social Learning and Stages of Change theories are also foundational to our program development. Many of our programs are developing or have developed evidence that they work to increase awareness, knowledge, skills and improve behavior, largely via quasi-experimental designs (e.g., pre/post testing).

2. Ultimate goal(s) of this Program

The ultimate goal of the 'Strengthening Families and Communities' planned program is to provide the citizens of Ohio with practical information which they can apply to their daily lives in order to make informed choices about family financial management, healthy lifestyles, nutrition, and family relationships, resulting in reduced health care expenditures, financial security at all life stages, improved quality of life, and more resilient families and communities.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2016	24.0	0.0	0.0	0.0
2017	25.0	0.0	0.0	0.0
2018	25.0	0.0	0.0	0.0
2019	26.0	0.0	0.0	0.0
2020	26.0	0.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct formal and informal needs assessments
- Develop programming materials and curricula
- Conduct meetings, workshops and educational sessions
- Conduct program evaluation and applied research
- Form and sustain community partnerships
- Train volunteers, paraprofessionals, and other community agency/organization professionals

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Education Class • Workshop • Group Discussion • One-on-One Intervention • Demonstrations 	<ul style="list-style-type: none"> • Public Service Announcement • Newsletters • Web sites other than eXtension • Other 1 (social media)

3. Description of targeted audience

'Strengthening Families and Communities' programming is tailored to meet the needs of each audience we engage. School programming is age appropriate, whereas programs at Senior Centers are targeted to inform on safe food preparation for individuals living alone or with one other person. The end result is a program that has the potential to encompass all residents of the state. Below is a listing of the specific groups we intend to reach with targeted awareness, educational and skills-development programming:

- Parents of children ages birth to 18, including, but not limited to: teen, step, adoptive, foster, single, divorcing, incarcerated, fathers who have not yet established paternity, and grandparents;
- Adults in, or thinking about entering, intimate relationships;
- Young adults;
- Older adults and those who care for them;

- Baby boomers, especially women;
- Limited resource families, including mothers with young children and food stamp recipients;
- New employees;
- Bankruptcy filers;
- Debt burdened individuals and couples;
- First time homebuyers;
- Individuals with diabetes and their caregivers/family support members;
- Food establishment managers and food service employees;
- Volunteer food preparers;
- Child care providers;
- Teachers;
- Social service professionals;
- General consumers (other formal or informal education).

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
 - Number of patents submitted
 - Number of peer reviewed publications
- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Educational sessions held with two or more participants
 - number of volunteer hours given
 - number of Dining with Diabetes classes taught
 - total number of volunteers participating in the planning and / or implementation of 'Strengthening Families and Communities' programming
 - number of individuals participating in 'Dining with Diabetes' programming
 - number of individuals participating in the 'Live Healthy Live Well' program
 - number of individuals participating in the 'Successful Co-Parenting' program
 - number of individuals participating in 'Healthy Finances' programming
- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	number of 'Dining with Diabetes' (DWD) participants that report engaging in cooking activities to help take control of their diabetes -- using healthy oils in cooking, substituting herbs and spices for salt, and using nutrition labels
2	number of 'Dining with Diabetes' participants that report engaging in physical activities to help take control of their diabetes -- fitting exercise into their daily routine, exercising continuously for at least 30 minutes at least three times per week, and being physically active on a daily basis
3	number of participants in the 'Live Healthy Live Well' program that report adopting one or more of the recommended practices that might help reduce their risk of developing chronic disease
4	number of individuals participating in the 'Successful Co-Parenting' program that feel more prepared to co-parent as a result of the program
5	number of individuals participating in 'Healthy Finances' programming that indicated the intent to change one or more behaviors as a result of attending an educational session

Outcome # 1

1. Outcome Target

number of 'Dining with Diabetes' (DWD) participants that report engaging in cooking activities to help take control of their diabetes -- using healthy oils in cooking, substituting herbs and spices for salt, and using nutrition labels

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

number of 'Dining with Diabetes' participants that report engaging in physical activities to help take control of their diabetes -- fitting exercise into their daily routine, exercising continuously for at least 30 minutes at least three times per week, and being physically active on a daily basis

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

number of participants in the 'Live Healthy Live Well' program that report adopting one or more of the recommended practices that might help reduce their risk of developing chronic disease

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior

- 724 - Healthy Lifestyle

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 4

1. Outcome Target

number of individuals participating in the 'Successful Co-Parenting' program that feel more prepared to co-parent as a result of the program

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 5

1. Outcome Target

number of individuals participating in 'Healthy Finances' programming that indicated the intent to change one or more behaviors as a result of attending an educational session

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management

4. Associated Institute Type(s)

- 1862 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

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

Description

{NO DATA ENTERED}

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

The following are planned evaluation study types for the 'Strengthening Families & Communities' program area:

- After only
- Retrospective
- Before-after
- During
- Case study

The following are planned methods of data collection for the 'Strengthening Families and Communities' program area:

- Sampling
- Mail survey
- On-site survey
- Structured interview
- Unstructured interview
- Case study
- Observation