2016 Purdue University Combined Research and Extension Plan of Work

Status: Accepted

Date Accepted: 06/02/2015

I. Plan Overview

1. Brief Summary about Plan Of Work

The planned programs for Indiana are:

- Global food security and hunger
- Climate change
- Sustainable energy
- Food Safety
- Childhood obesity
- Human, family, and community health and well-being
- Natural resources and environment

Agriculture is at the crossroads of change. Farmers are charged with producing enough food to feed 9 billion people expected to inhabit the globe by 2015. While it's a grand challenge, Purdue Agriculture knows it also presents grand opportunities for our state's farm families. Over the past few years, we have organized our Plan of Work, Annual Report and Planned Programs to be consistent with our stakeholder needs and the 5 NIFA pillars, including a significant overhaul of our Planned Programs in 2013. The tenets of the College of Agriculture's Strategic Plan and Ag Research and Extension strategic focus areas also provided additional insight into stakeholder desires. The current Strategic Plan of the College of Agriculture is coming to a close and a new plan will be in place in late 2015. Our Plan of Work will be adjusted to incorporate innovative concepts and stakeholder outcomes that are identified in the process.

We continue to report against two additional Planned Program areas: (1) Human, Family, and Community Health and Well-Being; and (2) Natural Resources and the Environment, to address the full range of stakeholder expected outcomes. Stakeholders said that Purdue research and extension should continue to focus efforts to strengthen families, farms, businesses, and communities and that Purdue is recognized as a trusted source of information in these areas. In its own way, each planned program contributes to Indiana's economic prosperity, enhances educational opportunities, or improves the quality of life of Hoosiers. The benefits of these planned programs extend beyond our Indiana borders to the rest of our nation and our world. These planned programs are even more relevant for 2015 to 2019 than they were when first identified.

Our outcomes also address issues identified in the Indiana State Department of Ag (ISDA) strategic plan. Agriculture continues to have a significant role in Indiana's economy and represents an area for economic growth and development, not only in research, but in technology, new added-value products, and stakeholder health. In Indiana the food and agricultural sector generates directly or indirectly about twenty percent of the jobs and income in the state. With Indiana's diverse agricultural structure, Purdue research and extension can play a role in helping people become more productive and prosperous. Environmental safety and increases in bio-fuel production are also high priority policy issues in Indiana. Several areas targeted for growth by the State Department of Agriculture are included among the planned programs identified in this plan of work.

Indiana's strategic plan for economic development stresses the need for a skilled constantly improving workforce, a culture of entrepreneurship, a pro-investment business climate, and strategic leadership development. Purdue's engagement strategic plan focuses on advancing Indiana's economic prosperity, enhancing educational and learning opportunities, and improving the quality of life of Hoosiers.

Planned Programs for Purdue research and extension include strategies for each of these factors. Five areas in community development focus on community and organizational planning, economic and business development, leadership and civic engagement, local government education, and quality places. In addition, several other planned programs include efforts related to economic prosperity and improving the quality of life.

One of the goals of the planned programs is to integrate research, outreach, and educational efforts to effectively address the issues identified. We will continue to build multi-disciplinary and multi-institutional teams to address issues such as when the Indiana cantaloupe growers were dealing with a statewide Salmonella outbreak and when the new Food Safety Modernization Act must be implemented.

The Purdue Plant Sciences Research and Education Pipeline is about giving the farmers the tools they need to meet the demand for food and bio-based products. The pipeline originated from a $20 million investment award to the College of Agriculture from the University. It brings together researchers and students from many disciplines to improve crop quality, identify tools for easier and more productive crop management, develop new ways to deal with adverse conditions, and help farmers use best practices to keep farms sustainable and profitable for future generations. The key elements of the program include: (1) Data collection--significantly increased volumes of data will be collected through in-field sensors, unmanned aerial vehicles, and robots about individual plant performance, (2) the state-of-the-art phenotyping facility will give researchers the tools to examine big data sets to identify high performance plants and in-field crop problems, (3) this tremendous amount of data enables faculty from multiple colleges to work alongside students in the field and lab to further improve crop varieties and develop innovative ways to tackle production challenges. (4) The entire package is about using the best tools to drive innovation that puts the Indiana farmers on the cutting edge of crop production and profitability. It's all about big data, research, improved crops, efficient water use, and better crop management.

Our Planned Programs continue to balance research opportunities with on-the-ground reality of stakeholders with a special focus on farmers. Stakeholders noted that families continue to face many challenges including financial concerns, health issues, and the need to build positive relationships inside and outside the family. These types of challenges can impede healthy family functioning and decision making. Research and extension programs addressing topics such as effective parenting, caring for older adults, building self-esteem, managing stress, basic money management, and planning for the future will assist families in dealing with these challenges.

The 2012 Indiana Agriculture Census showed a decline in the number of farms from 2007 to 2012 for a loss of 3.7% of farms over 5 years. Farm income had been strong in Indiana with record highs in 2013 ($6.0 billion). Purdue estimates that 2014 fell by about 25% and that 2015 incomes will drop by an additional 30%. Crop farms will see the most dramatic drop and farms that are primarily animal production will see less severe, yet notably lower incomes in 2015. The Indiana agriculture sector is in a period of downward adjustment. The overall financial strength remains strong due to strong incomes through 2013 and due to higher land values through 2013. For 2014 and 2015 many crop producers will operate at a loss and animal product producers will be close to breakeven. This thin margin period will reduce cash positions and lower land values will erode equity positions causing some financial stress. Financial stress is expected to be apparent in some segments of Indiana agriculture. Those who are likely to be most vulnerable are crop farms that cash rent most of their land, farms that have purchased large amounts of land at record high prices, and farms that have high costs of production.

In addition to the depth and breadth of the agriculturally-based research programs, Extension educators have been and continue to build programs to educate farmers and families on how to keep small-to-mid sized family farms intact and profitable. We are expanding our programs which focus extensively on farm succession planning, financial planning and land leasing. The addition of a Local Foods Director, and expanded Student Farm and Organic research programs will provide farmers and communities new ways to approach farming, marketing and distribution.

Developing Hoosier youth was a key theme stressed by stakeholders. The 4-H Youth Development program provides opportunities, relationships, and support for youth to help them acquire the life skills necessary to meet the challenges of adolescence and adulthood. Youth development programs are

aligned with specific mission areas including science, engineering and technology, healthy lifestyles, and citizenship education. With 20,000 volunteers involved in the Indiana 4-H youth development program, volunteer development opportunities are another essential part of this planned program. These volunteers are a vital component to positive youth development because of the on-going relationships that are established.

Improving the health of Hoosiers is another of the state's priorities. Indiana is near the top of the rankings of negative health issues, including obesity, smoking rate and the afflictions that accompany these: diabetes, high blood pressure, cancer, heart disease, and stroke. Purdue research and extension programs focus on the impact of dietary intake and exercise on human health, use and beneficial effects of phytochemicals, cereal processing and nutrition, calcium and bone metabolism, and impact of dietary intake and bone health. Educational programs are provided for the food and health care industries and consumers.

Consumers expect a wholesome and safe food supply, yet outbreaks of foodborne illness indicate a need for ongoing research and education in this area. Purdue food safety programs focus efforts toward rapid detection of foodborne pathogens, food processing treatments to reduce pathogens, control of molds and mycotoxins, pest control, and the impact of human intestinal microflora and human disease. Effective educational programs translate the best practices for farmers, retailers, and consumers to help them adopt food-handling procedures that more effectively minimize food-safety risks. The addition of an Extension Food Safety Educator, working out of the Southwest Purdue Agricultural Center in the area of Indiana that is home to a majority of the state's produce crops, will provide assistance to a diverse collection of growers - from small family operations who run roadside stands to large companies shipping produce cross-country.

Since one of the objectives of this plan is to provide relevant research and extension programs, regular review of progress toward ultimate goals and outcomes will be an essential part of the process. Teams working on planned programs will provide consistent review of progress toward goals and outcomes, including assessing whether additional topics should be added to a specific planned program because of changing needs. County Extension Boards continue to review planned programs on an annual basis to ensure that programs are continuing to address critical needs. PCARET, the Purdue Council on Agricultural Research, Extension and Teaching, meets semi-annually with county, district, and state administrators to discuss needs and how extension and research are addressing or can address them. An annual conference also provides an opportunity for the state PCARET to review progress on planned programs and provide input on expectations of future needs and programs**.** In addition, specific research projects are peer reviewed before they are undertaken.

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

Year	Extension		Research	
	1862	1890	1862	1890
2016	78.2	0.0	273.2	0.0
2017	78.2	0.0	273.2	0.0
2018	78.2	0.0	273.2	0.0
2019	78.2	0.0	273.2	0.0
2020	78.2	0.0	273.2	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 Non-University Panel
- Combined External and Internal University External Non-University Panel

2. Brief Explanation

An internal panel will be appointed by the Director of Extension and Director of Research to review planned programs for relevancy in addressing critical needs. County Extension Boards will continue to review planned programs on an annual basis to ensure that programs are continuing to address critical needs. County Extension Board members may also participate on some of the Extension Educators' advisory boards by program and conduct an annual review/evaluation of the county programming efforts.

As part of our efforts to build a stakeholder-approved Strategic Plan, twenty-seven listening sessions were held around the state with hundreds of stakeholders. Key themes that emerged and will be incorporated into our Strategic Plan include urban agriculture/work with small farms, science communication and helping the public understand contemporary agricultural technology and strengthen research-Extension linkages.

PCARET, the Purdue Council on Agricultural Research, Extension and Teaching, meets semi-annually with county, district, and state administrators to identify issues and how research and extension and research are addressing or can address them. The annual PCARET conference provides an opportunity to review progress on planned programs and provide input on expectations of future needs, programs, resources and networks.

Purdue's Hatch research projects are subject to peer review prior to submission to USDA-NIFA. Review panels consist of at least three internal scientists that include faculty from at least two disciplines. Faculty members are strongly encouraged to collaborate across departments, schools, and universities. Multi-state projects are reviewed by regional department head associations and the Multi-State Review Committee composed of agricultural experiment station directors. Reviewers look for relevance, feasibility, building on previous research, approach and methods, scientific, and technical merit.

Academic departments are reviewed every 5 years by an external team. The research, extension, and teaching components of each department are examined during these reviews. These reviews provide an additional opportunity for merit review of research and extension programming.

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?

Ongoing input from stakeholders is valued by Purdue extension and research programs. Annual review of programs occurs through Extension Boards and the Purdue Council on Agricultural Research, Extension, and Teaching (PCARET) which provide input on critical issues facing the state. Purdue College of Agriculture and departmental advisory groups meet semi-annually and also provide input on critical issues. Stakeholder feedback received during the winter 2010 work on the Extension strategic plan also validated these issues as critical issues in Indiana. A survey of the general population at the Indiana State Fair in 2011,

confirmed that our research directions were appropriate.

The tenets of Purdue's College of Health and Human Sciences, and Veterinary Medicine in addition to the College of Ag strategic plans, Ag Research and Extension key research themes are built into the Planned Programs. We've establish new goals based on "Stronger Economies Together: Strategies for Building New Economic Opportunities" from the USDA funded Southern Rural Development Center.

We will use secondary data sources such as the State Department of Health and CDC to evaluate impact on disease related metrics; metrics associated with Chapters 9, 11 and 13 bankruptcy against financial programs.

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

Purdue Agriculture embraces diversity among faculty, staff, support staff, county partners, clientele, and cooperating agencies and is committed to the principles of affirmative action and equal opportunity in education and employment and inclusive programming. We live in a global society experiencing major demographic, technologic, and economic change. Purdue Agriculture personnel and programs strive to provide the leadership to equip Indiana residents to effectively deal with differing ideas and views which will enable them to interact with diverse people and cultures in meaningful and constructive ways.

Underserved and under-represented populations were included in the 2003 and 2005 stakeholder input interviews and community sessions and in our general population surveys. Their input was valuable in determining the planned programs. As a result, the needs of these populations will be addressed through the research and educational programs related to youth, families, farms, businesses, and communities.

4-H Youth Development has expanded its use of Expansion Review Committees (ERCs) beginning in 2012. The ERC determines needs and directions of current 4-H programs, assists with identifying potential volunteer roles, advocates for underserved and underrepresented populations, ensures 4-H Extension programs practice nondiscrimination and equal opportunity, raises awareness of available Extension services and program. Since 2012, these committees continue to meet at least annually and document efforts and information. Data from these committees are included in annual County Civil Rights reports, and included in annual presentations to 4-H advisory committees.

For the 2015 College of Agriculture strategic planning process, county extension staff used these approaches to invite under-served and under-represented individuals, groups and/or agencies: letters of invitation were mailed and emailed, personal phone calls were made; conversations were held with representatives from community programs; information was posted in newspapers, on radio spots, online, and on fliers across the community.

As new initiatives and planned programs have been considered for the plan of work additional stakeholder input has shown that these planned programs remain relevant to underserved and under-represented populations. Continued efforts to identify and reach out to underserved populations is a high priority of our programming for the future.

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

Planned programs were developed by following the logic model to identify the situation, priorities, inputs, outputs, outcomes, assumptions, and external factors. Each planned program has specific outputs, outcomes, and impacts that relate to the situations and priorities. Target measures will be documented.

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

Planned Programs will enable the college to focus time and energy on issues that are

important to stakeholders. This process of determining Planned Programs helps us focus our efforts on the most critical needs identified by the state and the nation. As a result of preparing an integrated plan, we better understand how we are integrating research and extension efforts and where we need to strengthen the integration activities.

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 the general public

Brief explanation.

In years past, stakeholder opinions regarding Agricultural Research at Purdue have been folded into broader surveys conducted by Extension. While these surveys have always done an effective job at capturing the public's thoughts regarding research, we made the decision to conduct some research specific surveys independent of Extension that would complement the ongoing work of Extension.

As a result of the Lt. Governor visits to the 92 counties of Indiana, eight regional conferences were held in communities across the state to present a new initiative, the Hometown Collaboration Initiative (HCI). This effort is for communities under 25,000 people to expand their pipeline of local leaders, strengthen and expand jobs by build on existing economic assets, and embrace place making strategies focusing on natural and built resources and improving attractiveness and quality of life for the hometowns. A core principle of HCI is broad-based input and buy-in vital to long-term success and sustainability. In 2014,communities across Indiana applied for the new initiative. As a result, five were selected to become the HCI community finalists. Each of these five communities has selected their focus - leadership, economics, or quality of life - and will begin working with Purdue Extension in collaboration with the Lt. Governor's office and the Indiana Office of Community and Rural Affairs in 2015. Another round will begin in the fall of 2015 to select five more communities for 2016 activities.

The College of Agriculture is developing a new 5-year strategy to be rolled out in 2015. As part of that effort, the College conducted several important types of stakeholder sessions to understand where we should focus our energy for both research and extension. The Dean of the College of Agriculture conducted listening sessions with 6 communities, the Dean's Advisory Council and the Industry Stakeholder Group. The college facilitated 21 community forums across the state for stakeholder concerns, priorities, actions and strategies regarding child, youth and family issues and for community, economy (farms & businesses), and natural/environmental resources. At this writing, the data are still be analyzed for use in the strategic plan to be released later in 2015.

In 2012 Ag Research interviewed individuals at the Indiana State Fair who entered the Purdue sponsored exhibit. This qualitative survey indicated that directionally we are focused on the right things: food security/scarcity, crop production and environmental impact, food handling, obesity, alternative fuels, companion animal health and livestock health. These surveys were not intended to produce statistically significant results, but to experiment with different models for gathering information about Purdue's agricultural research. 174 people were surveyed, with 10% being from

underserved populations. Of the 174 surveyed, over 75% agreed or strongly agreed with our current research focus.

In 2012, 4-H expanded use of the Expansion Review Committees (ERC). ERCs are a group of adults and youth which are representative of the county demographics and review the county 4-H program to ensure that it is relevant, current, and provides impact based on local county needs. Since 2012, these committees continue to meet at least annually and document efforts, activities and findings.

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
- Open Listening Sessions
- Needs Assessments

Brief explanation.

Extension produced letters and flyers for announcing community forums and inviting stakeholders to participate. Efforts to invite stakeholders to participate included reaching out to a variety of individuals, agencies and groups. Here is a sampling of some of the individuals, agencies and groups invited to participate: WIC, Head Start, Senior Center, Extension Board, Extension Advisory Council, School corporation superintendents, principals, guidance counselors, and board members, minority coalitions, libraries, convention and visitors bureau, faith community and ministerial associations, Salvation Army, hospital, financial institutions, local charities, YMCA, boys and girls club, Veterans, community action programs, college success coalition members, social service agencies, elected and appointed officials, local division of Family and Children Services, county health department, county foundation, business leaders, Asian cultural center, Hispanic coordinator/programs, and Area Agency on Aging.

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
- Meeting with the general public (open meeting advertised to all)
- 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

Brief explanation.

For the 2015 College of Agriculture strategic planning process six listening sessions were conducted by the Dean of the College in communities across Indiana to gather input from stakeholders on what we are doing well, and more importantly, where we can get better in research, teaching and extension. Extension facilitated community forums in 21 counties statewide. Four roundtable sessions were held at each forum to address building a vibrant Indiana, with a focus on: 1) Children, Youth, and Family, and 2) Community, Economy (Farms & Businesses), and Natural/Environmental Resources. Throughout the discussions and digging deeper into the top issues for each focus, identify priority issues were identified for the communities by the stakeholders. Using the Global Café technique, stakeholders met around tables to discuss issues and concerns, then share with the larger group, and finally to vote and map out priorities. As a result, each of the 21 locations generated priority issues, strategies or activities to address the priority issues, and suggested activities for Purdue Research and Extension to consider implementing.

3. A statement of how the input will be considered

- To Identify Emerging Issues
- Redirect Extension Programs
- In the Action Plans
- To Set Priorities

Brief explanation.

Insight from stakeholders shared during the listening sessions, and themes, priorities, strategies, and activities generated from stakeholders in the community forums will be used to develop the College of Agriculture strategic plan which will include goals for research, extension and teaching, as well as initiatives and actions to support those goals, and the metrics to help measure our progress. Research and Extension involves the College of Agriculture, and two other Colleges--Health and Human Sciences, and Veterinary Medicine. We will further incorporate any and all stakeholder input and blend it with our three college efforts to generate the College of Agriculture strategic plan.

V. Planned Program Table of Content

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Global Food Security and Hunger

2. Brief summary about Planned Program

In 2013, we folded two planned program areas into Global Food Security and Hunger: (1) Animals and Their Systems and (2) Food and Non-Food Products. By combining these cross-cutting themes into one Planned Program, we are better positioned to distinguish and track the impact of our research and extension programs on our stakeholder approved strategic themes.

People building a sustainable and secure food production system. Purdue Agriculture plays a critical role in assuring a safe, nutritious, and sustainable food supply. Our work spans from the farm gate to the dinner plate. We conduct research that increases the quality and productivity of animals and plants, and extend that research by developing methods that further process food, minimize spoilage, and enhance food safety. Our agricultural engineers are focused on developing in-field machinery that can be used worldwide to improve food production, harvesting and storage.

People utilizing molecular approaches to expand the frontiers of agriculture and life sciences. We tackle the most basic problems. We use molecular tools to study wildlife adaptation, disease resistance, abiotic stress in plants, and the epigenetic basis of disease. We examine the arrangement of DNA and genetic selection of traits and track animal and plant populations. We are developing long-term solutions that improve agricultural production, preserve diverse landscapes, and positively affect human health.

People developing a robust bioeconomy to feed and power the world. Renewable resources are critical to sustaining our planet. We are discovering chemical means and developing naturally produced enzymes to digest cell walls in plants to create biofuels and other bio-products. We use these results to predict the impact of renewable energy sources and bio-products as society transitions to a bio-based economy.

People enhancing food and health. Food safety and value-added processing are essential for our health. We have developed new technologies such as nanoparticles to enhance anti-microbial activity and aseptic packaging, and we have designed methods to improve bacterial detection. We continue to use our expertise in carbohydrates and other nutrients to develop new value-added products. Addressing hunger and malnutrition are on the top of the priority list as our scientists work to develop functional foods that are economically viable in the hunt to address these issues.

People strengthening ecological and environmental integrity in agricultural landscapes. We study land use, crop and animal production, and pest management and push the envelope on using automation to measure such phenomena as carbon and nitrogen fluxes to preserve our diverse landscape and sustain the environment. We address issues of climate change and global sustainability, enabling us to take an ecosystems approach to answer fundamental questions affecting air, land, and water.

People facilitating informed decision making to improve economic and social well-being. Our research affects people and their communities. We help farmers and industry develop solutions to increase economic vitality. We track how youth and adults learn and then use that research to help build capacity within communities. We evaluate new technologies that empower individuals to make informed decisions. In the US, we educate and prepare communities, individuals and families for potential weather-related disasters and are on the front line of recovery efforts when disaster strikes. This knowledge is being adapted for outreach activities in other countries as well.

3. Program existence : Mature (More then 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
102	Soil, Plant, Water, Nutrient Relationships	4%		4%	
201	Plant Genome, Genetics, and Genetic Mechanisms	4%		4%	
205	Plant Management Systems	10%		10%	
206	Basic Plant Biology	4%		4%	
302	Nutrient Utilization in Animals	4%		4%	
304	Animal Genome	4%		4%	
305	Animal Physiological Processes	4%		4%	
307	Animal Management Systems	10%		10%	
315	Animal Welfare/Well-Being and Protection	4%		4%	
402	Engineering Systems and Equipment	10%		10%	
501	New and Improved Food Processing Technologies	2%		2%	
502	New and Improved Food Products	2%		2%	
512	Quality Maintenance in Storing and Marketing Non-Food Products	2%		2%	
601	Economics of Agricultural Production and Farm Management	10%		10%	
604	Marketing and Distribution Practices	3%		3%	
606	International Trade and Development Economics	4%		4%	
608	Community Resource Planning and Development	10%		10%	
801	Individual and Family Resource Management	3%		3%	
802	Human Development and Family Well-Being	3%		3%	
805	Community Institutions and Social Services	3%		3%	
	Total	100%		100%	

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

1. Situation and priorities

To improve global food security and reduce hunger, researchers and extension staff are focused on understanding the complex web of relationships between livestock and crop management, hunger and malnutrition, economics and community development, the role of non-food products, and the development & packaging of food products.

The global and domestic agricultural economy is facing unprecedented technological, policy, and social/cultural changes. This can have substantial socioeconomic and environmental impacts on Indiana since the food and agricultural sector generates directly or indirectly about 20% of the jobs and income in the state. In addition, the demand for food from a rapidly growing global population will challenge U.S. and international food production capacity.

According to www.agweb.com, 2014 had record setting productivity, which helped offset declining farmland values in Indiana. This is the first decline in annual farmland values since 1986 for Indiana. The high crop prices shouldn't reduce credit options for most farms for 2015, but our research and extension teams are looking at how to increase farm value and productivity so that more Indiana farming is economically viable.

Row crop producers are facing significant challenges resulting from higher fixed and variable input costs, escalating demands for environmental management and increasing governmental regulation. These producers continually strive to become more efficient and practice more effective environmental management. Research and extension programs assist farmers to produce crops more efficiently, handle pests as well as crop diseases and help producers who are interested in developing alternative marketing outlets.

Horticultural crop production is a growing part of the rural economy. Horticultural producers are also looking for greater efficiencies and new niche markets. The Purdue Small Farm & Sustainable Agriculture Team was formed several years ago to support the growing number of small and alternative farming operations. The team is a collaborative effort, engaging researchers, educators, and farmers to help foster this diverse community through a variety of venues, including annual conferences. Additionally, non-traditional producers, such as small land owners, organic producers, local planning and zoning committees, and others are contributing to the local food supply. Priorities: crops and the environment, productivity and biotic/abiotic stress.

Livestock producers are working to enhance efficiency, marketing and environmental management. In addition, production practices that influence animal well-being are becoming more important to producers and decision-makers. Priorities: livestock health, productivity, environment, and welfare.

The ability to reduce hunger and malnutrition locally and globally requires researchers to develop products that are adapted to the environment, nutrient rich, easily transportable, and cost-effective. Systems for harvesting and storage are critical, especially where fuel costs are high or access to equipment is unreliable. Food packaging to maintain taste, reduce spoilage and waste, and environmentally friendly are other critical parts of this network. Priorities: product and supply chain development.

Economic and community development involves the development of new food distribution channels, healthy communities and the kinds of organizational development necessary to create a holistic community approach to dealing with hunger and human health. Priority areas: food production systems, logistics and systems, marketing and retail management, and business development.

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

• Hunger and food security will continue to be high priority research areas for at least 5 years
• Economic development locally, nationally and globally will expand as a result of technology advancements and the need for farmers, government officials and the public to understand how to use these effectively
• Continued research will provide farmers with more options to use to enhance livestock production and crop management that could improve quality, quantity and conditions
• Local food production initiatives including organic and multi-function farming will continue to grow as consumers continue to want more choice in their food supply
• Small farms will continue to expand into the local markets
• Food packaging, non-food equipment and logistics play an important role in delivering quality food products that are safe

2. Ultimate goal(s) of this Program

• Improve livestock health, productivity, environment and welfare
• Improve crop health, productivity, environment, biotic/abiotic stress
• Impact key factors associated with economy and community development: food production systems, marketing and retail management, logistics and systems, and business development
• Reduce hunger and malnutrition
• Improve non-food products and systems
• Provide effective and timely preparation, education and recovery training and information related to weather and other disasters

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	37.2	0.0	171.4	0.0
2017	37.2	0.0	171.4	0.0
2018	37.2	0.0	171.4	0.0
2019	37.2	0.0	171.4	0.0
2020	37.2	0.0	171.4	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

• Develop publications, workshops, consultations, seminars, certification programs, distance education modules, field days, and other opportunities.
• Develop websites, online decision-making tools, apps
• Publish research and extension publications
• Conduct research
• Collaborate with other agencies
• Coordinate meetings with important stakeholders (researchers, industry, organizations, farmers, regulatory, etc.)
• Increase number of participants in life-long learning programs
• Foster leadership and economic development and facilitate strong partnerships and participation in state, regional, national, and international agencies, organizations, and groups
• Encourage participation by extension specialists in: Taskforces, Review Committees, Advisory Boards, Editorial Boards, Commodity committees/boards, Invited presentations, Honors and Awards, Common Interest Groups, Professional Societies
• Increase use of social media

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

Extension

Direct Methods	Indirect Methods
● Education Class	● Public Service Announcement
● Workshop	● Newsletters
● Group Discussion	● TV Media Programs
● One-on-One Intervention	● Web sites other than eXtension
● Demonstrations	● Other 1 (Ext pubs/social media)
	● Other 2 (Distance learning)

3. Description of targeted audience

National and International: livestock and crop producers, livestock and crop industry (entire value chain), elected officials and decision makers, agencies, extension specialists, potential 3rd party partners (NGO's, educational institutions, etc.), consumers

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 education workshops
- Number of Extension publications
- Number of research publications
- Number of volunteers
- Number of consultations
- Number of research projects

☑ 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	An impact on livestock resulting from new knowledge related to the environment, productivity, and/or health & welfare.
2	An impact on crops resulting from new knowledge related to the environment, productivity, and/or biotic/abiotic stress.
3	An economic and/or community impact resulting from new knowledge about food production systems, marketing & retail management, logistics & systems, and/or business development.
4	An impact on hunger and/or malnutrition resulting from new knowledge about food products, food quality, and/or food quantity.
5	An impact on non-food products resulting from new knowledge related to non-food products, and/or non-food systems.
6	An impact on disaster preparation, education, and/or recovery.

Outcome # 1

1. Outcome Target

An impact on livestock resulting from new knowledge related to the environment, productivity, and/or health & welfare.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 302 - Nutrient Utilization in Animals
- 304 - Animal Genome
- 305 - Animal Physiological Processes
- 307 - Animal Management Systems
- 315 - Animal Welfare/Well-Being and Protection
- 402 - Engineering Systems and Equipment
- 501 - New and Improved Food Processing Technologies

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

An impact on crops resulting from new knowledge related to the environment, productivity, and/or biotic/abiotic stress.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 205 - Plant Management Systems
- 206 - Basic Plant Biology

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

An economic and/or community impact resulting from new knowledge about food production systems, marketing & retail management, logistics & systems, and/or business development.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management
- 604 - Marketing and Distribution Practices
- 606 - International Trade and Development Economics
- 608 - Community Resource Planning and Development
- 801 - Individual and Family Resource Management
- 802 - Human Development and Family Well-Being
- 805 - Community Institutions and Social Services

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 4

1. Outcome Target

An impact on hunger and/or malnutrition resulting from new knowledge about food products, food quality, and/or food quantity.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 205 - Plant Management Systems
- 302 - Nutrient Utilization in Animals
- 304 - Animal Genome
- 305 - Animal Physiological Processes
- 307 - Animal Management Systems
- 402 - Engineering Systems and Equipment
- 501 - New and Improved Food Processing Technologies
- 502 - New and Improved Food Products
- 512 - Quality Maintenance in Storing and Marketing Non-Food Products
- 604 - Marketing and Distribution Practices

- 606 - International Trade and Development Economics
- 608 - Community Resource Planning and Development
- 801 - Individual and Family Resource Management
- 802 - Human Development and Family Well-Being
- 805 - Community Institutions and Social Services

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 5

1. Outcome Target

An impact on non-food products resulting from new knowledge related to non-food products, and/or non-food systems.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 402 - Engineering Systems and Equipment
- 501 - New and Improved Food Processing Technologies
- 512 - Quality Maintenance in Storing and Marketing Non-Food Products
- 604 - Marketing and Distribution Practices

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 6

1. Outcome Target

An impact on disaster preparation, education, and/or recovery.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 608 - Community Resource Planning and Development
- 805 - Community Institutions and Social Services

4. Associated Institute Type(s)

- 1862 Extension
- 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

• Public perception of animal welfare will be hot topics for farmers and researchers to manage
• As animal and crop management intensifies, so will the ability of new diseases or other threats to develop and spread rapidly
• Economics is a major driver requiring farmers and researchers to be responsive to rapid and sometimes dramatic changes in economic viability of a product or system
• Climate change has the potential to impact all aspects of the food production system.
• Political situations will continue to make it challenging to deliver food and systems to the most people and to those that are the most hungry

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

The planned programs identified for Indiana are based on input from stakeholders in the state through a variety of mechanisms including formal stakeholder surveys, listening sessions, and community forums. Stakeholder and participant input continue to be the driver for evaluating the impact and relevance of activities within our planned programs. We continue to monitor the effectiveness of our programs and develop actions to maintain, develop, or redirect our efforts by weighing feedback from several sources. Planned programs result in specific projects that address issues that are guided by stakeholder input. Specific projects are evaluated by appropriate methods including data analysis of pre- and post-participation knowledge and/or attitudes, profitability analyses, changes in behavior or conditions for individual participants and groups, or adoption rates of emerging technologies. Success of our overarching planned programs is subsequently determined using the sum of contributions from individual projects within each program area.

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Climate Change

2. Brief summary about Planned Program

Producers need to be able to plan for and make decisions to adapt to changing environments at the same time that they are trying to sustain economic viability. Research and Extension projects will be needed to assist producers with these decisions. Policy makers will also need research based information.

Indiana animal agriculture produces about 9.5 million tons of manure annually, equivalent to 1.4 tons per resident per year. Animal manure can cause water, air, and soil pollution and greenhouse gases from manure can affect climate. However, animal manure is also a valuable addition to soil and a renewable energy source. This **Animal Manure Issue Based Action Team (IBAT)** is focusing on new knowledge and technology for waste management and application, for pollution assessment and mitigation, for turning organic animal wastes into renewable energy to reduce negative effects on water quality, air quality, and climate change, and for promoting sustainable agriculture.

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 : 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
102	Soil, Plant, Water, Nutrient Relationships	10%		10%	
112	Watershed Protection and Management	5%		5%	
123	Management and Sustainability of Forest Resources	10%		10%	
132	Weather and Climate	10%		10%	
135	Aquatic and Terrestrial Wildlife	10%		10%	
201	Plant Genome, Genetics, and Genetic Mechanisms	10%		10%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	10%		10%	
212	Diseases and Nematodes Affecting Plants	5%		5%	
213	Weeds Affecting Plants	5%		5%	
306	Environmental Stress in Animals	5%		5%	
605	Natural Resource and Environmental Economics	15%		15%	
610	Domestic Policy Analysis	5%		5%	
	Total	100%		100%	

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

1. Situation and priorities

Characterizing the potential impacts of global environmental changes is critical for informing decisions and preparing society for the future. Changes in the abundance of, and competition between plant species, composition of plant ecosystems, or changes in land use impact those ecological communities, the neighboring human communities, and the global community. Changing land use patterns in Indiana are representative of changing land use patterns across the globe. This research and Extension effort helps cities, communities, and producers plan for climate change.

In general, our research, education and extension efforts are focused around:

* research focused on predicting climate changes short- and long-term
* understanding the best way to communicate information to farmers and stakeholders to improve their decision-making capacities.
* ability to plan for and adapt to future climate change impacts
* ability to make wise decisions regarding actions today that can impact climate change
* understanding and managing immediate climatological situations (drought, wet, snow, etc.)

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

While Federal formula and state funding will be essential to carry-out the applied research and extension aspects of this mission oriented program, large competitive extramural grants will be critical as well.

2. Ultimate goal(s) of this Program

The ultimate goal is to help farmers adapt to the impact of climate change while continuing to be profitable and efficient in the production of food and agricultural products, and natural development in a sustainable manner.

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	5.9	0.0	12.3	0.0
2017	5.9	0.0	12.3	0.0
2018	5.9	0.0	12.3	0.0
2019	5.9	0.0	12.3	0.0
2020	5.9	0.0	12.3	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct meetings, conferences, workshops
- Publish research and extension publications
- Establish web sites, online decision-making tools
- Organize field days
- Consultations
- Work with mass media
- Leverage social media

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

Extension

Direct Methods	Indirect Methods
● Workshop ● Group Discussion ● One-on-One Intervention ● Demonstrations	● Public Service Announcement ● Newsletters ● TV Media Programs ● Web sites other than eXtension ● Other 1 (Social Media (Facebook, Twitter)

3. Description of targeted audience

Producers, consumers, youth, elected officials and policy makers, professionals involved in weather and climate

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 Extension publications
- Number of research publications
- Number of research projects
- Number of consultations
- Number of education workshops
- Number of volunteers

☐ 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 observers monitoring weather and climate.
2	Number of research-based studies, publications, and reports for policy organization members and legislators on climate change.
3	Number of participants who increase their knowledge about climate change.
4	Number of participants who reduce pesticide, nutrient and water inputs while maintaining high quality turf.
5	Number of participants who increase knowledge of pesticides, nutrients and water inputs for maintaining high quality turf.
6	Number of participants who increase knowledge of management practices that maximize environmental stewardship.
7	Number of participants who adopt management practices that maximize environmental stewardship.
8	Number of participants who increase their knowledge of opportunities and challenges for agriculture under carbon dioxide emissions policies to address climate change.

Outcome # 1

1. Outcome Target

Number of observers monitoring weather and climate.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 132 - Weather and Climate

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

Number of research-based studies, publications, and reports for policy organization members and legislators on climate change.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 132 - Weather and Climate
- 610 - Domestic Policy Analysis

4. Associated Institute Type(s)

- 1862 Research

Outcome # 3

1. Outcome Target

Number of participants who increase their knowledge about climate change.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 132 - Weather and Climate
- 610 - Domestic Policy Analysis

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 4

1. Outcome Target

Number of participants who reduce pesticide, nutrient and water inputs while maintaining high quality turf.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 112 - Watershed Protection and Management
- 605 - Natural Resource and Environmental Economics

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 5

1. Outcome Target

Number of participants who increase knowledge of pesticides, nutrients and water inputs for maintaining high quality turf.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 605 - Natural Resource and Environmental Economics

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 6

1. Outcome Target

Number of participants who increase knowledge of management practices that maximize environmental stewardship.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 123 - Management and Sustainability of Forest Resources
- 605 - Natural Resource and Environmental Economics

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 7

1. Outcome Target

Number of participants who adopt management practices that maximize environmental stewardship.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 112 - Watershed Protection and Management
- 605 - Natural Resource and Environmental Economics

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 8

1. Outcome Target

Number of participants who increase their knowledge of opportunities and challenges for agriculture under carbon dioxide emissions policies to address climate change.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 605 - Natural Resource and Environmental Economics
- 610 - Domestic Policy Analysis

4. Associated Institute Type(s)

- 1862 Extension
- 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

{NO DATA ENTERED}

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

The planned programs identified for Indiana are based on input from stakeholders in the state through a variety of mechanisms including formal stakeholder surveys, listening sessions, and community forums. Stakeholder and participant input continue to be the driver for evaluating the impact and relevance of activities within our planned programs. We continue to monitor the effectiveness of our programs and develop actions to maintain, develop, or redirect our efforts by weighing feedback from several sources. Planned programs result in specific projects that address issues that are guided by stakeholder input. Specific projects are evaluated by appropriate methods including data analysis of pre- and post-participation knowledge and/or attitudes, profitability analyses, changes in behavior or conditions for individual participants and groups, or adoption rates of emerging technologies. Success of our overarching planned programs is subsequently determined using the sum of contributions from individual projects within each program area.

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Sustainable Energy

2. Brief summary about Planned Program

People developing a robust bioeconomy to feed and power the world. Renewable resources are critical to sustaining our planet. We are discovering chemical means and developing naturally produced enzymes to digest cell walls in plants to create biofuels and other bio-products. We use these results to predict the impact of renewable energy sources and bio-products as society transitions to a bio-based economy.

Development of economical and technically efficient processes to transform agronomic crops and biomass into liquid fuels is critical for our nation's future. Interdisciplinary teams of scientists are investigating the role of enzymes, chemical interactions, and processing techniques to enhance the conversion of biological materials into fuels for on and off-road vehicles, aircraft, and as heating oil. Enhanced environmental safety and increases in bio-fuels production are high priority policy issues in Indiana. Considerable expertise exists on the Purdue campus to develop alternative fuels from corn, soybeans, and cellulosic biomass. Systems will be designed that integrate agricultural and engineering approaches to optimize efficiency and yield and an economic analysis will be performed to identify appropriate applications

Biotechnology, growing demand for bio-fuels, and increased concentration of livestock production are increasing the opportunities and challenges for farm and business leaders as they seek to maximize profits in an environmentally and consumer sensitive fashion. New technologies and questions about shale oil, fracking, solar power, and the impact of removing crop residuals will continue to direct this conversation and influence technology development.

Energy workshops and educational programs will be conducted throughout the state that involve key research scientists ranging from chemical engineers to logistics experts to economists. The knowledge learned from basic and applied research projects will be translated through outreach programs directed to our stakeholders using a wide variety of delivery mechanisms. The overarching goal would be to improve processing efficiency and product quality and to translate this knowledge into practice. Without question, more efforts must be placed on studying and developing novel bio-based systems for alternative energy. The expertise at Purdue is well suited to study bio-based fuels and other opportunities related to production of non-food materials.

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 : 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
102	Soil, Plant, Water, Nutrient Relationships	10%		10%	
131	Alternative Uses of Land	5%		5%	
201	Plant Genome, Genetics, and Genetic Mechanisms	10%		10%	
204	Plant Product Quality and Utility (Preharvest)	15%		15%	
213	Weeds Affecting Plants	5%		5%	
216	Integrated Pest Management Systems	5%		5%	
402	Engineering Systems and Equipment	10%		10%	
511	New and Improved Non-Food Products and Processes	10%		10%	
605	Natural Resource and Environmental Economics	20%		20%	
610	Domestic Policy Analysis	10%		10%	
	Total	100%		100%	

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

1. Situation and priorities

A significant downturn in oil prices cools the public demand for bio-fuels and sustainable agricultural production systems. Researchers and Extension staff know that its important to continue exploring sustainable and alternative energy sources to be poised with solutions when prices rebound. To achieve sustainable energy goals, new technologies that embrace both engineering and life sciences must come together. Purdue University faculty in several departments such as Agricultural and Biological Engineering, Agronomy, Food Science, Agricultural Economics, and others across the campus including several centers in Discovery Park will conduct collaborative research and extend research results to the community. Additional audiences will include groups of faculty and the patenting and licensing of discoveries through the Office of Technology Commercialization, to industry leaders, policymakers, and the general public through educational programs, publications, websites, media releases, etc.

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

While Federal formula and state funding will be essential to carry-out the applied research and extension aspects of this program, large competitive extramural grants will be critical as well. University laboratories and infrastructure will be committed to efforts ranging from nanotechnology laboratories to more traditional bench science to pilot laboratory scale-ups to field and agronomic studies on the production, harvesting, storage, and transportation of bio-based crops.

2. Ultimate goal(s) of this Program

These research and outreach efforts should reduce U.S. foreign oil dependency, increase the profitability of agriculture, reduce environmental degradation, and create job and economic development opportunities throughout rural America.

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	11.1	0.0	35.2	0.0
2017	11.1	0.0	35.2	0.0
2018	11.1	0.0	35.2	0.0
2019	11.1	0.0	35.2	0.0
2020	11.1	0.0	35.2	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct meetings, conferences, workshops, seminars
- Conduct research projects
- Publish research and extension publications
- Publish newsletters
- Establish web sites
- Organize field days and demonstrations
- Consultations
- Work with mass media

* Social media, including Facebook, Twitter, etc.

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

Extension

Direct Methods	Indirect Methods
● Workshop ● Group Discussion ● One-on-One Intervention ● Demonstrations	● Public Service Announcement ● Newsletters ● TV Media Programs ● Web sites other than eXtension ● Other 1 (Social Media)

3. Description of targeted audience

Producers, consumers, youth, professionals related to energy, agribusiness, elected officials and public policy decision makers

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 Extension publications
- Number of research publications
- Number of research projects
- Number of consultations
- Number of education workshops
- Number of volunteers

☑ 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 energy producers, farmers, and consumers who increase their knowledge of the technical and economic implications of various Indiana crops being used for biofuels.
2	Number of technologies developed and disseminated that will increase the efficiency of bio-fuel production.
3	Number of participants who increased their knowledge of policy issues related to sustainable energy.
4	Number of research-based studies, publications, and reports for policy organization members and legislators on sustainable energy.

Outcome # 1

1. Outcome Target

Number of energy producers, farmers, and consumers who increase their knowledge of the technical and economic implications of various Indiana crops being used for biofuels.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 605 - Natural Resource and Environmental Economics

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

Number of technologies developed and disseminated that will increase the efficiency of bio-fuel production.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 204 - Plant Product Quality and Utility (Preharvest)
- 402 - Engineering Systems and Equipment
- 511 - New and Improved Non-Food Products and Processes
- 605 - Natural Resource and Environmental Economics

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

Number of participants who increased their knowledge of policy issues related to sustainable energy.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 610 - Domestic Policy Analysis

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 4

1. Outcome Target

Number of research-based studies, publications, and reports for policy organization members and legislators on sustainable energy.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 610 - Domestic Policy Analysis

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

{NO DATA ENTERED}

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

The planned programs identified are based on input from Indiana stakeholders through a variety of mechanisms including formal stakeholder surveys, listening sessions, and community forums. Stakeholder and participant input continue to be the driver for evaluating the impact and relevance of activities within our planned programs. We continue to monitor the effectiveness of our programs and develop actions to maintain, develop, or redirect our efforts by weighing feedback from several sources. Planned programs result in specific projects that address issues that are guided by stakeholder input. Specific projects are evaluated by appropriate methods including data analysis of pre- and post-participation knowledge and/or attitudes, profitability analyses, changes in behavior or conditions for individual participants and groups, or adoption rates of emerging technologies. Success of our overarching planned programs is subsequently determined using the sum of contributions from individual projects within each program area.

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Food Safety

2. Brief summary about Planned Program

Purdue food safety programs focus efforts toward rapid detection of foodborne pathogens, grain processing and control of molds and mycotoxins, non-thermal and thermal food processing treatments to reduce or eliminate pathogens and spoilage organisms, pest control and integrated pest management programs, the impact of human intestinal microflora and human disease, and food safety educational programs for farmers, retailers, and consumers. Examples of food safety integrated multi-disciplinary centers and efforts include the Center for Urban and Industrial Pest Management, and the Extension Disaster Education Network. Engineering and life science faculty are collaboratively designing bio-sensors to more efficiently detect food pathogens and contaminants.

3. Program existence : Mature (More then 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
201	Plant Genome, Genetics, and Genetic Mechanisms	5%		5%	
204	Plant Product Quality and Utility (Preharvest)	5%		5%	
501	New and Improved Food Processing Technologies	15%		15%	
503	Quality Maintenance in Storing and Marketing Food Products	10%		10%	
504	Home and Commercial Food Service	5%		5%	
701	Nutrient Composition of Food	15%		15%	
702	Requirements and Function of Nutrients and Other Food Components	5%		5%	
703	Nutrition Education and Behavior	10%		10%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	15%		15%	
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

In the U.S. alone, over 76 million cases of foodborne illness are reported each year, leading to over 5,000 deaths and 325,000 hospitalizations, costing Americans billions of dollars. Of most concern are inherent foodborne pathogens such as Norwalk virus, Campylobacter, Salmonella, E. coli, and Listeria. Since 9/11/2001, a major emphasis for the food industry and regulatory agencies is the threat of intentionally contaminated food systems. Recent passage of the Food Safety Modernization Act has resulted in a need to increase and automate our ability to detect pathogens in food. Research efforts need to focus on detection and control, and educational efforts should translate this information to optimize food handling and detection practices. Our food systems are also exposed to a wide variety of quality degrading challenges from production agriculture practices (i.e. pest control), through transportation systems (i.e. temperature control), at processing (i.e. sanitation), in retail food establishments and at consumer homes (i.e. food handler contamination). Providing best practices and implementing effective educational programs leads to a higher quality and more profitable food system.

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 tremendous amount of food safety and food defense research and outreach programs have been identified nationwide for the next five years. We would expect funding opportunities to increase or remain constant during the five year period although programs may focus on a single pathogen. To be more effective and more competitive, we recognize the need to further integrate research and extension efforts and to build multidisciplinary teams. Partnering with industry, regulatory agencies, and other stakeholders will also be a key strategic movement to increase our impact.

2. Ultimate goal(s) of this Program

The goal of this overall program is to integrate our research, outreach, and educational efforts to enhance the safety and quality of the food supply and to improve human health through development of more nutritious and healthy foodstuffs.

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	4.5	0.0	7.0	0.0
2017	4.5	0.0	7.0	0.0
2018	4.5	0.0	7.0	0.0
2019	4.5	0.0	7.0	0.0
2020	4.5	0.0	7.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Research-based programs will focus on conducting research experiments and programs emphasizing our key interest areas including detection and control of foodborne pathogens.

A wide variety of programs will be delivered to our targeted audiences. Some programs will include a complete development of curriculum, while others will involve the use of readily available programs used in other states and/or available for purchase through different organizations. Our output effort will include:

- partnering with important stakeholders

- development of workshop materials and curricula
- conducting workshops
- development of web-based and distance education materials
- working with the media

We expect to increase our offerings through distance education and/or web-based materials. Most programs involve some type of collaboration or partnerships with our stakeholders, with industry, with consumers, or with regulatory agencies. Evaluation tools vary greatly depending on the intended audience and program type ranging from surveys, to pre-and post-test, to national certification exams, and intensive follow up surveys to better assess knowledge gain.

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

Extension

Direct Methods	Indirect Methods
● Education Class	● Public Service Announcement
● Workshop	● Newsletters
● Group Discussion	● TV Media Programs
● One-on-One Intervention	● Web sites other than eXtension
● Demonstrations	● Other 1 (Social Media)

3. Description of targeted audience

Animal production personnel, plant production personnel, food manufacturing and processing plant personnel, food service and food retail workers, consumers, youth, state and county health departments, federal regulatory officials, state industry associations, first responders

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 education workshops
- Number of research projects
- Number of research publications
- Number of Extension publications
- Number of volunteers
- Number of consultations

☐ 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 incidents (reduction is goal) of foodborne illness associated with unsafe food handling practices
2	Number of persons who increased their knowledge of cooking foods adequately
3	Number of persons who increased their knowledge of avoiding cross-contamination
4	Number of persons who increased their knowledge of keeping food at a safe temperature
5	Number of persons who increased their knowledge of storing foods properly
6	Number of persons who increased their knowledge of proper hand washing
7	Number of participants passing food handler certificate
8	Number of participants adopting best management practices related to food safety

Outcome # 1

1. Outcome Target

Number of incidents (reduction is goal) of foodborne illness associated with unsafe food handling practices

2. Outcome Type : Change in Condition 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
- 1862 Research

Outcome # 2

1. Outcome Target

Number of persons who increased their knowledge of cooking foods adequately

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 504 - Home and Commercial Food Service
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

Number of persons who increased their knowledge of avoiding cross-contamination

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 504 - Home and Commercial Food Service
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 4

1. Outcome Target

Number of persons who increased their knowledge of keeping food at a safe temperature

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 504 - Home and Commercial Food Service
- 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 persons who increased their knowledge of storing foods properly

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 504 - Home and Commercial Food Service
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 6

1. Outcome Target

Number of persons who increased their knowledge of proper hand washing

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

Outcome # 7

1. Outcome Target

Number of participants passing food handler certificate

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

Number of participants adopting best management practices related to food safety

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 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
- 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 (state and national priorities)

Description

{NO DATA ENTERED}

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

The planned programs identified for Indiana are based on input from stakeholders in the state through a variety of mechanisms including a series of formal stakeholder surveys. Stakeholder and participant input continue to be the driver for evaluating the impact and relevance of activities within our planned programs. We continue to monitor the effectiveness of our programs and develop actions to maintain, develop, or redirect our efforts by weighing feedback from several sources. Planned programs result in specific projects that address issues that are guided by stakeholder input. Specific projects are evaluated by appropriate methods including data analysis of pre- and post-participation knowledge and/or attitudes, profitability analyses, changes in behavior or conditions for individual participants and groups, or adoption rates of emerging technologies. Success of our overarching planned programs is subsequently determined using the sum of contributions from individual projects within each program area.

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Childhood Obesity

2. Brief summary about Planned Program

Purdue human nutrition and human health programs focus on the impact of dietary intake and exercise on human health. Childhood obesity is a growing problem in our nation. Good nutrition and physical activity are essential for healthy growth and development of children and adolescents. Families, child care providers, teachers and other adults have key roles in influencing the eating and exercising habits of children and youth. Research and extension efforts include a wide variety of disciplines across Purdue's campus to address this issue.

3. Program existence : Mature (More then 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
201	Plant Genome, Genetics, and Genetic Mechanisms	10%		10%	
502	New and Improved Food Products	10%		10%	
607	Consumer Economics	10%		10%	
610	Domestic Policy Analysis	5%		5%	
701	Nutrient Composition of Food	5%		5%	
702	Requirements and Function of Nutrients and Other Food Components	10%		10%	
703	Nutrition Education and Behavior	20%		20%	
806	Youth Development	30%		30%	
	Total	100%		100%	

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

1. Situation and priorities

In 2013, 14.3% of Indiana children were overweight or obese, down from 17.1% in 2011. In youth, obesity is associated with increased risk for high blood pressure, Type 2 diabetes, and high cholesterol.

Poor diet and a sedentary lifestyle contribute to poor health. Overweight youth also have an increased risk of developing coronary heart disease, some cancers, and other health related problems. Research and extension programs can help individuals and families make informed, science-based decisions about their nutrition and physical activity.

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

Human nutrition research and outreach programs have been identified as a priority nationwide for the next five years. We would expect funding opportunities to increase or remain constant during the five year period. To be more effective and more competitive, we recognize the need to further integrate research and extension efforts and to build multidisciplinary teams. Partnering with industry, regulatory agencies, and other stakeholders will also be a key strategic movement to increase our impact.

2. Ultimate goal(s) of this Program

The goal of this overall program is integrate our research, outreach, and educational efforts to improve human health through a greater understanding of nutrition and the development of consumers who can make wise choices related to nutrition and health.

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	1.2	0.0	11.0	0.0
2017	1.2	0.0	11.0	0.0
2018	1.2	0.0	11.0	0.0
2019	1.2	0.0	11.0	0.0
2020	1.2	0.0	11.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct research
- Conduct educational workshops, seminars, short courses, conferences
- Partner with other agencies interested in childhood obesity
- Work with the media
- Develop curricula, publications, web sites, distance education materials
- Publish research and Extension articles

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

Extension

Direct Methods	Indirect Methods
● Education Class	● Public Service Announcement
● Workshop	● Newsletters
● Group Discussion	● TV Media Programs
● One-on-One Intervention	● Web sites other than eXtension
● Demonstrations	● Other 1 (social media)

3. Description of targeted audience

Parents, youth, children, consumers, day care providers, healthcare providers, state and county health departments, professional 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 Extension publications
- Number of research publications
- Number of research projects
- Number of consultations
- Number of education workshops
- Number of volunteers

☐ 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 persons who adopt one or more practices to improve food choices.
2	Number of participants who have increased their knowledge of how to raise healthy eaters.
3	Number of persons who increased their knowledge of selection and preparation of foods with reduced fat and/or calories.
4	Number of persons who increased knowledge of USDA serving sizes.
5	Number of participants consuming appropriate serving sizes.
6	Number of participants demonstrating ability to choose or prepare foods with reduced fat and/or calories.
7	Number of youth who increased knowledge of the importance of physical activity.
8	Number of participants who adopt increased physical activity levels.
9	Number of participants who increased their knowledge of the connection between food choices and risk of chronic disease.
10	Number of participants who increased their knowledge of the relationship between nutrition and health.
11	Number of participants who adopt one or more practices to improve food choices and activity levels.

Outcome # 1

1. Outcome Target

Number of persons who adopt one or more practices to improve food choices.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

Number of participants who have increased their knowledge of how to raise healthy eaters.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

Number of persons who increased their knowledge of selection and preparation of foods with reduced fat and/or calories.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 701 - Nutrient Composition of Food

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 4

1. Outcome Target

Number of persons who increased knowledge of USDA serving sizes.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 5

1. Outcome Target

Number of participants consuming appropriate serving sizes.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 6

1. Outcome Target

Number of participants demonstrating ability to choose or prepare foods with reduced fat and/or calories.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 7

1. Outcome Target

Number of youth who increased knowledge of the importance of physical activity.

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
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 8

1. Outcome Target

Number of participants who adopt increased physical activity levels.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 9

1. Outcome Target

Number of participants who increased their knowledge of the connection between food choices and risk of chronic disease.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 701 - Nutrient Composition of Food
- 703 - Nutrition Education and Behavior
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 10

1. Outcome Target

Number of participants who increased their knowledge of the relationship between nutrition and health.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 11

1. Outcome Target

Number of participants who adopt one or more practices to improve food choices and activity levels.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 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

{NO DATA ENTERED}

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

The planned programs identified for Indiana are based on input from stakeholders in the state through a variety of mechanisms including formal stakeholder surveys, listening sessions, and community forums. Stakeholder and participant input continue to be the driver for evaluating the impact and relevance of activities within our planned programs. We continue to monitor the effectiveness of our programs and develop actions to maintain, develop, or redirect our efforts by weighing feedback from several sources. Planned programs result in specific projects that address issues that are guided by stakeholder input. Specific projects are evaluated by appropriate methods including data analysis of pre-

and post-participation knowledge and/or attitudes, profitability analyses, changes in behavior or conditions for individual participants and groups, or adoption rates of emerging technologies. Success of our overarching planned programs is subsequently determined using the sum of contributions from individual projects within each program area.

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Human, Family, and Community, Health and Well-being

2. Brief summary about Planned Program

For 2016-2020 we will continue to report in Human, Family and Community Health and Well-Being, combining cross-cutting themes into one Planned Program, to better distinguish and track the impact of our research and extension programs on our stakeholder-approved strategic themes.

Provide producers and consumers a more complete, science-based understanding of our food systems. We will develop educational programs that help consumers make the most informed food choices possible, and help farmers better respond to customer needs and demands. Specific focus areas include improving nutrition & wellness, helping stakeholders adjust their diet for chronic diseases, and the role of environmental factors in this complex area.

Prepare children for academic success through programs and partnerships that strengthen families. We will develop tools that Indiana families need to prepare children to succeed in kindergarten and beyond with programs that improve nutrition, health, and literacy.

Reduce human obesity across Indiana through community-based programs. We will enhance community health coalitions that can help Hoosiers reduce obesity, make healthy food choices, and increase physical activity.

Help regions, communities, and neighborhoods plan and prepare for a sustainable future. We will help community and organization leaders develop planning and decision-making strategies that improve long-term viability. The **Enhancing the Value of Public Spaces** program addresses the subject of quality of place in alignment to help regions, communities, and neighborhoods plan and prepare for a sustainable future. This program provides community leaders with a decision support framework that assesses the value of their community public spaces using social, economic, and environmental indicators to support the development and management of sustainable and resilient Indiana communities. The team, which formed in 2013, provides the sustainability expertise to develop the curriculum and create, implement, and evaluate the education program. The program will roll-out evaluation and reporting, curriculum development, review and publication, and train the trainer programs in 2015.

Develop and support leaders throughout Indiana. The Community Leadership Certificate program engages volunteers, senior citizens, aspiring leaders in civic and nonprofit organizations, and elected and appointed officials who want to be more effective in their organizations and communities. Goals of the community leadership program administered in 11 four-hour sessions are to develop and deliver educational programs in leadership, and develop online resources to expand access to resources for individuals and organizations. Efforts are made to reach diverse populations and engage those typically not involved in community organizations. The state-wide curriculum includes educational objectives, session agendas, homework assignments that include self-assessment instruments and research about local issues, program host guide, and facilitator guides for each topic. A 200-page toolkit provides all materials necessary for Extension educators to initiate and carry out a successful community leadership program.

Facilitating informed decision making to improve economic and social well-being. The national documentary film, Reject!, became a springboard to **build positive change** in Indiana communities. Purdue Extension created the framework and process for this important relational work to be accomplished known as All In: Building Positive Communities. The goals of the project are: 1) to use the film Reject! and resulting discussions/actions from community forums as catalysts for lasting change; and 2) decrease ostracism/social rejection and increase supportive /nurturing human attitudes and behaviors in communities in Indiana are integrated into long term activities to build positive communities.

3. Program existence : Mature (More then 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
608	Community Resource Planning and Development	12%		12%	
610	Domestic Policy Analysis	3%		3%	
611	Foreign Policy and Programs	3%		3%	
701	Nutrient Composition of Food	3%		3%	
702	Requirements and Function of Nutrients and Other Food Components	10%		10%	
703	Nutrition Education and Behavior	10%		10%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	3%		3%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	10%		10%	
721	Insects and Other Pests Affecting Humans	3%		3%	
723	Hazards to Human Health and Safety	3%		3%	
801	Individual and Family Resource Management	12%		12%	
802	Human Development and Family Well-Being	12%		12%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	10%		10%	
805	Community Institutions and Social Services	3%		3%	
806	Youth Development	3%		3%	
	Total	100%		100%	

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

1. Situation and priorities

Health and well-being are intertwined across gender, age, race and socio-economic status. They are not only a function of food consumed and activity levels, but also a function of stress associated with job

losses, inability to effectively manage household finances to get out of debt or build wealth, medical issues and access to care, and taking care of parents. In addition, many families continue to live in poverty and are at risk of going hungry.

At Purdue, we are focused on understanding the relationship among these many factors and taking these research results into the community to help the people of Indiana improve their lifestyles to improve their health and well-being. Priorities: foods and nutrition, health and wellness, chronic diseases, family resource management, parenting and relationships, and human development.

Positive youth development should not be left to chance. The youth of today are impacted significantly by their family situation in addition to the influences of school, peer groups and technology. Purdue's 4-H Youth Development programs provide opportunities for youth to acquire skills necessary to meet the challenges of adolescence and adulthood. 4-H Youth Development uses hands-on, research-based educational opportunities that help youth become competent, caring, confident, connected, and contributing citizens. As a result, they are better positioned to become well-rounded and healthy individuals that are able to accept new challenges, expect success, establish and maintain relationships at many levels, and respond to the needs and concerns of others. Priorities: leadership, citizenship, science, healthy living, career development, and adult volunteer development.

The capacity of local people, organizations and institutions to come together for the purpose of acting on current and future opportunities and challenges is critical to the health of any community. Launching sound programs that spur a civic renewal among people, organizations and institutions in Indiana is vital. Few institutions have the content, process knowledge and local connections to lead community planning efforts. Consensus is growing among economic development professionals, government officials and business leaders that spurring local economic development requires a multifaceted strategy. This strategy includes promoting economic growth through the development of a local system of support to building capacities of aspiring entrepreneurs and existing small businesses. Priorities: community and organizational planning, economic and business development, leadership and civic engagement, local government education, and quality places.

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

• Improving health and well-being is an on-going issue that needs continued research in both the basic sciences and social science realm and must partner with Extension to try to impact behavior in the community.
• Doctors and researchers will continue to uncover possible new ways of treating chronic illnesses that need to be tested and then shared with the public through Extension
• Even if there is a significant, consistent upsurge in the economy, there will be a need to educate individuals and families on how to manage money and build wealth
• The success of our future society depends on today's youth and it is wise to find ways to support them

in skill development for academics, career and personal relationships
• Local places face many factors impacting residents and need support for economic and business development, leadership and quality places for vibrant communities.

2. Ultimate goal(s) of this Program

• Improve human health
• Improve family well-being
• Strengthen financial literacy for individuals and families
• Expand and strengthen the development of our youth
• Increase capacity of local people, organizations and institutions to come together for the purpose of acting on current and future opportunities and challenges.
• Equip vested leaders, organizations and stakeholders with sound training in community and organizational planning as a vital link to community development.
• Increase the effectiveness of local governments, boards and committees by ensuring a sustainable future for Indiana communities.
• Improve job creation, business retention and community resources for business owners in Indiana.
• Build capacity of Indiana's local stakeholders to enhance their communities' quality of place, better manage their natural resources, and improve their overall quality of life.

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	16.9	0.0	29.6	0.0
2017	16.9	0.0	29.6	0.0
2018	16.9	0.0	29.6	0.0
2019	16.9	0.0	29.6	0.0
2020	16.9	0.0	29.6	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

• Develop, workshops, consultations, seminars, certification programs, distance education modules, field days, and other opportunities
• Develop and implement curriculum
• Conduct evaluation/research
• Provide youth development and adult volunteer training
• Develop web sites
• Provide staff development
• Collaborate with other agencies/stakeholders
• Publish research and extension articles

• Increase number of participants in life-long learning programs.
• Foster leadership and economic development and facilitate strong partnerships in state, regional, national, and international agencies, organizations, and groups.
• Encourage participation by extension specialists in: Taskforces, Review Committees, Advisory Boards, Editorial Boards, Commodity committees/boards, Invited presentations, Honors and Awards, Common Interest Groups, Professional Societies

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

Extension

Direct Methods	Indirect Methods
● Education Class	● Public Service Announcement
● Workshop	● Newsletters
● Group Discussion	● TV Media Programs
● One-on-One Intervention	● Web sites other than eXtension
● Demonstrations	● Other 1 (Extension publs/social media)
	● Other 2 (Distance learning programs)

3. Description of targeted audience

Families, parents, youth, 4-H youth - adult volunteers - administration - parents, children, appointed and elected public officials, Commodity boards and committees.

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 education workshops
- Number of research publications
- Number of Extension publications
- Number of community collaborations, coalitions, partnerships
- Number of volunteers
- Number of research projects
- Number of consultations

☐ 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	An impact on human health resulting from new knowledge about nutrition & wellness, chronic diseases, and/or environmental factors.
2	An impact on family well-being resulting from new knowledge about family resources management, parenting & relationships, and/or child development.
3	An impact on youth development resulting from new knowledge about youth leadership, life skills, volunteers, and/or career development.
4	An impact on economic and/or community development resulting from new knowledge about leadership, economic development, government operations and/or community development.
5	An impact on policy and/or regulation related to human, family and community, health and well-being.

Outcome # 1

1. Outcome Target

An impact on human health resulting from new knowledge about nutrition & wellness, chronic diseases, and/or environmental factors.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 608 - Community Resource Planning and Development
- 610 - Domestic Policy Analysis
- 611 - Foreign Policy and Programs
- 701 - Nutrient Composition of Food
- 702 - Requirements and Function of Nutrients and Other Food Components
- 703 - Nutrition Education and Behavior
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 721 - Insects and Other Pests Affecting Humans
- 723 - Hazards to Human Health and Safety
- 803 - Sociological and Technological Change Affecting Individuals, Families, and Communities
- 805 - Community Institutions and Social Services
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

An impact on family well-being resulting from new knowledge about family resources management, parenting & relationships, and/or child development.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 701 - Nutrient Composition of Food
- 702 - Requirements and Function of Nutrients and Other Food Components
- 703 - Nutrition Education and Behavior
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and

Other Sources

- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 721 - Insects and Other Pests Affecting Humans
- 723 - Hazards to Human Health and Safety
- 801 - Individual and Family Resource Management
- 802 - Human Development and Family Well-Being
- 803 - Sociological and Technological Change Affecting Individuals, Families, and Communities
- 805 - Community Institutions and Social Services
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

An impact on youth development resulting from new knowledge about youth leadership, life skills, volunteers, and/or career development.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management
- 802 - Human Development and Family Well-Being
- 805 - Community Institutions and Social Services
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 4

1. Outcome Target

An impact on economic and/or community development resulting from new knowledge about leadership, economic development, government operations and/or community development.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 608 - Community Resource Planning and Development
- 610 - Domestic Policy Analysis
- 611 - Foreign Policy and Programs
- 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
- 721 - Insects and Other Pests Affecting Humans
- 723 - Hazards to Human Health and Safety
- 801 - Individual and Family Resource Management
- 802 - Human Development and Family Well-Being
- 803 - Sociological and Technological Change Affecting Individuals, Families, and Communities
- 805 - Community Institutions and Social Services
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 5

1. Outcome Target

An impact on policy and/or regulation related to human, family and community, health and well-being.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 608 - Community Resource Planning and Development
- 610 - Domestic Policy Analysis
- 611 - Foreign Policy and Programs
- 701 - Nutrient Composition of Food
- 702 - Requirements and Function of Nutrients and Other Food Components
- 703 - Nutrition Education and Behavior
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 721 - Insects and Other Pests Affecting Humans
- 723 - Hazards to Human Health and Safety

- 801 - Individual and Family Resource Management
- 802 - Human Development and Family Well-Being
- 803 - Sociological and Technological Change Affecting Individuals, Families, and Communities
- 805 - Community Institutions and Social Services
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 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

{NO DATA ENTERED}

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

The planned programs identified for Indiana are based on input from stakeholders in the state through a variety of mechanisms including formal stakeholder surveys, listening sessions, and community forums. Stakeholder and participant input continue to be the driver for evaluating the impact and relevance of activities within our planned programs. We continue to monitor the effectiveness of our programs and develop actions to maintain, develop, or redirect our efforts by weighing feedback from several sources. Planned programs result in specific projects that address issues that are guided by stakeholder input. Specific projects are evaluated by appropriate methods including data analysis of pre- and post-participation knowledge and/or attitudes, profitability analyses, changes in behavior or conditions for individual participants and groups, or adoption rates of emerging technologies. Success of our overarching planned programs is subsequently determined using the sum of contributions from individual projects within each program area.

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Natural Resources and Environment

2. Brief summary about Planned Program

The integrated research, education, and extension programs in Natural Resources and Environment include faculty and staff from eight departments within the College of Agriculture and are designed to address a broad spectrum of environmental issues that occur as a result of either natural or developed environments. One of the primary segments of the program involves increasing knowledge of the relationship between soils, nutrients, and plants. Another goal is increasing and improving the productivity and sustainability of forest resources, particularly hardwoods. Programs will teach landowners and land managers to evaluate the condition of lands and undertake management and restoration activities that increase their quality of life while providing natural resources benefits for society. A number of activities are aimed at preventing or mitigating pollution of natural resources, whether from natural causes or as a result of human activity. These include the Animal Manure Management Group which provides current, scientifically sound information and technologies that are economically sound, feasible for implementation and promote environmental stewardship to livestock and poultry producers, technical service providers and consultants, government officials and the general public. The Water Quality Group will address non-point sources of water pollution and loss of riparian habitat by working with land owners and managers to participate in collaborative watershed planning exercise. Urban and suburban environments that will result in sustainable land use, enhancement of natural components, and increased quality of life for residents will be targeted.

The **Rainscaping Issue Based Action Team** uses landscape design and management practices - at the household and community scales, such as schools, community centers, and fairgrounds - that enable plants and soils to absorb storm water, reducing runoff from fertilizers and other pollutants that eventually reaches lakes, streams, and rivers. Community water quality potentially affected by homeowner landscape management practices could be improved through increased community education and implementation of rainscaping practices. Rainscaping Education team focuses on program planning, resource review, training, and conducting needs assessments of Master Gardener coordinators for program design.

3. Program existence : Mature (More then 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
101	Appraisal of Soil Resources	1%		1%	
102	Soil, Plant, Water, Nutrient Relationships	18%		18%	
104	Protect Soil from Harmful Effects of Natural Elements	5%		5%	
111	Conservation and Efficient Use of Water	2%		2%	
112	Watershed Protection and Management	6%		6%	
121	Management of Range Resources	1%		1%	
123	Management and Sustainability of Forest Resources	18%		18%	
125	Agroforestry	1%		1%	
131	Alternative Uses of Land	10%		10%	
132	Weather and Climate	4%		4%	
133	Pollution Prevention and Mitigation	24%		24%	
135	Aquatic and Terrestrial Wildlife	10%		10%	
	Total	100%		100%	

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

1. Situation and priorities

Indiana residents want to live in aesthetically pleasing urban and rural environments, with ready access to well managed forests and other natural resources. Air and water resources should be free from pollution. At the same time, the production of crops and livestock and harvesting of timber, especially hardwoods, are important contributors to the economy of the state. Research is necessary to generate the knowledge that will allow these agricultural enterprises to flourish while providing Indiana residents with the quality of environment that they desire. Extension programs will provide assistance to farmers, ranchers, land owners, and land managers that will enable them to maintain their enterprises in a profitable, yet environmentally sustainable manner.

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

The increasing urban/rural interface will require that farmers, ranchers, and land owners learn to coexist with urban and rural residents. Research and Extension programs will provide producers with the knowledge and skills they need to maintain their enterprises in an economically viable manner, while minimizing negative impacts on the environment and their neighbors. Extension programs can also successfully teach urban and rural residents about the importance of agricultural production to the economy of the state and encourage dialogue between these two groups.

2. Ultimate goal(s) of this Program

• Watershed stakeholders will collaborate effectively to develop and implement plans to protect and restore water resources.
• Owners of forest lands and wildlands and their professional advisors will have the skills necessary to meet the objectives of the owners in a sustainable and ecologically sound manner.
• To equip the livestock and poultry producers with the knowledge and current information to comply with regulations, make wise decisions for manure management systems design, and management and implementation of new scientifically and economically sound technologies for operation.
• To inform crop and livestock producers in the value of optimal use of manure nutrients as fertilizer in crop production.
• The urban and suburban communities of Indiana will provide their residents with aesthetically pleasing environments in which to live and work.

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	1.4	0.0	6.7	0.0
2017	1.4	0.0	6.7	0.0
2018	1.4	0.0	6.7	0.0
2019	1.4	0.0	6.7	0.0
2020	1.4	0.0	6.7	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Workshops
- Extension publications
- Public service announcements
- Research projects
- Web site development
- Home and farm visits
- Displays
- IP video programs
- Demonstrations and field days
- One-on-one consultations
- Collaboration with other agencies

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

Extension

Direct Methods	Indirect Methods
● Education Class	● Public Service Announcement
● Workshop	● Newsletters
● Group Discussion	● Web sites other than eXtension
● One-on-One Intervention	● Other 1 (Extension publications)
● Demonstrations	● Other 2 (Social Media)

3. Description of targeted audience

Agricultural producers,rural and urban residents, elected officials and other decision-makers, owners of private and public forestlands and wildlands, natural resource professionals, technical service providers, tree care providers, right of way managers, urban planners, youth

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 education workshops
- Number of research projects
- Number of Extension publications
- Number of consultations
- Number of volunteers
- Number of research 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(I). State Defined Outcome

O. No	Outcome Name
1	Number of participants who increase knowledge of practices to protect water resources.
2	Number of participants who improve decision making for use of water resources.
3	Number of participants who increase knowledge of proper application of fertilizer, manure and waste products to soil and potential for environmental consequences of misapplication.
4	Number of participants who increased adoption of proper application of fertilizer, manure and waste products to soil.
5	Number of participants who increase knowledge of best management practices for optimal manure nutrient utilization with on- and off-site agricultural lands.
6	Number of participants who adopt best management practices for optimal manure nutrient utilization with on- and off-site agricultural lands.
7	Number of participants who increase knowledge of the value of ponds in landscapes and methods for installing and managing ponds.
8	Number of participants who increase value of landscapes through better installation and management of ponds.
9	Number of participants who increase knowledge of on-site wastewater treatment siting and maintenance needs.
10	Number of participants who make more informed decisions for on-site wastewater treatment siting and maintenance.
11	Number of water quality violations related to animal production and land application in the state of Indiana.
12	Number of tree care providers in Indiana who become certified arborists.
13	Number of professional natural resource advisors who have the skills necessary to assess the health of the wildlands.
14	Number of wildlands owners who have a relationship with knowledgeable professional natural resource advisors and have developed and implemented a management plan.
15	Number of natural resource professionals and wildland owners who have worked with landowners to develop and implement management plans.
16	Number of owners of wildlands who will have assessed the health of their lands and developed and implemented management plans.
17	Number of landowners with knowledge of proper tree planting and management techniques.
18	Number of participants who increased their knowledge of natural resource management.
19	Number of participants who increased their knowledge of proper application of pesticides.
20	Number of participants who increased their knowledge of topsoil importance.
21	Number of participants who increased their knowledge of Indiana's diverse wildlife.
22	Number of woodlot owners who improved their management skills.

Outcome # 1

1. Outcome Target

Number of participants who increase knowledge of practices to protect water resources.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 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 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

Number of participants who improve decision making for use of water resources.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 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 Extension

Outcome # 3

1. Outcome Target

Number of participants who increase knowledge of proper application of fertilizer, manure and waste products to soil and potential for environmental consequences of misapplication.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 112 - Watershed Protection and Management
- 133 - Pollution Prevention and Mitigation

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 4

1. Outcome Target

Number of participants who increased adoption of proper application of fertilizer, manure and waste products to soil.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 112 - Watershed Protection and Management
- 133 - Pollution Prevention and Mitigation

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 5

1. Outcome Target

Number of participants who increase knowledge of best management practices for optimal manure nutrient utilization with on- and off-site agricultural lands.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 112 - Watershed Protection and Management
- 133 - Pollution Prevention and Mitigation

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 6

1. Outcome Target

Number of participants who adopt best management practices for optimal manure nutrient utilization with on- and off-site agricultural lands.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 112 - Watershed Protection and Management
- 133 - Pollution Prevention and Mitigation

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 7

1. Outcome Target

Number of participants who increase knowledge of the value of ponds in landscapes and methods for installing and managing ponds.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 133 - Pollution Prevention and Mitigation
- 135 - Aquatic and Terrestrial Wildlife

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 8

1. Outcome Target

Number of participants who increase value of landscapes through better installation and management of ponds.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 111 - Conservation and Efficient Use of Water
- 133 - Pollution Prevention and Mitigation
- 135 - Aquatic and Terrestrial Wildlife

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 9

1. Outcome Target

Number of participants who increase knowledge of on-site wastewater treatment siting and maintenance needs.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 131 - Alternative Uses of Land
- 133 - Pollution Prevention and Mitigation

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 10

1. Outcome Target

Number of participants who make more informed decisions for on-site wastewater treatment siting and maintenance.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 112 - Watershed Protection and Management
- 131 - Alternative Uses of Land
- 133 - Pollution Prevention and Mitigation

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 11

1. Outcome Target

Number of water quality violations related to animal production and land application in the state of Indiana.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 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 Extension
- 1862 Research

Outcome # 12

1. Outcome Target

Number of tree care providers in Indiana who become certified arborists.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 123 - Management and Sustainability of Forest Resources
- 125 - Agroforestry

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 13

1. Outcome Target

Number of professional natural resource advisors who have the skills necessary to assess the health of the wildlands.

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
- 135 - Aquatic and Terrestrial Wildlife

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 14

1. Outcome Target

Number of wildlands owners who have a relationship with knowledgeable professional natural resource advisors and have developed and implemented a management plan.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 121 - Management of Range Resources
- 123 - Management and Sustainability of Forest Resources
- 135 - Aquatic and Terrestrial Wildlife

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 15

1. Outcome Target

Number of natural resource professionals and wildland owners who have worked with landowners to develop and implement management plans.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 121 - Management of Range Resources
- 123 - Management and Sustainability of Forest Resources
- 135 - Aquatic and Terrestrial Wildlife

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 16

1. Outcome Target

Number of owners of wildlands who will have assessed the health of their lands and developed and implemented management plans.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 121 - Management of Range Resources
- 123 - Management and Sustainability of Forest Resources
- 135 - Aquatic and Terrestrial Wildlife

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 17

1. Outcome Target

Number of landowners with knowledge of proper tree planting and management techniques.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 123 - Management and Sustainability of Forest Resources

- 125 - Agroforestry

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 18

1. Outcome Target

Number of participants who increased their knowledge of natural resource management.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 112 - Watershed Protection and Management
- 121 - Management of Range Resources
- 123 - Management and Sustainability of Forest Resources

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 19

1. Outcome Target

Number of participants who increased their knowledge of proper application of pesticides.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 133 - Pollution Prevention and Mitigation

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 20

1. Outcome Target

Number of participants who increased their knowledge of topsoil importance.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 21

1. Outcome Target

Number of participants who increased their knowledge of Indiana's diverse wildlife.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 135 - Aquatic and Terrestrial Wildlife

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 22

1. Outcome Target

Number of woodlot owners who improved their management skills.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 123 - Management and Sustainability of Forest Resources
- 125 - Agroforestry

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.)

Description

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

The planned programs identified for Indiana are based on input from stakeholders in the state through a variety of mechanisms including formal stakeholder surveys, listening sessions, and community forums. Stakeholder and participant input continue to be the driver for evaluating the impact and relevance of activities within our planned programs. We continue to monitor the effectiveness of our programs and develop actions to maintain, develop, or redirect our efforts by weighing feedback from several sources. Planned programs result in specific projects that address issues that are guided by stakeholder input. Specific projects are evaluated by appropriate methods including data analysis of pre- and post-participation knowledge and/or attitudes, profitability analyses, changes in behavior or conditions for individual participants and groups, or adoption rates of emerging technologies. Success of our overarching planned programs is subsequently determined using the sum of contributions from individual projects within each program area.