2017 Purdue University Combined Research and Extension Plan of Work

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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 the 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 is a grand challenge, Purdue Agriculture knows it also presents grand opportunities for our state's farms and farm families. 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. To meet these challenges, Purdue's College of Agriculture has organized its Plan of Work to be consistent with our stakeholder needs, the 5 NIFA Planned Programs, plus 2 Purdue-specific Planned Programs. This structure was the result of a significant overhaul in 2013 that reduced the number of Planned Programs from 12 to 7. The Purdue Planned Program areas (1) Human, Family, and Community Health and Well-Being; and (2) Natural Resources and the Environment address the full range of stakeholder expected outcomes not covered by NIFA's Planned Programs.

2016-2020 College of Agriculture Strategic Plan

The College of Agriculture rolled out a new strategic plan for 2015-2020. A 35-member task force of faculty, staff and students that broadly represented the college. Five teams worked through a provocative series of questions that focused on understanding our world/assessing our college; defining global leadership and making it happen. The teams conducted surveys of faculty, staff and students to learn more about how the college could impact their needs and goals of the residents of Indiana. We held 27 Dean's listening sessions and Extension community forums throughout Indiana and engaged nearly 800 stakeholders.

All of this informed the final mission, vision and value statements. Our Vision: Purdue Agriculture will be the world's leading land-grant college of agriculture, food, life and natural resource sciences. We will embrace the land-grant ideal in all we do. Our Mission: Purdue Agriculture will help make Indiana, our nation, and our world better through students prepared to make a difference; research with purpose, leading to discovery with impact; engagement/extension that strengthens lives and livelihoods; and an inclusive culture that supports excellence in all we do. Our values include passion for the students we educate, stakeholders we serve, the work that we do, the places we work and study. Stakeholder engagement with purpose, and the impact it makes possible. Creativity, bringing bold, new thinking to our scholarship and our work. Excellence, being the very best that we can be, in all we do. Diversity, in the fullest and richest sense of the word, across our people, our stakeholders, our ideas, our work. Respect, for all individuals, for all perspectives, for all missions. The focus areas in the Strategic Plan remain the

same, but are applied in this new context.

- Build a sustainable and secure food production system
- Utilize molecular approaches to expand the frontiers of agriculture, food, natural resources and life sciences
- Develop a robust bio-economy to feed and power the world
- Enhance food and health
- Strengthen ecological and environmental integrity
- Facilitate informed decision-making to improve economic and social well-being

Strategic Plan Drives New Initiatives

The Extension community forums and Dean's listening sessions strengthened our ties to current stakeholders, introduced us to fresh faces that can help us reach new audiences, and inspired our most recent Extension strategic initiatives. These initiatives will help us: 1) capitalize on our strengths and experience to advance, and accomplish, new goals; 2) focus resources to help us provide meaningful programs that address priority needs; 3) engage youth via Indiana 4-H and other youth-serving organizations to address important issues; 4) enhance the quality of programs to ensure optimal effectiveness and impact across Indiana, and 5) deliver programming relevant to current, and emerging, needs of all people across Indiana.

Extension initiatives are aligned in 2 categories. Initiatives for **Children, Youth, and Family** are strengthening families, building effective parenting skills, supporting career preparation, promoting healthy living, and enhancing positive life skills. Initiatives for **Community, Economy, Agriculture, and Natural Resources** are strengthening workforce, business, and economic development; expanding agriculture-related opportunities; fostering responsible land use and conservation of resources; creating quality communities; and increasing civic participation and local government education. Purdue Extension recently funded teams of faculty, specialists and educators who developed 12 new Initiatives to help us address these priorities of Indiana residents. These are described in further detail within each Planned Program Overview.

These are by no means the only programs Purdue Extension has, or will create, to address the strategic initiatives, just those most recently funded. The strategic initiatives they address reflect current, focused priorities of growth and outreach as outlined to us by the people of the state of Indiana. They are but a fraction of the ways in which, with help from volunteers and local leaders, Purdue Extension reaches millions of people across Indiana -- urban and rural, young and young at heart.

Ongoing Priorities

Preparing our Youth for the future continues to be statewide priority. 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, citizenship education, with the addition of teen leadership. With nearly 13,000 adult 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 established. The college PK-12 Council, comprised of representatives from all eleven departments, continues to gain momentum. Its purpose is to leverage the college strengths in engaging youth through outreach and engagement efforts to expand the pool of students interested in, and prepared for, careers in food, agricultural, life, and natural resource sciences.

Promoting healthy living is another state priority. 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 and chronic conditions, use and beneficial effects of phytochemicals, nutrient processing, calcium metabolism, and dietary intake to enhance health. Educational programs are provided for food and health care industries and for consumers. A new initiative, Be Heart Smart, for combatting heart disease, is targeted at adults aged 30 to 55. The 4-session class offers simple changes for a heart healthy lifestyle, heart-smart eating plans, stress reduction techniques,

tips for talking to healthcare providers, and more.
Strengthening families and building effective parenting skills are key issues for Indiana as many continue to face challenges related to financial concerns, health issues, and the need to build positive relationships inside and outside the family. These challenges impede healthy family functioning and decision making. Research and extension programs addressing topics such as positive communication and connectedness, effective parenting skills, childcare, building self-esteem, managing stress, basic money management, and planning for the future will assist families in dealing with these challenges.
Enhancing success in Indiana's communities continues to be a driving Extension priority for communities of all sizes and encompasses programs to increase community vitality, build leadership capacity, improve public decision making, and resolve public issues. The Hometown Collaboration Initiative (HCI) is the new flagship program for Extension with a focus on communities of 25,000 or fewer people who want to develop a new generation of local leaders, grow small businesses and entrepreneurs or enhance community design and public spaces.
Feeding a growing population is going to require Smarter Agriculture™. The mission of the Plant Sciences Research and Education Pipeline is to propel the Purdue plant sciences program to a global leadership position by delivering the innovation, technology, and human capacity necessary to help farming operations of all sizes produce food, fuel, and fiber more efficiently. The initiative 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.
Stakeholders look to Purdue to support the development of diversified farming. 2014 saw 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. In 2015, the position of Assistant Program Leader for Diversified Food and Farming Systems was created to coordinate efforts in this rapidly emerging space and increase outreach on the Purdue campus and across the state.
Consumers remain confident in safety of Indiana foods. Consumers continue to 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, and pest control. 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. Purdue researchers and extension personnel are working to understand the implications of the new Food Safety Modernization Act (FSMA) and are developing outreach programs and training materials to support producers along the entire value chain. We will continue to build integrated, multi-disciplinary and multi-institutional teams to address emergencies such as statewide flooding, the outbreak of Porcine Epidemic Diarrhea Virus (PEDv) which killed more than 70% of neonatal pigs in Indiana and the H7N8 virus resulting in the loss of 60,000 turkeys.
Purdue held a groundbreaking for a nearly 90,000-square-foot Hobart and Russell Creighton Hall of Animal Sciences that will serve as the new home of the Department of Animal Sciences. The three-floor structure will house state-of-the-art research laboratories, classrooms designed for interactive and team-based learning, conference rooms for Extension activities, and open collaborative spaces to facilitate faculty and student interactions. It will also contain offices for all of the department's faculty and staff,

scientists with the U.S. Department of Agriculture-Agricultural Research Service's Livestock Behavior Unit, and staff of Indiana animal regulatory agencies. This investment by Purdue and donors will consolidate the Department of Animal Sciences into a unified complex, fostering greater collaboration among faculty, staff and students in the department and across the university and providing contemporary spaces for teaching, research and Extension activities.

Adoption of USDA National Outcomes and Indicators

In 2015, we conducted an overhaul of our reporting with a new system, Digital Measures. As administrative demands rise for researchers, Extension specialists and educators we sought ways to streamline reporting processes with the goal of input data once and use many times. Digital Measures provided the framework for us to accomplish this goal. With Digital Measures, faculty are able to point to formula funded reports in REEport as the basis for the Annual Report of Combined Research and Extension. The new system has also helped simplify how faculty, Extension specialists and educators report outputs and outcomes based on Planned Programs.

More significantly, we incorporated the USDA National outcomes Indicators for research and extension reporting. This required a paradigm shift in how individuals report into the system. While faculty and extension staff were trained in the National outcomes indicators, it will take another year to fine tune the reporting process. The 2015 Annual Report was the first year for reporting into Digital Measures. We have found the data to be more robust and the quality of the impact statements much improved. We fully expect our reports to USDA to continually improve as staff gain familiarity with the new system.

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

Year	Extension		Research	
	1862	1890	1862	1890
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
2021	78.2	0.0	0.0	0.0

II. Merit Review Process

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

- Internal University Panel
- External 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 annually to ensure that programs are continuing to address critical needs. County Extension Boards and advisory boards conduct annual review/evaluation of the county programming efforts. Also, the Dean's Advisory Council, which meets twice yearly, reviews both Extension and research priorities.
As part of our efforts to build a stakeholder-approved Strategic Plan, twenty-seven community forums and listening sessions were held around the state with hundreds of stakeholders. Key themes that emerged have been incorporated into our Strategic Plan and 12 new initiatives have been funded by Extension.
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 are addressing or can address their needs. 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.
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 themes are built into the Planned 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.
For the 2015 College of Agriculture strategic planning process, county extension staff used these approaches to invite underserved and underrepresented 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. Ag

Research also provided services to produce materials in Spanish for areas with limited English proficiency. The Ag research brochure is printed in Spanish to reach under served audiences in Indiana.
The college has created Diversity Assistantships for graduate students that cover tuition costs and grad remit fees, we provide and heavily market opportunities for staff to learn more about diversity through unique speakers and workshops and collect data on individual's experience from attending these voluntary programs. Strong intercollegiate relationships have been developed with several HBCUs as we look for opportunities to learn from each other, share student experiences and develop collaborative proposals.
Extension educators increased reach to underserved populations by 1) forming partnerships with local groups serving minorities and low-income individuals, 2) using targeted marketing outlets, 3) hosting meetings in neighborhoods and centers frequented by these target populations, 4) providing accommodations for those with handicaps or limited financial means, or 5) using multiple media outlets to publicize events open to the public.
4-H Youth Development 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. We also successfully implemented via USDA/NIFA and National 4-H Council grant funding, new 4-H program efforts designed specifically for underrepresented youth in Ft. Wayne, Lafayette and Indianapolis.
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 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 that would complement the ongoing work of Extension. In addition, the Dean's Advisory Council and a selected group of industry leaders were solicited for their input on priorities for research and 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). A new process providing Indiana communities with data-driven, expertly supported plans for positive, sustainable change. HCI assists Indiana communities of 25,000 or fewer people who want to develop a new generation of local leaders, grow small businesses and entrepreneurs, to enhance community design and public spaces. Almost a dozen communities, selected from submitted proposals, are in process to develop positive, lasting impact. Some HCI communities are also involved in Stronger Economies Together, a U.S. Department of Agriculture Rural Development program emphasizing regional economic development. The College of Agriculture rolled out its 2016-2020 Strategic Plan. 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 27 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.

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. These surveys are being expanded in 2016-2020.

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, 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. Based on the initiatives, Extension has funded 12 team-led projects that are described in the Plan Overview

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 were incorporated into the College of Agriculture 2016-2020 Strategic Plan that includes 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. The College of Veterinary Medicine also completed a strategic plan in 2015 and received stakeholder input from around the state. We will further incorporate any and all stakeholder input and blend it with our three college efforts to generate the Plan of Work.

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.
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.
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.
Educating Indiana's agricultural producers and professionals. Building on its foundation of face-to-face instruction for Indiana farmers, Purdue Extension is broadening and deepening knowledge of production agriculture across the industry. Fertilizer and chemical dealers, crop consultants, seed company agronomists, and other employees of Midwestern agriculture businesses, cooperatives, and corporations rely on ANR (Agriculture and Natural Resources) Extension educators for crop production and pest management recommendations to help make sound business decision for their farm and the environment.
The Center for Commercial Agriculture plays a key role in providing management education for the farmers in the business of producing the world's agricultural products, informed by global and science-based knowledge and trends, but with impact for stakeholders in their local setting. They will continue in their pivotal role of providing guidance and interpretation of the 2014 Farm Bill to affected stakeholders.
Farm Financial Suite for Managing Tight Margins Initiative: Develop a suite of financial tools for statewide implementation that can help farmers analyze multiple aspects of their financial portfolio, comprehensively evaluate options to weather volatile or challenging financial times, and develop and promote the sustainability of Indiana's farm businesses.
Confined Animal Feeding Operations (CAFOs) Update: Continue to lead the way in research for consumers, producers, and community leaders to make well-informed decisions regarding issues that may coincide with expanding Indiana's animal agriculture.

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.
We will continue to develop applications that puts information into the hands of our farmers where they work--in the field. Agriculture has gone through waves of productivity increases in the past; datafication is now one of the primary drivers of that increase which will help solve food security challenges and help translate data into actionable insights. Datafication, defined by Mayer-Schönberger and Cukier as the ability to quantify all sorts of information into machine-readable data format. This data originating from various sources can be more easily shared and processed the full potential of datafication in farming is contingent upon shortcomings regarding data privacy (data protection), data quality, and data ownership being addressed.
The 2014 Farm Bill has been described as a sweeping overhaul of agricultural policy and ushered in significant changes for farmers. It eliminated direct support payments and replaced them with new, insurance-based programs for many important commodities in our state. Farmers needed to make long and short term planting decision based on this Farm Bill. Extension educators and specialists will continue to develop workshops and provide one-on-one guidance to farmers who had a short time frame to make decisions with this new information.
Corn producers continued to have record setting productivity, which helped offset declining farmland values in Indiana. The Purdue Agricultural Economics report for August of 2015 reported that all qualities of farmland declined across the state. Top, average, and poor quality farmland declined by 5.1%, 3.8%, and 4.8%, respectively. Top, average, and poor farm land quality had a per acre value of $9,266, $7,672, and $5,863, respectively. This is the first time since 2009 that all three farmland quality classes declined. The high crop prices shouldn't reduce credit options for most farms, 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
- The public will impact the entire value chain regarding perceived animal health and welfare

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
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
2021	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 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	GF 1.2 - # Of improved animal genetics
2	GF 1.3 - # Of increased efficiencies (i.e.. (% pregnant), or increases in yield/unit (bushels/acre; lbs. product (meat, protein, milk) per animal ; lbs. feed per gain).
3	ANR-S - ANR Div Ag # of farmers/food producers who learn about available assistance
4	GF 2.1 - # New or improved innovations developed for food enterprises
5	GF 2.4 - # Producers (and other members of the food supply chain) that have increased revenue
6	GF 2.6 - # New diagnostic technologies
7	GF 2.11 - # Acres that incorporate ecosystem services and/or biodiversity considerations
8	ANR-S - Farm & Ag Mgmt - # of farms informed about succession planning
9	ANR-S - Field Crops - # of participants informed about agronomic issues
10	ANR-S - Livestock - # of participants informed about livestock management practices
11	ANR-M - Field Crops - # of participants who self-report that they adopted a recommended practice for their operation
12	ANR-S - Field Crops - # of participants informed about crop production issues
13	GF 2.3 - # Innovations adopted in food enterprises including production, allied services, processing, and distribution
14	ANR-S - Div Ag - # of people who learned about role of diversified agriculture in a local food system

Outcome # 1

1. Outcome Target

GF 1.2 - # Of improved animal genetics

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 315 - Animal Welfare/Well-Being and Protection
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 307 - Animal Management Systems
- 305 - Animal Physiological Processes
- 304 - Animal Genome

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

GF 1.3 - # Of increased efficiencies (i.e.. (% pregnant), or increases in yield/unit (bushels/acre; lbs. product (meat, protein, milk) per animal ; lbs. feed per gain).

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management
- 307 - Animal Management Systems
- 206 - Basic Plant Biology
- 304 - Animal Genome
- 302 - Nutrient Utilization in Animals
- 805 - Community Institutions and Social Services
- 802 - Human Development and Family Well-Being
- 801 - Individual and Family Resource Management
- 608 - Community Resource Planning and Development
- 205 - Plant Management Systems
- 512 - Quality Maintenance in Storing and Marketing Non-Food Products
- 305 - Animal Physiological Processes

- 606 - International Trade and Development Economics
- 402 - Engineering Systems and Equipment
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 604 - Marketing and Distribution Practices
- 315 - Animal Welfare/Well-Being and Protection
- 502 - New and Improved Food Products
- 102 - Soil, Plant, Water, Nutrient Relationships
- 501 - New and Improved Food Processing Technologies

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

ANR-S - ANR Div Ag # of farmers/food producers who learn about available assistance

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 206 - Basic Plant Biology
- 601 - Economics of Agricultural Production and Farm Management
- 501 - New and Improved Food Processing Technologies
- 606 - International Trade and Development Economics
- 307 - Animal Management Systems
- 512 - Quality Maintenance in Storing and Marketing Non-Food Products
- 801 - Individual and Family Resource Management
- 604 - Marketing and Distribution Practices
- 315 - Animal Welfare/Well-Being and Protection
- 502 - New and Improved Food Products
- 805 - Community Institutions and Social Services
- 305 - Animal Physiological Processes
- 802 - Human Development and Family Well-Being
- 304 - Animal Genome
- 102 - Soil, Plant, Water, Nutrient Relationships
- 608 - Community Resource Planning and Development
- 302 - Nutrient Utilization in Animals

- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 402 - Engineering Systems and Equipment

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 4

1. Outcome Target

GF 2.1 - # New or improved innovations developed for food enterprises

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 5

1. Outcome Target

GF 2.4 - # Producers (and other members of the food supply chain) that have increased revenue

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 6

1. Outcome Target

GF 2.6 - # New diagnostic technologies

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 7

1. Outcome Target

GF 2.11 - # Acres that incorporate ecosystem services and/or biodiversity considerations

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 8

1. Outcome Target

ANR-S - Farm & Ag Mgmt - # of farms informed about succession planning

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management
- 102 - Soil, Plant, Water, Nutrient Relationships
- 205 - Plant Management Systems
- 802 - Human Development and Family Well-Being

- 502 - New and Improved Food Products
- 606 - International Trade and Development Economics
- 315 - Animal Welfare/Well-Being and Protection
- 805 - Community Institutions and Social Services
- 608 - Community Resource Planning and Development
- 604 - Marketing and Distribution Practices
- 512 - Quality Maintenance in Storing and Marketing Non-Food Products
- 801 - Individual and Family Resource Management
- 501 - New and Improved Food Processing Technologies
- 307 - Animal Management Systems
- 402 - Engineering Systems and Equipment

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 9

1. Outcome Target

ANR-S - Field Crops - # of participants informed about agronomic issues

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 601 - Economics of Agricultural Production and Farm Management
- 205 - Plant Management Systems
- 501 - New and Improved Food Processing Technologies
- 102 - Soil, Plant, Water, Nutrient Relationships
- 512 - Quality Maintenance in Storing and Marketing Non-Food Products
- 302 - Nutrient Utilization in Animals
- 402 - Engineering Systems and Equipment
- 608 - Community Resource Planning and Development
- 315 - Animal Welfare/Well-Being and Protection
- 802 - Human Development and Family Well-Being
- 604 - Marketing and Distribution Practices
- 206 - Basic Plant Biology
- 606 - International Trade and Development Economics

- 502 - New and Improved Food Products
- 805 - Community Institutions and Social Services
- 307 - Animal Management Systems

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 10

1. Outcome Target

ANR-S - Livestock - # of participants informed about livestock management practices

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 604 - Marketing and Distribution Practices
- 315 - Animal Welfare/Well-Being and Protection
- 304 - Animal Genome
- 302 - Nutrient Utilization in Animals
- 307 - Animal Management Systems
- 305 - Animal Physiological Processes
- 601 - Economics of Agricultural Production and Farm Management

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 11

1. Outcome Target

ANR-M - Field Crops - # of participants who self-report that they adopted a recommended practice for their operation

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 307 - Animal Management Systems
- 802 - Human Development and Family Well-Being
- 402 - Engineering Systems and Equipment
- 801 - Individual and Family Resource Management
- 606 - International Trade and Development Economics
- 608 - Community Resource Planning and Development
- 805 - Community Institutions and Social Services
- 512 - Quality Maintenance in Storing and Marketing Non-Food Products
- 315 - Animal Welfare/Well-Being and Protection
- 302 - Nutrient Utilization in Animals
- 502 - New and Improved Food Products
- 601 - Economics of Agricultural Production and Farm Management
- 604 - Marketing and Distribution Practices
- 501 - New and Improved Food Processing Technologies
- 205 - Plant Management Systems

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 12

1. Outcome Target

ANR-S - Field Crops - # of participants informed about crop production issues

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 302 - Nutrient Utilization in Animals
- 606 - International Trade and Development Economics
- 502 - New and Improved Food Products
- 402 - Engineering Systems and Equipment
- 512 - Quality Maintenance in Storing and Marketing Non-Food Products
- 604 - Marketing and Distribution Practices
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 601 - Economics of Agricultural Production and Farm Management
- 206 - Basic Plant Biology
- 205 - Plant Management Systems
- 102 - Soil, Plant, Water, Nutrient Relationships

- 501 - New and Improved Food Processing Technologies

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 13

1. Outcome Target

GF 2.3 - # Innovations adopted in food enterprises including production, allied services, processing, and distribution

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 805 - Community Institutions and Social Services
- 512 - Quality Maintenance in Storing and Marketing Non-Food Products
- 801 - Individual and Family Resource Management
- 601 - Economics of Agricultural Production and Farm Management
- 802 - Human Development and Family Well-Being
- 502 - New and Improved Food Products
- 606 - International Trade and Development Economics
- 604 - Marketing and Distribution Practices
- 501 - New and Improved Food Processing Technologies
- 608 - Community Resource Planning and Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 14

1. Outcome Target

ANR-S - Div Ag - # of people who learned about role of diversified agriculture in a local food system

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 805 - Community Institutions and Social Services
- 802 - Human Development and Family Well-Being
- 307 - Animal Management Systems
- 608 - Community Resource Planning and Development
- 102 - Soil, Plant, Water, Nutrient Relationships
- 402 - Engineering Systems and Equipment
- 315 - Animal Welfare/Well-Being and Protection
- 502 - New and Improved Food Products
- 601 - Economics of Agricultural Production and Farm Management
- 205 - Plant Management Systems
- 512 - Quality Maintenance in Storing and Marketing Non-Food Products
- 606 - International Trade and Development Economics
- 302 - Nutrient Utilization in Animals
- 604 - Marketing and Distribution Practices
- 801 - Individual and Family Resource Management

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

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. 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.
Over the years, attention to the climate cycle has put the spotlight on the actions, values and systems that would not have otherwise been examined without these shifts in temperature and weather patterns. Our researchers and extension staff are exploring a full range of scenarios that can contribute to or mitigate climate change impacts.
One key concept is crop resiliency in the face of climate change. In the U.S., agricultural crops contribute about $150 billion annually, most of which comes from the intensely cultivated Midwest. The viability of this industry is affected by increasingly variable climate patterns. Researchers are working with farmers to improve the resilience and profitability of farms amid variable climate changes by providing stakeholders with better decision support tools (DSTs), such as predictive climate models, delivered more effectively. Research is being produced on the biophysical and economic impacts of different climate scenarios on corn and soybean yields and conduct complementary research to understand how producers and advisors are likely to use this information.

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	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:

- developing decision support tools and training materials to deliver climate information to our various stakeholders
- leverage tools such as HubZero as mechanisms for collecting and sharing information to a wide range of stakeholders
- 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
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
2021	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 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	CC 1.2 - # Current year climate relevant education programs
2	CC 1.3 - # Current year climate relevant research programs
3	CC 1.6 - # New assessment and management tools developed, including models and measurements of greenhouse gas emissions
4	CC 1.7 - # Climate relevant social media products, web-based products and communication tools
5	CC 1.8 - # New climate relevant databases, monitoring systems, and inventories managed or under development
6	NRE 1.16 - # Projects that incorporate ecosystem services and/or biodiversity considerations

Outcome # 1

1. Outcome Target

CC 1.2 - # Current year climate relevant education programs

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

CC 1.3 - # Current year climate relevant research programs

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 610 - Domestic Policy Analysis
- 135 - Aquatic and Terrestrial Wildlife
- 123 - Management and Sustainability of Forest Resources
- 605 - Natural Resource and Environmental Economics
- 112 - Watershed Protection and Management
- 102 - Soil, Plant, Water, Nutrient Relationships

- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 306 - Environmental Stress in Animals
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 213 - Weeds Affecting Plants
- 132 - Weather and Climate
- 212 - Diseases and Nematodes Affecting Plants

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

CC 1.6 - # New assessment and management tools developed, including models and measurements of greenhouse gas emissions

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 4

1. Outcome Target

CC 1.7 - # Climate relevant social media products, web-based products and communication tools

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 5

1. Outcome Target

CC 1.8 - # New climate relevant databases, monitoring systems, and inventories managed or under development

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 610 - Domestic Policy Analysis
- 112 - Watershed Protection and Management
- 132 - Weather and Climate
- 123 - Management and Sustainability of Forest Resources
- 213 - Weeds Affecting Plants

- 212 - Diseases and Nematodes Affecting Plants
- 135 - Aquatic and Terrestrial Wildlife
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 605 - Natural Resource and Environmental Economics
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 102 - Soil, Plant, Water, Nutrient Relationships
- 306 - Environmental Stress in Animals

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 6

1. Outcome Target

NRE 1.16 - # Projects that incorporate ecosystem services and/or biodiversity considerations

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

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

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 bio-economy 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.
The USDA's Rural Energy for America Program (REAP) remains a pivotal program for impacting energy use on farms. Purdue's extension teams will continue strengthening the auditing efforts required of producers that are applying for REAP grants or seeking rebates and incentives from utility companies. 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 : 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	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 it is important to continue exploring sustainable and alternative energy sources to be poised with solutions when prices rebound. In addition, researchers continue to explore ways to make co-products that can increase the value from a biofuel crop. 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.
Crude oil prices will dominate the economic incentives for transitioning to a biofuel economy. There will be a lag in transitioning as long as crude oil prices remain low or until policies or regulations demands use of fuels from alternative sources.

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
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
2021	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 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	SE 5.4 - # Alternative uses of feedstock identified
2	SE 4.4 - # New production/logistic practices developed
3	SE 4.1 - # New technologies developed
4	SE 5.1 - # Decision tools available

Outcome # 1

1. Outcome Target

SE 5.4 - # Alternative uses of feedstock identified

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 610 - Domestic Policy Analysis
- 605 - Natural Resource and Environmental Economics
- 511 - New and Improved Non-Food Products and Processes
- 402 - Engineering Systems and Equipment
- 204 - Plant Product Quality and Utility (Preharvest)
- 213 - Weeds Affecting Plants
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 131 - Alternative Uses of Land

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

SE 4.4 - # New production/logistic practices developed

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

SE 4.1 - # New technologies developed

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 4

1. Outcome Target

SE 5.1 - # Decision tools available

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 610 - Domestic Policy Analysis
- 216 - Integrated Pest Management Systems

- 402 - Engineering Systems and Equipment
- 213 - Weeds Affecting Plants
- 131 - Alternative Uses of Land
- 605 - Natural Resource and Environmental Economics
- 204 - Plant Product Quality and Utility (Preharvest)
- 511 - New and Improved Non-Food Products and Processes
- 102 - Soil, Plant, Water, Nutrient Relationships
- 201 - Plant Genome, Genetics, and Genetic Mechanisms

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 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

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.
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.
Purdue will play a pivotal role in the roll-out of the Food Safety Modernization Act (FSMA). The state of Indiana requires that at least one food handler at a food establishment must be a certified food handler who has passed an examination by an ANSI-CFP program, such as ServSafe, Prometric or NRFSP. The Purdue Extension Service educators' will continue to provide the training and proctor the exam for food service employees to have food handler certification. Using the National Restaurant Association's ServSafe® curriculum and partnering with the Indiana Restaurant Association hundreds of food service employees are certified or re-certified in food handler certification annually in Indiana.
The Purdue ANR Extension Good Agricultural Practices (GAPS) program teaches principles of on-farm safety to fruit and vegetable growers while maintaining consumer confidence in Indiana produce. Extension's Food Safety Educator and one of its Vegetable Specialists lead a team offering in-person and online workshops to help producers meet safety regulations. Extension also co-publishes Food Safety for Fruit and Vegetable Farms which addresses prevention of foodborne illness outbreaks at all crop stages. Indiana residents are actively engaged in the local foods conversation which opens them up to food safety issues if not properly trained in food handling procedures. Extension will continue to develop programs as the need arises such as how to properly field dress, store, preserve and handle venison. These programs not only reduce the potential food safety issues but introduces extension programs to new audiences.

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.
Passage of FSMA will impact the entire food chain, especially growers regardless of size. Implementing FSMA on-the-ground will be a long-term collaborative effort among Indiana's food agencies, extension, researchers, and the food value chain. Purdue is working with this diverse group to identify the types of information, training and one-on-one support needed to efficiently and effectively implement these requirements.

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.
FSMA will have a significant impact on the value chain economically. While it should reduce negative impacts associated with food safety, it could also impact the local foods market if programs aren't developed that allow small and entry level growers to meet the requirements in economically sustainable ways.

2. Ultimate goal(s) of this Program

The overall goal of this program is to improve food safety and confidence in the safety of Indiana's food supply by integrating 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
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
2021	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
- ServSafe training
- Good Agricultural Practices (GAPS)
- 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

Commercial and local foods producers, including 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 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	FS 1.1 - # Viable technologies developed or modified for detection and characterization of food supply contamination from foodborne threats
2	FS 1.2 - # Viable prevention, control and intervention strategies for all food production scales for foodborne threats along the food production continuum
3	FS 3.2 - # Food handlers receiving food safety training and education in safe food handling practices

Outcome # 1

1. Outcome Target

FS 1.1 - # Viable technologies developed or modified for detection and characterization of food supply contamination from foodborne threats

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 501 - New and Improved Food Processing Technologies
- 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
- 503 - Quality Maintenance in Storing and Marketing Food Products
- 504 - Home and Commercial Food Service

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

FS 1.2 - # Viable prevention, control and intervention strategies for all food production scales for foodborne threats along the food production continuum

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
- 701 - Nutrient Composition of Food
- 501 - New and Improved Food Processing Technologies
- 703 - Nutrition Education and Behavior
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
- 204 - Plant Product Quality and Utility (Preharvest)
- 503 - Quality Maintenance in Storing and Marketing Food Products
- 702 - Requirements and Function of Nutrients and Other Food Components

- 504 - Home and Commercial Food Service

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

FS 3.2 - # Food handlers receiving food safety training and education in safe 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
- 503 - Quality Maintenance in Storing and Marketing Food Products
- 504 - Home and Commercial Food Service
- 703 - Nutrition Education and Behavior
- 501 - New and Improved Food Processing Technologies

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

Reduce human obesity across Indiana through community-based programs. Childhood obesity is a growing problem in our nation. We will enhance community health coalitions that can help Hoosiers--adults and children-- reduce obesity, make healthy food choices, and increase physical activity. Purdue human nutrition and human health programs focus on the impact of dietary intake and exercise on human health. 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. Caregivers are a critical influence on childhood eating and exercising behaviors and should be part of the solution for reducing childhood obesity.

2. Ultimate goal(s) of this Program

The overall goal of this program is improve the health of our children and reduce childhood obesity in Indiana by integrating our research, outreach, and educational efforts 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
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
2021	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 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	CO 3.3 - # Of discoveries, innovations, technologies that relate to how food is enhanced, processed, or prepared that impacts childhood obesity (including sensory qualities)
2	CO 4 - # Of discoveries, innovations, technologies that relate to understanding the causes of childhood obesity
3	# of youth understand the benefits of physical activity
4	# of youth reduce sedentary activity

Outcome # 1

1. Outcome Target

CO 3.3 - # Of discoveries, innovations, technologies that relate to how food is enhanced, processed, or prepared that impacts childhood obesity (including sensory qualities)

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 701 - Nutrient Composition of Food
- 610 - Domestic Policy Analysis
- 703 - Nutrition Education and Behavior
- 702 - Requirements and Function of Nutrients and Other Food Components
- 502 - New and Improved Food Products
- 607 - Consumer Economics
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

CO 4 - # Of discoveries, innovations, technologies that relate to understanding the causes of childhood obesity

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 701 - Nutrient Composition of Food
- 806 - Youth Development
- 702 - Requirements and Function of Nutrients and Other Food Components
- 607 - Consumer Economics
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 502 - New and Improved Food Products
- 610 - Domestic Policy Analysis
- 703 - Nutrition Education and Behavior

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

# of youth understand the benefits of physical activity

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 701 - Nutrient Composition of Food
- 806 - Youth Development
- 703 - Nutrition Education and Behavior
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 610 - Domestic Policy Analysis
- 502 - New and Improved Food Products
- 607 - Consumer Economics
- 702 - Requirements and Function of Nutrients and Other Food Components

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 4

1. Outcome Target

# of youth reduce sedentary activity

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 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

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 U.S., 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. 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.
Hometown Collaboration Initiative (HCI) A new process providing Indiana communities with data-driven, expertly supported plans for positive, sustainable change. HCI assists Indiana communities of 25,000 or fewer people who want to develop a new generation of local leaders, grow small businesses and entrepreneurs, to enhance community design and public spaces. Almost a dozen communities, selected from submitted proposals, are in process to develop positive, lasting impact. Some HCI communities are also involved in Stronger Economies Together, a U.S. Department of Agriculture Rural Development program emphasizing regional economic development.

- Broadband Advancement Initiatives: Strengthen the capacity of local governments and small businesses, especially in underserved communities, to apply broadband strategies (or "e-Strategies") to help community members investigate job opportunities, gain new career skills, access government services, obtain health information, or learn new information that can enrich their lives.
- Strengthening the Workforce: A curriculum designed to teach life skills (or soft skills) to 9th- through 12th-graders and adults of college age or older, with multiple lessons that can be offered alone or combined as a comprehensive series.

Building Local Foods The Rebuilding Your Local Food System program aims to expand this economic potential by helping communities strategically increase the production, distribution, and sales of local foods. Initially in 2 pilot communities, and now an additional 5, community leaders are working through the process of identifying useful community assets, touring examples of successful food systems, engaging with experts, and creating professional networks. These groups of leaders have gained a better understanding of local food systems, essential factors for their success, ways to improve or rebuild processes, and hot eh benefits transcend dollars.

- Market Basket 360: Develop a website hub that centralizes materials necessary to successfully start, sustain, market, and educate the public about farmers' markets.
- Urban Agriculture Training Initiatives: Education about food production, business planning, and social capital development for urban and small farmers, self-reliant backyard growers, and community farm and garden leaders.

Community Leadership program A new certificate program involves 44 hours of interactive educational opportunities to enable people to learn about themselves, their community and their leadership role within it. The focus is on expanding the leadership base of people who will assume active roles in the community, establishing strong community networks among participants and community leaders, encouraging community volunteerism and service, and creating a network of people to share creative

ideas and promote community action. An initial pilot community has begun and more communities will be taking this on.

Master Gardener Leadership program Certified Master Gardeners can now participate in a 5-week leadership development training to learn about the nature of leadership, interpersonal communication skills, working with others, serving on boards and committees, running effective meetings, conflict management, and more. After training, participants regularly report a stronger inclination to get involved and greater confidence in assuming leadership roles.

Enhancing the Value of Public Spaces This new program uses a community capitals framework and the appreciate inquiry process to demonstrate how high quality public spaces improve a community's quality of place and create a comprehensive action plan. The community workshop forums bring together leadership, stakeholders and decision makers to provide input into crafting the high quality action plan with Purdue Extension providing technical assistance. Five pilot communities have groups of leaders in place working through this 3- to 6-month process with another 7 communities just beginning. The program is helping leaders and stakeholders develop and build efforts to accomplish projects to improve their communities.

Health Coalitions Health coalitions are leading the charge for community health. Indiana's community health coalitions are thriving today with the invaluable partnership with Purdue Extension. A growing number of county-based coalitions is influencing positive health policy, improving healthcare access, and establishing wellness programs. Extension's Health Coalition Capacity Build Team gives Educators necessary skills to build coalitions, develop coalition coaches and awareness, and help coaches reach out to communities. Now, nearly 50 Indiana counties (and counting) have a structure to identify local healthcare priorities and implement effective solutions. These efforts are building networks and training stakeholders and leaders to address priority community health issues.

The Nature of Health Initiative: Engaging families in nature-learning opportunities and providing a train-the-trainer program for teachers on the importance of outdoor learning.

Get Walkin' Initiative: An email-based reminder program meant to encourage community-wide walking, with messages of self-efficacy, social support, and goal-setting with the intent to increase walking among Indiana residents.

Strengthening families and building effective parenting skills are key issues for Indiana as many continue to face challenges related to financial concerns, health issues, and the need to build positive relationships inside and outside the family. These challenges impede healthy family functioning and decision making. Research and extension programs addressing topics such as positive communication and connectedness, effective parenting skills, childcare, building self-esteem, managing stress, basic money management, and planning for the future will assist families in dealing with these challenges.

Co-Parenting and Strengthening Families Initiative: Skills programs for divorcing, separating, or co-parenting individuals that can help them provide respectful, nurturing environments for children, as well as multisession workshops for parents and youth designed to prevent teen substance abuse and other behavior problems.

4-H Teen Leadership 4-H is building an emphasis on teens as teachers. A couple programs have targeted teaching bio-technology and animal bio-security, along with ongoing camp counselor training, to focus on nurturing positive development and leadership skills in youth. These young leaders are given training in leadership, communication, personalities, learning styles, youth development, and team building. This is often paired with Science or STEM and Healthy Living concepts and education. Indiana 4-H Youth Development Spark Clubs: Special topic clubs intentionally designed as short-term experiences to "spark" an interest in Indiana 4-H both for new youth and new adult volunteers.

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.
• Growth in local foods markets will drive generate new policies, guidelines, food safety issues, create market entry barriers and opportunities

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
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
2021	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, commercial and individual producers in the local foods value chain.

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 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	# of youth demonstrate their ability to work effectively in teams
2	# of youth express interest and be engaged in Science related activities
3	# of youth demonstrate a capacity for science process skills
4	# of youth demonstrate leadership efficacy
5	# of key stakeholders engaged and active in community and economic development locally, countywide and regionally
6	NC - # of participants reporting new leadership roles and opportunities undertaken
7	NC - $ value of grants and resources leveraged/generated by communities
8	# of food councils and institutes created to promote practical food systems policies
9	# of participants adopted one or more practices to improve food choices and/or activity levels
10	# of childcare providers who reported adoption of recommended practices for math, science and vocabulary development in children
11	# of childcare providers who reported intention to adopt best practices for nutrition education activities with children, parents, families
12	# of childcare providers reported ability to apply strategies to improve quality of early childhood classrooms
13	# of participants reported plans to apply money management strategies to their personal finances
14	# youth made changes in knowledge and behavior about financial literacy
15	# of participants evaluating new business ventures
16	# of discoveries that relate to human nutrition and chronic conditions
17	# of discoveries that relate to human health
18	# of discoveries that relate to human nutrition and well-being
19	# of technologies that relate to human nutrition and well-being

Outcome # 1

1. Outcome Target

# of youth demonstrate their ability to work effectively in teams

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development
- 805 - Community Institutions and Social Services
- 802 - Human Development and Family Well-Being
- 608 - Community Resource Planning and Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

# of youth express interest and be engaged in Science related activities

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

# of youth demonstrate a capacity for science process skills

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 4

1. Outcome Target

# of youth demonstrate leadership efficacy

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 5

1. Outcome Target

# of key stakeholders engaged and active in community and economic development locally, countywide and regionally

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 611 - Foreign Policy and Programs
- 608 - Community Resource Planning and Development
- 806 - Youth Development
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
- 805 - Community Institutions and Social Services
- 803 - Sociological and Technological Change Affecting Individuals, Families, and Communities
- 802 - Human Development and Family Well-Being

- 610 - Domestic Policy Analysis
- 801 - Individual and Family Resource Management

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 6

1. Outcome Target

NC - # of participants reporting new leadership roles and opportunities undertaken

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 7

1. Outcome Target

NC - $ value of grants and resources leveraged/generated by communities

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 608 - Community Resource Planning and Development
- 803 - Sociological and Technological Change Affecting Individuals, Families, and Communities
- 805 - Community Institutions and Social Services

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 8

1. Outcome Target

# of food councils and institutes created to promote practical food systems policies

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 9

1. Outcome Target

# of participants adopted one or more practices to improve food choices and/or activity levels

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being
- 701 - Nutrient Composition of Food
- 801 - Individual and Family Resource Management
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
- 703 - Nutrition Education and Behavior
- 702 - Requirements and Function of Nutrients and Other Food Components

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 10

1. Outcome Target

# of childcare providers who reported adoption of recommended practices for math, science and vocabulary development in children

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being
- 701 - Nutrient Composition of Food
- 703 - Nutrition Education and Behavior
- 801 - Individual and Family Resource Management
- 806 - Youth Development
- 805 - Community Institutions and Social Services

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 11

1. Outcome Target

# of childcare providers who reported intention to adopt best practices for nutrition education activities with children, parents, families

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management
- 701 - Nutrient Composition of Food
- 703 - Nutrition Education and Behavior
- 702 - Requirements and Function of Nutrients and Other Food Components
- 806 - Youth Development
- 802 - Human Development and Family Well-Being
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
- 608 - Community Resource Planning and Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 12

1. Outcome Target

# of childcare providers reported ability to apply strategies to improve quality of early childhood classrooms

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 608 - Community Resource Planning and Development
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 13

1. Outcome Target

# of participants reported plans to apply money management strategies to their personal finances

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 14

1. Outcome Target

youth made changes in knowledge and behavior about financial literacy

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 15

1. Outcome Target

# of participants evaluating new business ventures

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 611 - Foreign Policy and Programs
- 801 - Individual and Family Resource Management
- 805 - Community Institutions and Social Services
- 610 - Domestic Policy Analysis
- 608 - Community Resource Planning and Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 16

1. Outcome Target

# of discoveries that relate to human nutrition and chronic conditions

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 702 - Requirements and Function of Nutrients and Other Food Components
- 805 - Community Institutions and Social Services
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 701 - Nutrient Composition of Food
- 802 - Human Development and Family Well-Being
- 703 - Nutrition Education and Behavior
- 721 - Insects and Other Pests Affecting Humans
- 723 - Hazards to Human Health and Safety
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 17

1. Outcome Target

# of discoveries that relate to human health

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 803 - Sociological and Technological Change Affecting Individuals, Families, and Communities
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 702 - Requirements and Function of Nutrients and Other Food Components
- 711 - Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
- 723 - Hazards to Human Health and Safety
- 701 - Nutrient Composition of Food
- 802 - Human Development and Family Well-Being
- 805 - Community Institutions and Social Services
- 801 - Individual and Family Resource Management
- 721 - Insects and Other Pests Affecting Humans

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 18

1. Outcome Target

# of discoveries that relate to human nutrition and well-being

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 19

1. Outcome Target

# of technologies that relate to human nutrition and well-being

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 803 - Sociological and Technological Change Affecting Individuals, Families, and Communities
- 806 - Youth Development
- 802 - Human Development and Family Well-Being
- 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

{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. 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.
Natural Resources Leadership Program: Localized curriculum and training that can aid communities in decision-making, leadership development, and action-planning to address complex natural resource management and land-use planning issues.

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
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
2021	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 consultations
- 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	NRE 1.2 - # New relevant databases, monitoring systems, and inventories managed or under development
2	NRE 1.11 - # New production/logistic practices developed and tested
3	NRE 1.8 - # Relevant social media products, web-based products and communication tools
4	NRE 1.3 - # Viable technologies developed or modified for detection and characterization
5	NRE 1.4 - # Viable prevention, control and intervention strategies
6	NRE 1.15 - # Projects characterizing social, economic, and/or cultural practices
7	NRE 1.6 - # New diagnostic technologies
8	# new discoveries of species/cultivars for sustainable systems

Outcome # 1

1. Outcome Target

NRE 1.2 - # New relevant databases, monitoring systems, and inventories managed or under development

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 133 - Pollution Prevention and Mitigation
- 104 - Protect Soil from Harmful Effects of Natural Elements
- 102 - Soil, Plant, Water, Nutrient Relationships
- 112 - Watershed Protection and Management
- 111 - Conservation and Efficient Use of Water
- 132 - Weather and Climate
- 131 - Alternative Uses of Land
- 125 - Agroforestry
- 121 - Management of Range Resources
- 123 - Management and Sustainability of Forest Resources
- 135 - Aquatic and Terrestrial Wildlife
- 101 - Appraisal of Soil Resources

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

NRE 1.11 - # New production/logistic practices developed and tested

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 104 - Protect Soil from Harmful Effects of Natural Elements
- 132 - Weather and Climate
- 111 - Conservation and Efficient Use of Water
- 133 - Pollution Prevention and Mitigation
- 121 - Management of Range Resources

- 125 - Agroforestry
- 102 - Soil, Plant, Water, Nutrient Relationships
- 112 - Watershed Protection and Management
- 135 - Aquatic and Terrestrial Wildlife
- 123 - Management and Sustainability of Forest Resources
- 131 - Alternative Uses of Land
- 101 - Appraisal of Soil Resources

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

NRE 1.8 - # Relevant social media products, web-based products and communication tools

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 131 - Alternative Uses of Land
- 123 - Management and Sustainability of Forest Resources
- 121 - Management of Range Resources
- 104 - Protect Soil from Harmful Effects of Natural Elements
- 135 - Aquatic and Terrestrial Wildlife
- 125 - Agroforestry
- 133 - Pollution Prevention and Mitigation
- 112 - Watershed Protection and Management
- 102 - Soil, Plant, Water, Nutrient Relationships
- 101 - Appraisal of Soil Resources
- 111 - Conservation and Efficient Use of Water
- 132 - Weather and Climate

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 4

1. Outcome Target

NRE 1.3 - # Viable technologies developed or modified for detection and characterization

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 104 - Protect Soil from Harmful Effects of Natural Elements
- 101 - Appraisal of Soil Resources
- 111 - Conservation and Efficient Use of Water
- 125 - Agroforestry
- 133 - Pollution Prevention and Mitigation
- 132 - Weather and Climate
- 112 - Watershed Protection and Management
- 135 - Aquatic and Terrestrial Wildlife
- 123 - Management and Sustainability of Forest Resources
- 131 - Alternative Uses of Land
- 121 - Management of Range Resources
- 102 - Soil, Plant, Water, Nutrient Relationships

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 5

1. Outcome Target

NRE 1.4 - # Viable prevention, control and intervention strategies

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

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

- 104 - Protect Soil from Harmful Effects of Natural Elements
- 102 - Soil, Plant, Water, Nutrient Relationships
- 131 - Alternative Uses of Land
- 101 - Appraisal of Soil Resources
- 123 - Management and Sustainability of Forest Resources
- 121 - Management of Range Resources

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 6

1. Outcome Target

NRE 1.15 - # Projects characterizing social, economic, and/or cultural practices

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 131 - Alternative Uses of Land
- 121 - Management of Range Resources
- 132 - Weather and Climate
- 104 - Protect Soil from Harmful Effects of Natural Elements
- 101 - Appraisal of Soil Resources
- 123 - Management and Sustainability of Forest Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 133 - Pollution Prevention and Mitigation
- 135 - Aquatic and Terrestrial Wildlife
- 125 - Agroforestry
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 7

1. Outcome Target

NRE 1.6 - # New diagnostic technologies

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 123 - Management and Sustainability of Forest Resources
- 101 - Appraisal of Soil Resources
- 125 - Agroforestry
- 112 - Watershed Protection and Management
- 131 - Alternative Uses of Land
- 133 - Pollution Prevention and Mitigation
- 135 - Aquatic and Terrestrial Wildlife
- 111 - Conservation and Efficient Use of Water
- 104 - Protect Soil from Harmful Effects of Natural Elements
- 132 - Weather and Climate
- 121 - Management of Range Resources

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 8

1. Outcome Target

new discoveries of species/cultivars for sustainable systems

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 121 - Management of Range Resources
- 104 - Protect Soil from Harmful Effects of Natural Elements
- 101 - Appraisal of Soil Resources
- 111 - Conservation and Efficient Use of Water
- 133 - Pollution Prevention and Mitigation

- 112 - Watershed Protection and Management
- 131 - Alternative Uses of Land
- 125 - Agroforestry
- 123 - Management and Sustainability of Forest Resources
- 135 - Aquatic and Terrestrial Wildlife
- 132 - Weather and Climate

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

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.