2016 University of Illinois Combined Research and Extension Plan of Work

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I. Plan Overview

1. Brief Summary about Plan Of Work

The College of Agricultural, Consumer and Environmental Sciences [ACES] Strategic Goals

In the coming months and years, the strategies and the methods employed by the College to achieve success will need to be flexible, but the essential goals remain the same: global preeminence in our scholarship and exceptional value to society, especially on issues relevant to Illinois.

ACES will be recognized as the global leader in learning, discovery, and engagement in the most promising areas of scholarship broadly relevant to agricultural, consumer, and environmental sciences. ACES will be acknowledged in Illinois, across America, and around the world for preparing globally-competitive undergraduate, graduate, and mid-career students; for first-class discovery research that is purposefully translated into practice; and as the preferred source of knowledge that informs sound individual and collective decisions, transforms lives, and deepens cooperative relationships.

University of Illinois Extension

The mission of University of Illinois Extension [Extension] is to provide practical, research-based information and educational programs to enable people to improve their lives and communities through learning partnerships that put knowledge to work. The planned programs included in this document describe successful programs that Extension faculty and staff plan to continue in addition to a number of new initiatives that will address the issues facing Illinois residents. These programs will be led by a cadre of new staff who bring new ideas and skills as well as by experienced staff who are committed, knowledgeable, and respected by Extension stakeholders.

Support from Extension stakeholders is critical as Illinois experiences a continuing and significant deficit in the state's fiscal spending. This deficit presents a serious risk to maintaining the scope of programs, participation, and impact. At the time of this document submission, the new governor has recommended a 31.5 percent FY 2016 budget reduction for higher education - a proposal that, if enacted, would cut general revenue funding [GRF] for the University of Illinois by nearly $209 million. In addition, his budget includes a 20 percent decrease in direct appropriations to Extension that include: [1] Dollars to match locally-allocated funds for Extension; [2] Support for 4-H youth programming; and [3] Support for programming in Cook County. University of Illinois Extension stakeholders are engaging legislators to inform them of the value of Extension's educational outreach as they prepare to develop and debate the legislature's state budget proposal.

Extension remains committed to serving both urban and rural areas by offering programs that address critical issues facing Illinois residents and increasing efforts to deliver programs using new technologies. Extension's educational outreach is focused on a healthy society, food security and safety, environmental stewardship, a sustainable and profitable food production and marketing system, and enhancing youth, family, and community wellbeing. Programming in these five areas continues to provide

interdisciplinary opportunities for designing and delivering information to various target audiences and stakeholders and are reflected in the ten planned programs that are described in this 2016-2020 plan of work. University of Illinois Extension's staff members remain committed to and optimistic that this set of planned programs will be accomplished and impact the lives of individuals and communities in important ways.

The 2016 program year will be marked by the second-year of funding eight cross-campus initiatives. Extension provided funding for these initiatives, splitting the overall funding with the Office of the Provost for the eight projects. Depending on state funding, Extension looks forward to sustaining and evaluating this effort designed to: [1] Raise the visibility and relevance of outreach across university units and among stakeholders in the state with the purpose of developing stronger and more meaningful connection with stakeholders; [2] Creating a model for working across campus units to support and expand the university's land-grant mission of outreach; [3] Developing collaborative, change-oriented projects that respond to or address a need evident or identified at the community level; and [4] Fostering or developing outreach from interdisciplinary work. Brief descriptions of these eight initiatives may be found in several of the planned program sections of this document.

The Illinois Agricultural Experiment Station [Office of Research] [IAES]

IAES is administratively assigned to the College of ACES and is a directly reviewed subsidiary for campus budget review purposes. The unit is situated in the Office of Research and manages a portfolio of research projects underwritten by statutory federal and state appropriations, as well as grants and contracts. IAES research encompasses programs in the College of ACES and in other units funded in part through the IAES. These units include the Colleges of Veterinary Medicine, Engineering, Liberal Arts and Sciences, and Law, as well as the Illinois Natural History Survey. The IAES also funds some research with partners in other institutions.

Faculty and staff with research responsibilities in the College of ACES have some percentage of their research appointments in the IAES. In identifying and responding to new opportunities, the IAES plays a leadership role in articulating and interpreting the research efforts of faculty, departments, and programs in the College, in the spirit of the Hatch Act, and aims to catalyze multidisciplinary research focused on agriculture, food, the environment, and communities. The long-term strategic goal of the College of ACES is to undertake new investments in research that are a balance between discovery and application, as well as between long-term and short-term outcomes, to ensure both new knowledge creation and relevance to the state's food, agricultural, environmental, and human interests. The IAES is devoted to mission-oriented outcomes focused primarily on development of a sound and competitive agriculture industry. Research and practical translation of knowledge to solve specific problems for IAES stakeholders enables their continuing competitive advantages. IAES research benefits the nation by applying relevant science to the unique conditions of the State of Illinois, including her soil, climate, ecosystems, and agricultural communities. To produce science that matters, the research portfolio demands strong entrepreneurial motivation, as well as elements that are very responsive to those with a stake in the agricultural and food system. More than ever, our research must respond swiftly to the rapid pace of change in today's era of globalization.

Modifications to the Plan of Work

Due to limited numbers of Extension Educators and the shrinking faculty Extension appointment in Consumer Economics, those activities are now reflected in the Human Health and Human Development planned program section. Extension efforts also include increases in educational outreach via distance technologies and marketing through social media.

Importance of Hatch Funds

The funds provided to support research through the Hatch Act provide basic capacity funding for the State Agricultural Experiment Stations. Hatch funds allow the Illinois Station to fund translational research capacity that allows us to turn discoveries into tools and technologies that farmers, livestock producers, and other stakeholders can use, they support strategic investments in research initiatives of importance to Illinois stakeholders, they enable targeted research efforts balanced between discovery and application as well as between long-term and short-term outcomes, and they provide critical seed funding for faculty research efforts that lead to further competitive and private-sector support. Hatch funds are used to support the seven stations of the **Illinois Research and Education Network** [St. Charles, Brownstown, Dixon Springs, South Farms, Orr, Monmouth, and Shabonna], to support the **Center for Advanced Bioenergy Research** [**CABER**], the **National Soybean Research Laboratory** [**NSRL**], the **Plant Breeding Center**, the **Center for Family Resiliency**, and the **Environmental Change Institute**. They also help fund the ongoing work of the **National Atmospheric Deposition Program** [which has provided measurements of the chemicals in precipitation since 1977], as well as the identification and development of high-yielding biomass crops for sustainable energy production, improvements in crop production through breeding, genetics, and pest management, better stewardship of our forests, watersheds, and other natural resources, progams focusing on human health and development [such as obestity, nutrition, and child development], and work to better insure the availability of a safe and secure food supply for all Americans.

Importance of Smith-Lever Funds

The funds provided to support University of Illinois Extension through the Smith-Lever allocation also provide valuable basic capacity funding to address priority issues that are global, national, and statewide in scope. These dollars create flexibility in accessing the latest information technologies to reach a broad segment of our population through the extensive website presence that Illinois has developed as well as through webinars, online self-paced modules, apps, podcasts, and blogs. At the same time Smith-Lever funding enables access to resources to maintain a staff presence throughout the state essential in meeting the needs of limited resource audiences who need personal supportive interaction in addressing health issues such as child obesity and food security. Smith-Lever funds are also used to ensure that Extension can address these issues through staff support for multi-state activities that include the **Illinois-Indiana Sea Grant Program** and to initiate innovative programs such as the **Master Naturalist** program that enhances an understanding of climate change and its relation to environmental stewardship. These funds also have created capacity resulting in new funds to support ongoing efforts related to safe food production and demonstration of biomass conversion as a viable alternative energy source. The flexibility provided by Smith-Lever funds also allows Extension to continue to support successful grant-funded programs that address priority issues after the grant funding is no longer available.

The Planned Programs

Agricultural And Biological Engineering - Research activities will include a project with a focus on improving the efficiency of liquid agricultural chemical application systems, a study that will produce a framework and methodology for collecting information and evaluating field-based supply chain logistics with a global perspective, and an examination of the removal of emerging contaminants [such as pharmaceuticals, steroids, surfactants, and plasticizers] that have been detected in wastewater discharges from various human and livestock sources. Extension efforts will focus on manure management and technological advancements related to preserving soil and water quality, farm safety, and converting biomass conversion into heat and electricity.

Agricultural And Consumer Economics - Research activities will include an investigation into the technical and economic potential for sugarcane ethanol production in Brazil and its land use implications, an evaluation of the risk to grain farms and agribusinesses associated with the Farm Bill commodity program, an ongoing assessment of the impact of Dodd-Frank on agricultural producers, a study that will analyze the allocative efficiency, productivity, and output of the U.S. agricultural sector over the last thirty years using farm-level data, and a study of the economic impacts of policies and interventions designed to help developing world small farmers cope with inefficiencies caused by poorly-functioning input and output markets. Extension educational activities will focus on farm financial management, including marketing and risk management delivered by campus faculty.

Animal Health And Production - Research activities will include work to determine the concentration of digestible energy and nutrients in soybean meal produced in the U.S., research designed to elucidate the molecular and cellular processes that regulate differentiation and growth of skeletal muscle, projects that will generate an integrated view of the multiple adaptations of the cow to nutritional management and other environmental factors, and a close examination of the individual dietary macronutrients and other components known to affect microbial-derived fermentative metabolites and/or barrier function in growing pigs. Extension activities will include annual statewide programs that address animal production and health for swine, beef, dairy, sheep, goats, poultry, and horses for owners, producers, and 4-H youth.

Community Resource Planning And Development - Research activities will include an exploration of the extent to which different types of involved partner violence [IPV] are associated with different patterns of judicial involvement, interventions, and legal outcomes over time, research to identify chronic stressors in the lives of low-income, African-American families living in inner-city neighborhoods and the coping strategies used to address these stressors, and an examination into the complex relationships that exist between family socioeconomic conditions, daycare, schooling experiences, and cognitive, behavioral, and socio-emotional growth and development during childhood. Extension activities will focus on community economic development, community leadership and organization development, and community participatory planning.

Food Safety And Food Security - Research activities will include an effort to determine the potential of high-pressure processing to improve fresh and further-processed meat quality, a study with the long-term goal of developing an effective labeling system for consumers who have health concerns related to sodium and fat to aid in making healthy food choices, research to improve our fundamental understanding of the interactions among bacteria, produce, sanitizer, and washing solution hydrodynamics, a study with the long-term goal of using the power of ultrasound to minimize the food safety risk of fresh produce, and the identification of methods that extend the shelf life, improve the nutritional quality, and enhance the safety of fresh cut produce. Extension programs related to food security will address corn, soybean, fruit, and vegetable crop production and management including integrated pest management, support for local food systems development, and access to adequate healthy food for those at greatest risk of hunger.

Human Health And Human Development - Research activities will include work to improve our understanding of the protective factors that maintain relationship quality during the transitions to marriage and parenthood, an evaluation of the effect of dietary botanical estrogens on breast cancer growth and progression using preclinical animal models, the development of an afterschool physical activity curriculum and template to effectively support healthy weight among Latino school children, ongoing work under the **GET-UP KIDS** project with the objective of integrating observed [phenotype] characteristics with genetic information, and a project designed to enhance our understanding of the mechanisms of healthy foods in chronic disease prevention and provide new knowledge for understanding how nutrition early in life shapes physiology and susceptibility to childhood obesity. Extension interdisciplinary programs will address individual and family issues at all stages of the life cycle from infancy through issues of aging and care of dependent adults to enhance human health and development. Extension activities will focus on five areas: [1] Care-giving education for parents and those who care for adults; [2] Work-life management education;

[3] Financial wellness; [4] Maintaining cognitive health; and [5] Reducing the risk of obesity and managing chronic diseases with an emphasis on proper nutrition and physical activity.

Natural Resources And The Environment - Research activities will include a project with the overall goal of documenting phosphorus input and output budgets in constructed wetlands receiving tile flow from adjacent corn and soybean farm fields in central Illinois, work to improve our understanding of the role urban agriculture plays in the conservation of species and the provisioning of ecosystem services, research with the goal of improving our understanding of how birds select habitats, and work with the primary objective of assessing the impact of land use change on soil organic carbon dynamics and greenhouse gas emissions on the sloping, nearly level, and pothole landscapes subjected to clearing, drainage, soil erosion, cultivation, or grazing. Extension activities will focus on soil and water management [encompassing information on enhancing carbon sequestration in plants and soils and reducing plant stress in coping with climate variations], forestry management, the development of volunteer natural resource stewards, and environmental stewardship education for new and inexperienced small acreage landowners.

Plant Health, Systems And Production - Research activities will include the development of additional methods for the control of H. glycines to supplement existing control strategies, a project that will utilize DNA-based markers for confirmation and surveys of herbicide resistance traits in waterhemp, efforts to improve our understanding of the pathogen and etiology and epidemiology of bacterial spot, research to improve our understanding of the intrinsic structural, chemical, and biological changes in the corn kernel and soybean seed during storage and processing, and ongoing work under the Varietal Information Program for Soybeans [VIPS] with the goal of sharing soybean production research information in a useful and cost-effective manner. Extension activities will address alternative agriculture production, invasive and/or exotic pest diagnosis and management, integrated pest management, and selection and plant management practices for maintaining healthy lawns and public properties while protecting natural resources through the assistance of trained volunteers [Master Gardeners].

Sustainable Energy - Research activities will include the application of systems thinking and the combination of deconstruction, hydrolysis, and microbiology technologies to develop an efficient, cost-effective system for converting biomass into biofuels, the identification and development of high-yielding dedicated energy crops for various land types with an objective of meeting the national goal for sustainable bioenergy production using perennial grasses, the breeding of additional Miscanthus cultivars with improved winterhardiness and high yield-potential in the central and northern Midwest, and the development of near-infrared [NIR] spectroscopy as an inexpensive and high-throughput method for evaluating quality characteristics of Miscanthus genotypes. Extension programming will focus on disseminating biofuel research findings and information on other alternative energy resources, as well as ways to advance successful and profitable commercialized biomass-based heat and electric energy and to reduce the use of non-renewable energy sources.

4-H Youth Development - Drawing on research conducted in the College of ACES in nutrition and health, leadership, and youth involvement in groups, as well as the expertise of faculty in the Colleges of Engineering, Pharmacy, Dentistry, and Medicine, the National Center for Rural Health, and the Graduate School of Library and Information Science, the University of Illinois Extension **4-H Youth Development Program** will focus on the three National 4-H Mission Mandates: Science, Engineering, and Technology [SET], Healthy Lifestyles, and Youth in Civic Engagement/Leadership through priority programs that involve: [1] Learning employment skills; [2] Experiencing healthy relationships; [3] Becoming physically fit; [4] Thinking green; and [5] Engaging in science. Volunteer training and 4-H enrollment expansion in reaching youth living in metropolitan areas and youth of Hispanic ethnicity will also receive significant attention.

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

Year	Extension		Research	
	1862	1890	1862	1890
2016	150.0	0.0	180.0	0.0
2017	150.0	0.0	180.0	0.0
2018	150.0	0.0	180.0	0.0
2019	150.0	0.0	180.0	0.0
2020	150.0	0.0	180.0	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 Panel
- Expert Peer Review
- Other (Extension Staff Program Teams)

2. Brief Explanation

Research and outreach projects and programs have always been subject to a review process. Formula-funded research projects undergo a merit review process at the departmental level by at least three faculty members in a related discipline to insure the projects are scientifically sound, relevant to society's needs, and not duplicative of efforts undertaken elsewhere. Formula projects are then submitted to NIFA for final review and approval. Internal research grants are all reviewed internally. Greater detail on the Hatch review process is included in the Annual Report.

In Extension, state program leaders working with staff have been charged with the responsibility for insuring that Extension programs are research-based. Campus faculty and staff are expected to deliver the majority of statewide programs. In most cases, local programs and curriculum will be developed by more than one educator and reviewed by several of their peers who have the same assigned specialized areas of delivery. Curriculum materials are sometimes sent for review directly to peers in other states and 4-H curriculum materials are often sent through a national jury process. In addition, during annual staff performance reviews attention is given to programming quality. Finally, the merit of all new program efforts and a selected number of ongoing programs are evaluated by participants regarding content and delivery. Evaluations of impact have been developed for an increasing number of statewide

programs and are expected to continue to increase. Reporting program impacts is enabled by the 'success story' section of the individual field staff monthly reporting system and annual performance appraisal and reviewed by program leaders and field staff supervisors. Efforts will continue related to identifying and evaluating the actual knowledge, practice, and condition change outcomes generated in or by program participants and their environments.

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?

The Office of Research supports scientists in the College of ACES who are working to solve some of the world's most critical challenges. ACES research is on the forefront of discoveries, having both local relevance for the citizens of Illinois and global impact for the world's scientific community. Our research and education centers, located throughout the state of Illinois, provide a vital testing ground where research can generate practical applications to benefit consumers, farmers, commodity groups, agricultural organizations, environmentalists, conservationists, government agencies, industry and business.

Interaction between ACES Research and Extension faculty and multi-county Extension staff have been and will continue to be through periodic meetings that address the development and promotion of integrated planned programs in global food security and hunger, sustainable energy, and food safety. In 2012, formal working groups of campus faculty and Extension field staff were appointed to develop new Extension state plans of work. Interactions of ACES Research and Extension faculty and staff at national conferences and professional associations will provide opportunities to identify multi-state interest in research and Extension program development. Examples of integrated and multi-state efforts that address these priorities include: [1] Co-location of Extension educators with researchers at six experiment station locations such as the **Dixon Springs Agricultural Center** to facilitate integrated crop and livestock production programs that address global food security and hunger; [2] Integrated efforts through the Center for Advanced BioEnergy Research to carry out research and explore the use of biomass as a viable sustainable energy source; [3] Delivery of research at multi-state conferences for producers of food crops that focus on production as well as safe food handling practices; [4] The **Illinois-Indiana Sea Grant** program's focus on water quality and it's relation to climate change [a high priority of educational interest in Illinois] including efforts to address improper use, storage, and disposal of pharmaceutical and personal care products; [5] Integrated efforts through the campus **Institute for Sustainability, Energy, and Environment** to address climate change and sustainable energy; [6] Participation in a number of North Central Extension multistate joint meetings and networks that provide educational resources such as the **North Central Center for Rural Development** mini-grants and webinars; [7] Renewal of **Farm to School** programming with the filling of a position that is focused on access to healthy fresh food for school children that may lower the risk of obesity; and [8] Disaster planning drawing on **Extension Disaster Education Network** [EDEN] resources and training.

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

At the campus level, **Inclusive Illinois, one campus, many voices**, represents the commitment of the University of Illinois to cultivating a community at Illinois where everyone is welcomed, celebrated, and respected. Through education, engagement, and excellence, each voice creates the Inclusive Illinois Experience. At the College level, the College of ACES

seeks to encourage diversity and multiculturalism among its faculty, staff and student body and has committed itself to the following four goals: [1] To increase the cultural diversity in the undergraduate student body; [2] To create a college environment that values differences among students, faculty and staff; [3] To strengthen the human expertise of the food and agricultural sciences through cooperative relationships between ACES departments and other colleges and universities, government agencies and industry; and [4] To increase the number of minority and women faculty and staff.

Considerable efforts have been made and continue to be made to insure that nontraditional stakeholders are given a voice in identifying needs to be addressed and in shaping the research and programmatic responses to these needs through membership on College and Extension advisory groups [includes 6.4% minority group members] and through informal input. Currently 8.3% of the Extension webpage views received are to Spanish sites. More than sixty Extension websites are available in Spanish as well as two in Chinese and one in Korean. FY 2012 state funding reductions designated for Cook County reduced the scope of priorities and programming for under-served and under-represented populations. However, Cook County staff will continue to offer programs focused on Science, Technology, Engineering, and Math [STEM] and on urban community health. The **Expanded Food and Nutrition Education Program** [**EFNEP**] and the **Supplemental Nutrition Assistance Program - Education** [**SNAP-Ed**] will likely continue to be primary outreach models to reach under-represented and under-served audiences in multiple locations across the state. The 4-H Youth Development Educators assigned to metro areas will engage youth in under-served areas of the state, as will those specifically assigned to engage youth of Hispanic ethnicity who currently make up 10 percent of the previous year's 4-H enrollment.

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

Hatch Multistate projects represent a significant component of the total Hatch portfolio. Both Hatch and Hatch Multistate projects are reviewed on an annual basis when deciding which projects to feature in the Plan of Work and Annual Report. Of course, projects included represent only the Illinois research portion of a given program. Multistate committees publish an Annual Report of their work that allows stakeholders to view the impact of the project on a regional or national basis. When selecting programs to be included in the Plan of Work, special attention is given to including those that display a significant Extension/research partnership. Examples currently include programs supporting agribusinesses [**farmdoc**], work focused on childhood obesity [**Abriendo Caminos**], and work focused on safe food production. Individuals providing leadership for multistate and integrated activities will be asked to submit a report that includes documentation of the indicators of outcomes and impacts. Several avenues are utilized for disseminating results to stakeholders including **ACES@Illinois** [the annual College of ACES update supported by integrated funds]. For examples, please see the stakeholder input section of our Annual Report. Data collected through follow-up evaluations distributed and collected from Extension educational programs and through the staff reporting system will also be noted in marketing and promotion of the activities to targeted future participants as well as in the web-based and printed county and state reports distributed to local stakeholders and Illinois' state and federal legislators. The Director of Communications for University of Illinois Extension along with ten newly-established multi-county based staff and two campus-based staff with assignments in publicity and promotion will enhance Extension's ability to report expected outcomes and impacts.

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

Multistate projects play a unique role in the ACES research portfolio. Multistate research allows researchers to collaborate with other investigators on issues that are of regional [and in

some cases national] significance, to develop new relationships that lead to further collaborations, and to interact with top scientists who share similar research interests but also bring to the table viewpoints from stakeholders in their part of the country that may be significantly different. Joint activities are also especially important in that they allow Extension Educators to have access to cutting-edge research while at the same time allowing investigators to receive input from stakeholders through their participation in Extension programs. Multistate Extension activities are expected to prevent duplication of work and allow sharing of expertise across state lines. Extension multistate conferences and distance education delivery will tap into the varied expertise of university faculty and staff in each state. Likewise, many planned multistate and integrated activities involve delivery through websites, which have no geographical boundaries.

Outcome targets in terms of participation, academic publications, and research projects completed provide a basis for monitoring research and Extension program implementation. Measures of outcomes provide a basis for estimating program effectiveness. The monitoring of both kinds of measures provides a basis for determining effectiveness, a necessary precursor to determining efficiency.

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 individuals
- Survey of the general public
- Other (Department Advisory Committees)

Brief explanation.

All programs in the college are continually subjected to a diverse process of stakeholder input. The college, the Office of Research, the Office of Extension and Outreach, academic departments, and many programs within the college have advisory groups and councils made up of stakeholders. In this context, stakeholders may represent organized entities in the state with a particular interest in a program area, but they also include individual stakeholders. In addition to stakeholder input provided through formal means such as the advisory groups and councils, College administrators, educators, partners, students, and alumni all play roles in seeking out stakeholder input [as of this writing, the College is preparing for the ExplorACES open house which will be held in March].

Local Extension councils are comprised of volunteers nominated locally and appointed by the College to provide advice on educational programming. The makeup of the councils [includes 6.4% minority group representatives] reflects local populations and local participation in Extension programs. Local Extension advisory councils serve on a multi-county structure that includes a diverse representation from each of the counties. One or more meetings held via the Illinois conferencing system are used to reduce travel time and facilitate council member participation. These councils are asked to identify issues and/or suggest program priorities to meet local needs that are reflected in multi-county plans of work. Staff members are asked to [and provided with

resources to] involve council members in selecting three to five of the twelve state plans of work that were of greatest priority and modify them to reflect the local situation and educational activities to be delivered. These multi-county plans draw upon the 2013-14 statewide plans of work and are modified to reflect local priorities and planned program responses which are updated annually. In addition to the local multi-county Extension advisory councils, regional councils and a statewide council also are tapped for input. Re-establishment of the State Program Planning and Assessment committee will ensure that attention is given to ways that might help Extension County Directors to enhance council input.

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
- Open Listening Sessions
- Needs Assessments
- Use Surveys

Brief explanation.

A variety of methods and techniques are used to identify individuals and groups, with several specific examples discussed in detail in our Annual Report. These examples include activities conducted by the Associate Dean of Research, Extension administrators and educators, and Departments within the College of ACES.

As part of the University of Illinois Extension Affirmative Action plan, County Extension Directors and Extension Educators identify individuals to serve on formal local multi-county, regional, and state advisory groups for Extension. These groups will play a key role in identifying Research and Extension priority activities, as well as suggesting others who should be contacted. In addition, Extension staff members network and establish relationships with individuals and groups in assigned areas to assess priority needs. Extension staff will need to continue those efforts in the coming years in order to sustain local funding. In addition, some multi-county Extension units have data that has been collected through surveys completed by local stakeholders and public meetings designed to identify issues and program interests. The State Program Planning and Assessment Committee will consider options for gathering statewide stakeholder input regarding interests and needs such as the one developed in 2012 by Extension to assess the needs of current Extension volunteers. Extension administrators at the regional and state level also network with traditional and non-traditional internal and external individuals and groups and will use these contacts to seek suggestions for other key stakeholders that can be contacted to provide direction for research and Extension.

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
- 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
- Meeting specifically with non-traditional individuals
- Survey specifically with non-traditional individuals
- Meeting with invited selected individuals from the general public

Brief explanation.

As mentioned in our Annual Report, the Associate Dean for Research [Dr. Neal Merchen] places a high priority on identifying stakeholders and collecting input in a variety of ways [building on the many relationships with stakeholders Dr. Merchen has already developed as Head of the Department of Animal Sciences]. The College Office of News and Public Affairs will continue to solicit comments through news releases, publications, and broadcasts. Most Extension stakeholder input on program content will likely be gathered from program participants through end-of-program surveys, discussions with multi-county Extension Advisory Council members, and meeting with local and state organizations. Efforts at the department level will continue to include one-on-one conversations, surveys, workshops, and extending invitations to specific groups and individuals to serve on advisory committees. Field days, the **ExplorACES** open house, and events hosted by the Office of Advancement are examples of recurring efforts to collect stakeholder input.

3. A statement of how the input will be considered

- In the Budget Process
- To Identify Emerging Issues
- Redirect Extension Programs
- Redirect Research Programs
- In the Staff Hiring Process
- In the Action Plans
- To Set Priorities

Brief explanation.

Continuation, redirection, or initiation of new research and Extension programs draws heavily on stakeholder input from formalized groups and various needs assessment methods. Stakeholders play a critical role in identifying currently-unmet needs in research and outreach programs, and their input is used to sharpen the research priorities of college departments and to insure that publications, Extension programs and other outreach efforts are focusing on those areas of greatest concern to stakeholders. The State Extension Program leaders will continue to meet with multi-

county Extension educators in identifying priority programs to be delivered and those programs not addressing high-priority areas will be discontinued.

Stakeholder groups including industry partners, alumni, local and state **Extension Advisory Council** members, and **Extension Partners** [a grassroots group formed to support Extension] members will continue to be influential in expressing research and Extension needs to local, state, and federal government officials responsible for continuing, restoring, or increasing funding for research and Extension that can be used in budgeting, allocating or reallocating funds, and identifying needed faculty and staff expertise.

V. Planned Program Table of Content

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Agricultural And Biological Engineering

2. Brief summary about Planned Program

Leadership is provided by the Department of Agricultural and Biological Engineering. The overarching goal of agricultural and biological engineering work is to enhance complex living systems involving agriculture, food, the environment and energy. The Department of Agricultural and Biological Engineering works toward this goal by applying principles from many scientific and engineering disciplines. Geographically located in an area of intense agricultural production with access to excellent transportation facilities and surrounded by a large concentration of agricultural and industrial equipment manufacturers and food processors, the department is in an enviable position to serve all areas of the agricultural community. Many agricultural engineering graduates who have been educated and trained in the modern teaching facilities and research laboratories of the University of Illinois Agricultural Engineering Sciences Building are employed throughout the nation. Interaction and cooperation with these graduates and other alumni allow the department to seek input from stakeholders around the world.

Areas of focus covered in this planned program [or in others when appropriate] include bio-based processing and production systems, biomass and renewable energy, precision and information agriculture, agricultural and biosystems management, agricultural safety and health, food quality and safety, environmental stewardship, land and water resources, spacially distributed systems, structure and facilities for living systems, indoor environmental control, bio-sensors, bio-instrumentation, bio-informatics and bio-nanotechnology, intelligent machinery systems, automation of biological systems, and advanced life support systems. Faculty and staff in the Department of Agricultural and Biological Engineering with joint research and Extension appointments will focus their outreach education efforts on manure management, integrated pest management, drainage systems, agricultural safety and health, indoor air quality/ventilation, and biomass conversion for heat and electricity. [Biomass conversion for heat and electricity is reflected in the Sustainable Energy planned program].

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 : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
112	Watershed Protection and Management	20%		10%	
133	Pollution Prevention and Mitigation	0%		10%	
141	Air Resource Protection and Management	5%		10%	
401	Structures, Facilities, and General Purpose Farm Supplies	10%		20%	
402	Engineering Systems and Equipment	5%		15%	
403	Waste Disposal, Recycling, and Reuse	35%		10%	
404	Instrumentation and Control Systems	5%		15%	
405	Drainage and Irrigation Systems and Facilities	20%		10%	
	Total	100%		100%	

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

1. Situation and priorities

Engineering technology plays a major role in developing and maintaining competitive livestock and crop industries in Illinois. It also contributes to increasing worker safety in agriculture and related industries. Such technology is also addressing concerns and problems related to odor and air quality, animal waste, animal treatment, protection and management of water resources, and biomass conversion to heat and electricity.

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

That new technologies can be developed that are cost-effective in the field [and affordable for smaller producers] and that resources will be available to continue to develop and refine these technologies.

2. Ultimate goal(s) of this Program

To improve agricultural productivity through the use of intelligent machines, to integrate biological science and engineering for enhancement of living systems, to use holistic approaches to provide engineering solutions, and to mitigate conditions through knowledge and practices regarding manure management to preserve or improve water and air quality.

V(E). Planned Program (Inputs)

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

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

V(F). Planned Program (Activity)

1. Activity for the Program

Research activities will include a project with a focus on improving the efficiency of liquid agricultural chemical application systems [through the development of a real-time droplet size monitoring system for low-pressure field sprayers], work focused on the development of a novel handheld impedance analyzer system for use in animal health applications, research that will produce mathematical models to understand the ecological and evolutionary interactions in ecosystems subjected to nano[bio]technological intervention, a study that will produce a framework and methodology for collecting information and evaluating field-based supply chain logistics with a global perspective, research that will assist applicators in determining what droplet size is best suited for different types of applications, how the various factors impact droplet size, and how to best mitigate drift under various application scenarios, and an examination of the removal of emerging contaminants [such as pharmaceuticals, steroids, surfactants, and plasticizers] that have been detected in wastewater discharges from various human and livestock sources.

Extension activities will include website expansion and online quizzes and training sessions to certify that livestock managers are knowledgeable about manure management. Workshops and online agricultural safety materials will address farm safety topics such as roadway collisions involving farm equipment and safe grain storage handling, and individualized services will be available to disabled farmers through the AgrAbility Unlimited project. All other Extension efforts related to natural resources, soil drainage and tillage, pesticide application, indoor air quality/ventilation, and bio-based energy production and use are noted in other planned program sections [See Sustainable Energy, Natural Resources and the Environment, and Food Safety and Food Security].

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

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● One-on-One Intervention ● Demonstrations	● eXtension web sites ● Web sites other than eXtension

3. Description of targeted audience

Members of the target audience will include researchers, Extension field staff and educators, the horticultural research community, the agricultural chemical [herbicide and fertilizer] industry, chemical application equipment manufacturers, students and researchers in the areas of biosensors and nanotechnology applied to agriculture, agricultural engineers, environmental consultants, researchers in the livestock industry, animal scientists, livestock producers, agriculture consultants, livestock commodity group representatives, undergraduate students in agricultural and biological engineering, aerial applicators, commercial and private ground rig applicators, pesticide adjuvant manufacturers, farmers, crop scouts, turf grass applicators, pesticide registrants, drainage contractors, wastewater treatment facility staff, wastewater treatment equipment providers, regulators, environmental scientists, and environmental engineers. Extension target audiences will include Illinois commercial and private pesticide applicators, nationwide aerial applicators, technical service providers [TSP's] who specialize in developing comprehensive nutrient management plans, livestock producers, and custom manure haulers.

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 Completed Hatch 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	Maximizing Efficiency And Minimizing Drift For Agricultural Aerial Applications
2	Improving Emission Control Technologies For Livestock Buildings
3	Implementation Of Global Engineering Solutions Using Agricultural Machinery
4	Development And Use Of A Manure Management Plan

Outcome # 1

1. Outcome Target

Maximizing Efficiency And Minimizing Drift For Agricultural Aerial Applications

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 133 - Pollution Prevention and Mitigation
- 141 - Air Resource Protection and Management
- 401 - Structures, Facilities, and General Purpose Farm Supplies
- 402 - Engineering Systems and Equipment
- 404 - Instrumentation and Control Systems

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

Improving Emission Control Technologies For Livestock Buildings

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 133 - Pollution Prevention and Mitigation
- 141 - Air Resource Protection and Management
- 401 - Structures, Facilities, and General Purpose Farm Supplies
- 402 - Engineering Systems and Equipment
- 404 - Instrumentation and Control Systems

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

Implementation Of Global Engineering Solutions Using Agricultural Machinery

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 401 - Structures, Facilities, and General Purpose Farm Supplies
- 402 - Engineering Systems and Equipment
- 404 - Instrumentation and Control Systems

4. Associated Institute Type(s)

- 1862 Research

Outcome # 4

1. Outcome Target

Development And Use Of A Manure Management Plan

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 112 - Watershed Protection and Management
- 133 - Pollution Prevention and Mitigation
- 403 - Waste Disposal, Recycling, and Reuse

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Economy
- Appropriations changes
- Competing Programmatic Challenges

Description

External factors include the development of new technologies in closely related fields, demand for a given agricultural product, and environmental concerns.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Perioidic end-of meeting questionnaires distributed at manure management workshops.

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Agricultural And Consumer Economics

2. Brief summary about Planned Program

The Department of Agricultural and Consumer Economics targets research and outreach programs aimed at improving the economic and environmental wellbeing of producers, consumers, and families. Drawing on economics, business, and law, the department analyzes issues related to individuals and families, agriculture and natural resources, and food -- all ranging in scope from local to global. Researchers in the department partner with Extension Specialists to deliver educational programs to address economic needs of residents of Illinois and beyond. This planned program encompasses the research and outreach activities carried out by campus faculty with expertise in agricultural economics and consumer economics research encompassing consumer financially-related issues and programs. It should be noted that Extension Educators with responsibility for consumer financial wellness educational efforts are reflected in the Human Health and Human Development planned program.

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 : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
112	Watershed Protection and Management	0%		5%	
602	Business Management, Finance, and Taxation	10%		10%	
603	Market Economics	15%		15%	
604	Marketing and Distribution Practices	5%		10%	
605	Natural Resource and Environmental Economics	10%		10%	
606	International Trade and Development Economics	0%		10%	
607	Consumer Economics	30%		15%	
610	Domestic Policy Analysis	0%		15%	
801	Individual and Family Resource Management	30%		10%	
	Total	100%		100%	

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

1. Situation and priorities

Leadership for research and outreach activities is provided by the Department of Agricultural and Consumer Economics. ACE faculty and Extension staff who have disciplinary backgrounds in economics, law, finance, business, and consumer economics use their expertise to lead innovative research, outreach and education programs in Illinois and around the world, including Africa, Asia, Canada, South America, and Europe.

Agricultural producers, including those engaged in horticultural businesses, express concerns about their enterprise's sustainability and profitability and about how to manage changes and risks with competing demands for limited resources. In addition, domestic and foreign policies that characterize today's global society require recognition of how those demands influence the viability of their enterprises and the appropriate responses they can and should take. Extension Educators will focus on issues associated with planning ahead for financial security, health insurance decisions, and developing basic financial management skills for older youth, college students, limited resource audiences, and young adults.

2. Scope of the Program

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

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

1. Assumptions made for the Program

That international developments in agricultural law have an increasing impact on the legal situation in the United States, that farmers lack the information to best utilize crop yield and revenue insurance products, that many current environmental economic tools are simplistic and could provide better insight to policy makers if they were enriched by considering special issues [such as paying closer attention to heterogeneity of land, consumers, and producers], and that resources will continue to be available to allow agricultural economists at Illinois to continue to provide thoroughly-researched advice to policy makers and producers at both the local and national levels.

2. Ultimate goal(s) of this Program

To inform and improve decisions related to the Midwest commercial food and agricultural sectors involving production, financing, marketing, and risk management, to identify and estimate the impact of federal and state policies on rural communities, agricultural producers, and society, to help inform the policy-making process, and to describe and measure the wellbeing of communities resulting from changes in economic and regulatory conditions.

V(E). Planned Program (Inputs)

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

Year	Extension		Research	
	1862	1890	1862	1890
2016	0.0	0.0	5.0	0.0
2017	0.0	0.0	5.0	0.0
2018	0.0	0.0	5.0	0.0
2019	0.0	0.0	5.0	0.0
2020	0.0	0.0	5.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Activities will include a project that will explore the possibility of government's influence on household finance and home purchase using a comparative approach, a study that will analyze the allocative efficiency, productivity, and output of the U.S. agricultural sector over the last thirty years using farm-level data, an effort to identify the best ways to communicate nutrition information to consumers and determine which format[s] are most likely to influence consumers to make healthier food selections, an analysis of local, state, federal, and selected international laws that constitute the legal environment for agriculture and an evaluation of their impact on agricultural production, agri-business, and the protection and conservation the environment, a study of the policy design for programs in each of the three related titles of the farm bill: commodities, conservation, and crop insurance [the project will seek to better understand the policies and how they are to work together, as well as the legal aspects and implications for farmers and other program users], an ongoing assessment of the impact of Dodd-Frank on agricultural producers, an investigation into the impact on economic outcomes of policy changes and new technologies in the food and agricultural system [the research will explore both the consequences of such changes, measuring the impacts of those changes on issues of direct interest to food producers, consumers, and processors in the U.S. and abroad, and the causes of the changes, analyzing the political and social forces that bring them about], a study of the economic impacts of policies and interventions designed to help developing world small farmers cope with inefficiencies caused by poorly-functioning input and output markets [the research will explore both the drivers and the consequences of these inefficiencies and the economic impacts of public and private sector initiatives to resolve market failures as well as the decisions and investments of farmers themselves], an investigation into the technical and economic potential for sugarcane ethanol production in Brazil and its land use implications, an evaluation of risk on grain farms and agribusiness associated with the Farm Bill commodity program, and a project that will provide greatly needed information on the causes, consequences, and likely future of farmland prices.

The **Center for Economic and Financial Education** is also located in the Department of Agricultural and Consumer Economics and is responsible for generating campus-based integrated research and outreach for educational conferences, training, and resources for teachers and financial professionals.

Extension activities will focus on farm financial management including marketing and risk management delivered by campus faculty [It should be noted that Extension field educator positions with expertise in this area have been eliminated in the reorganization of Extension effective July 1, 2011]. Delivery methods will include continuous updating and promotion of the **farmdoc** website, regional **Economic Summit** conferences featuring research updates, workshops on using web-based farm management tools [such as the **Farm Analysis Solution Tool** [**FAST**]], tax schools, and podcasts.

Individuals who are current or future small farm owners will also be able to access information to identify the risk in maintaining or entering into small farm plant or animal production enterprises through programs provided by Extension.

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

Extension

Direct Methods	Indirect Methods
● Education Class	● Newsletters
● Workshop	● TV Media Programs
● One-on-One Intervention	● Web sites other than eXtension
● Other 1 (Webinars)	● Other 1 (Podcasts)

3. Description of targeted audience

Members of the target audience will include researchers in consumer economics, household finance, and behavioral finance, policymakers, academics in the agricultural economics and food and nutrition circles, food manufacturers, restaurants, practicing lawyers and academic lawyers in the U.S. and abroad, government regulatory agencies, farmers, processors and retail distributers of agricultural products, private firms with agricultural interests, Extension professionals, the crop insurance industry [agents and companies], the farm credit/banking industry, USDA officials, landowners, community groups, producer organizations, schools in the state of Illinois, graduate and undergraduate students, leaders in agricultural finance and members of institutions involved in providing credit to agricultural interests, farm managers, financial managers in the agricultural investment community, agricultural lenders, academic economists, and agricultural production students. Programs addressing financial wellness are addressed in the Human Health and Development planned program.

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 Completed Hatch 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	Page File Requests Made To Farmdoc
2	Number Of Web Hits On The Varietal Information Program For Soybeans Website
3	Toward A Better Understanding Of The Causes, Consequences, And Likely Future Of Farmland Prices
4	Educating Farmers On What The Provisions Of The Farm Bill Mean To Them
5	Number Making Decisions To Reduce Risk In Agriculture Production

Outcome # 1

1. Outcome Target

Page File Requests Made To Farmdoc

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 602 - Business Management, Finance, and Taxation
- 603 - Market Economics
- 604 - Marketing and Distribution Practices
- 605 - Natural Resource and Environmental Economics

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

Number Of Web Hits On The Varietal Information Program For Soybeans Website

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 602 - Business Management, Finance, and Taxation
- 603 - Market Economics
- 604 - Marketing and Distribution Practices
- 605 - Natural Resource and Environmental Economics

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

Toward A Better Understanding Of The Causes, Consequences, And Likely Future Of Farmland Prices

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 602 - Business Management, Finance, and Taxation
- 603 - Market Economics
- 605 - Natural Resource and Environmental Economics
- 610 - Domestic Policy Analysis

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 4

1. Outcome Target

Educating Farmers On What The Provisions Of The Farm Bill Mean To Them

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 602 - Business Management, Finance, and Taxation
- 603 - Market Economics
- 604 - Marketing and Distribution Practices
- 605 - Natural Resource and Environmental Economics
- 610 - Domestic Policy Analysis
- 801 - Individual and Family Resource Management

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 5

1. Outcome Target

Number Making Decisions To Reduce Risk In Agriculture Production

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 602 - Business Management, Finance, and Taxation
- 610 - Domestic Policy Analysis

4. Associated Institute Type(s)

- 1862 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Changes in legislation, changes in state and national economic variables such as employment, interest rates, and availability of capital, and challenges faced in the emerging private research and development sectors in developing countries.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Owners/renters of small acreage who participate in a series of online modules, webinars, or workshops will be asked to complete an evaluation at the end of the modules related to financial management decision-making and will be contacted after completing the module to determine whether or not they chose to undertake specific agricultural enterprises.

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Animal Health And Production

2. Brief summary about Planned Program

Leadership for animal health and production research and outreach programs is provided by Extension Educators, the Department of Animal Sciences, and the College of Veterinary Medicine. Our research and Extension programs address efficiency, profitability and well-being of dairy and beef cattle, pigs, and poultry and enhance the supply of food for a growing world population. Our programs in companion animal biology and humane care education create information for pet owners and help them to understand the value of positive relationships between humans and animals. Fundamental research in physiology, nutrition and behavior solve animal science problems that can also have a significant impact on medical problems in humans.

Extension and outreach is conducted primarily by campus faculty and by two Extension Educators located at the **Dixon Springs Agricultural Center** in Southern Illinois and at the **Orr Agricultural Research and Demonstration Center** in Western Illinois, by one Extension Educator who facilitates statewide 4-H youth livestock projects and activities, and by those Extension Educators with responsibilities for education regarding small acreages used for livestock production. Additionally, Extension programs are conducted on both a multi-state and in-state basis organized to address specific species.

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 : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
301	Reproductive Performance of Animals	20%		15%	
302	Nutrient Utilization in Animals	5%		20%	
303	Genetic Improvement of Animals	5%		15%	
305	Animal Physiological Processes	0%		10%	
307	Animal Management Systems	25%		10%	
311	Animal Diseases	15%		20%	
315	Animal Welfare/Well-Being and Protection	15%		10%	
806	Youth Development	15%		0%	
	Total	100%		100%	

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

1. Situation and priorities

Illinois ranks fourth in hog production and has a number of areas where land is more conducive to grazing animals than row crop production. Priorities in the Animal Health and Production planned program focus on production management [addressing new issues involving health, feeding, reproduction, genetics, and management] but also deal with issues that cut across several other planned programs, such as human development [companion and recreational animals], positive youth development [teaching youth about the importance of caring for animals and capitalizing on the animal as a tool for youth development], natural resource utilization [with an emphasis on environmental protection and water quality], agricultural economics [improving marketing skills and business planning], and of course, food safety [developing educational programs that encourage participation in quality assurance, residue avoidance, and **Hazard Analysis Critical Control Point** [HACCP] programs].

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

It is assumed that consumption of and demand for meat and dairy products will remain. Concerns over animal treatment present a need that researchers and Extension Educators are well positioned to meet. As resources continue to tighten at both the state and national levels, every effort will be made to continue to serve these needs as they relate to both Illinois and national stakeholders.

2. Ultimate goal(s) of this Program

The goals of this planned program are to develop management practices that enhance efficiency of production of food-producing animals, to develop nutrition and management practices that optimize the health of domestic animals, to develop management practices that enhance animal wellbeing and minimize the impacts of animal production on the environment, to improve methods for diagnosis, prevention, and treatment of infectious diseases in food animals, to develop new strategies to improve food safety, to educate animal producers and owners on keeping their animals healthy, and to provide veterinarians with the latest health information to best serve their clients.

V(E). Planned Program (Inputs)

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

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

V(F). Planned Program (Activity)

1. Activity for the Program

Activities will include the development of new therapeutic agents to treat Toxoplasma gondii and Cryptosporidium parvum, a study with the objective of determining the pharmacokinetics of transmucosal meloxicam via both oral and rectal routes in piglets in hopes of identifying this route as an efficacious, efficient, and minimally-stressful way of providing pain management during castration, work to determine the concentration of digestible energy and nutrients in soybean meal produced in the U.S. [allowing us to more accurately formulate diets for pigs and improve animal performance, reduce diet costs, and reduce excretion of nutrients into the environment], research designed to elucidate the molecular and cellular processes that regulate differentiation and growth of skeletal muscle [thereby providing the basic knowledge necessary to increase the efficiency of lean meat production in meat-producing animals], projects that will generate an integrated view of the multiple adaptations of the cow to nutritional management and other environmental factors [such knowledge would be helpful in identifying targets that can be manipulated via nutrition or other means to decrease the risk of disease during the transition period], and an examination of the interaction between the normal gut lumen microbes and activation of the intestinal immune system in gut health and development [improving our understanding of the role of colostrum in modulating physiological digestive, absorptive, or barrier function of the alimentary tract will

generate useful information that will impact the management of newborn animals not only in terms of prevention of infectious disease, but also in terms of nutrition and welfare].

Activities will also include a study that will test the hypothesis that postnatal viral infection and subsequent activation of brain microglial cells disrupts neurodevelopment resulting in reduced resilience, a close examination of the individual dietary macronutrients and other components known to affect microbial-derived fermentative metabolites and/or barrier function in growing pigs, work to optimize housing environments by defining environmental conditions [aerial, thermal, spectral, and nutritional] and management practices that will result in production systems which promote bird welfare, performance, food safety and security, environmental soundness, and ultimately sustainable development of the U.S. poultry industry, an investigation to determine which measures of performance recorded on developing heifers are good indicators of their efficiency as brood cows, the identification of molecular pathways involved in the regulation of HPA activity in foxes [ultimately providing new insight into regulation of stress-induced behaviors in other mammals], work to develop a better understanding of the role of global nutrition of the cow's diet before and after calving on its endocrine function and fertility [increasing postpartum reproductive performance in dairy cows], and a project with the long-term objective of developing a modified live vaccine that will elicit a protective immune response against strangles that is free of the significant safety risks associated with the currently marketed Pinnacle IN product.

Extension activities will include establishing and maintaining the Extension commercial agriculture website. Programs addressing dairy production will include **Illinois Dairy Summits** and multi-state conferences. Seminars and regional programs that provide research updates on livestock production for specific species of livestock such as the beef cattle conferences and field days and the **Executive Pork Producers Program** will be ongoing. In addition, workshops, podcasts, and webinars that focus on small ruminant animals will be developed and targeted for new farmers. The 4-H horse and livestock clinics, horse and livestock judging events, and ethics training and online certification for new 4-H members enrolled in livestock are also major program activities that will be conducted. A related series of certification workshops focusing on manure management is included in the Agricultural and Biological Engineering planned program. The Food Safety planned program also includes specific activities related to livestock production.

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

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● One-on-One Intervention ● Demonstrations ● Other 1 (Webinars) ● Other 2 (Online Courses)	● eXtension web sites ● Web sites other than eXtension

3. Description of targeted audience

Members of the target audience will include academic, medical, veterinary, industrial, and professional scientists and clinicians, entomologists, veterinary scientists and large animal veterinarians, feed companies, livestock producers, farmers, research scientists, reproduction companies, Extension Educators, animal scientists, swine veterinarians and members of the swine production industry, poultry producers and researchers, breed associations, beef cow-calf producers, national and international dairy

goat farmers, dairy nutritionists, and research scientists working on viral diseases of swine. Extension audiences include youth, owners of companion animals, and small acreage owners seeking to raise livestock.

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 Completed Hatch 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	Increased Knowledge Of Livestock Care And Management
2	Improved Control Of Porcine Reproductive And Respiratory Syndrome
3	The Development Of New Therapeutic Agents To Treat Toxoplasma Gondii And Cryptosporidium Parvum
4	Determining The Concentration Of Digestible Energy And Nutrients In Soybean Meal To More Accurately Formulate Diets For Pigs
5	Determining Which Measures Of Performance Recorded On Developing Heifers Are Good Indicators Of Their Efficiency As Brood Cows
6	Identification Of Molecular Pathways Involved In The Regulation Of Hypothalamic-Pituitary-Adrenal [HPA] Activity

Outcome # 1

1. Outcome Target

Increased Knowledge Of Livestock Care And Management

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 307 - Animal Management Systems
- 311 - Animal Diseases
- 315 - Animal Welfare/Well-Being and Protection
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Improved Control Of Porcine Reproductive And Respiratory Syndrome

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 305 - Animal Physiological Processes
- 307 - Animal Management Systems
- 311 - Animal Diseases
- 315 - Animal Welfare/Well-Being and Protection

4. Associated Institute Type(s)

- 1862 Research

Outcome # 3

1. Outcome Target

The Development Of New Therapeutic Agents To Treat Toxoplasma Gondii And Cryptosporidium Parvum

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 302 - Nutrient Utilization in Animals
- 303 - Genetic Improvement of Animals
- 311 - Animal Diseases
- 315 - Animal Welfare/Well-Being and Protection

4. Associated Institute Type(s)

- 1862 Research

Outcome # 4

1. Outcome Target

Determining The Concentration Of Digestible Energy And Nutrients In Soybean Meal To More Accurately Formulate Diets For Pigs

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 302 - Nutrient Utilization in Animals
- 305 - Animal Physiological Processes
- 315 - Animal Welfare/Well-Being and Protection

4. Associated Institute Type(s)

- 1862 Research

Outcome # 5

1. Outcome Target

Determining Which Measures Of Performance Recorded On Developing Heifers Are Good Indicators Of Their Efficiency As Brood Cows

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 305 - Animal Physiological Processes
- 307 - Animal Management Systems
- 315 - Animal Welfare/Well-Being and Protection

4. Associated Institute Type(s)

- 1862 Research

Outcome # 6

1. Outcome Target

Identification Of Molecular Pathways Involved In The Regulation Of Hypothalamic-Pituitary-Adrenal [HPA] Activity

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 303 - Genetic Improvement of Animals
- 305 - Animal Physiological Processes
- 307 - Animal Management Systems
- 315 - Animal Welfare/Well-Being and Protection

4. Associated Institute Type(s)

- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Consumer preferences for animal products are one important external factor [such as a preference shift from milk to bottled water or from beef to pork or chicken]. Of the utmost importance is maintaining public confidence that animals are treated humanely. Changes in legislation and the increasing difficulty of maintaining funding and staffing levels are also very important external factors. In addition, drought can affect grazing practices and profitability.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

An evaluation will be distributed and collected from all attendees at grazing, beef production, or **Putting Small Acres to Work** programs to seek to determine the degree of knowledge change related to topics addressed. Participants will also be asked to indicate one management technique that they plan to implement. Those responses will be used to develop an evaluation that will be mailed, e-mailed, or distributed to returnees attending the next year's program to seek responses on practice changes from those who attended the previous year.

Online quizzes will be used to test youth knowledge of ethical treatment of livestock.

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Community Resource Planning And Development

2. Brief summary about Planned Program

Dramatic social and economic changes in the United States and around the world are affecting individuals, organizations, and communities. Leadership for community development rests with the Department of Human and Community Development and the University of Illinois Extension Community and Economic Development program team and program leader. The team works in partnership with University of Illinois faculty and others who provide research to support programs. Partners include the Institute for Government and Public Affairs and the Department of Urban and Regional Planning.

University of Illinois Extension educational outreach will be primarily through academic professionals located in multi-county units providing practical, research-based information and programs for communities, organizations, businesses, and leaders to address local needs, rural and urban. Extension programs will focus on community economic development, community leadership and organization, and community participatory planning. With respect to community participatory planning, a special effort will be made to involve youth and in planning for disasters. Depending on local priorities and available resources, Community and Economic Development Extension Educators will collaborate with other educators to address developing issues and accessing local food systems. In addition, educators will provide primary delivery of education to enhance the availability of data development of decision-making skills of local officials, strengthen the leadership skills of emerging and current community leaders, facilitate input on community planning processes, help communities develop policies and practices that encourage entrepreneurship, and increase the knowledge and skills of business owners and managers to foster successful businesses. Given the challenges faced by Illinois communities of all population sizes, this planned program will play an important role as community leaders and residents address their needs.

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 : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
608	Community Resource Planning and Development	70%		35%	
802	Human Development and Family Well-Being	5%		25%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	15%		10%	
805	Community Institutions and Social Services	5%		20%	
806	Youth Development	5%		10%	
	Total	100%		100%	

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

1. Situation and priorities

Illinois communities face a host of issues that demand leadership and strategies to address the rapidly-changing social and economic landscape as they struggle to create a competitive advantage in a rapidly-changing global economy. Many communities in Illinois are experiencing declines in population and a slowing economy. These communities are characterized by a lack of viable community organizations, businesses, workforce opportunities, and recreation opportunities. These communities may also be characterized by a lack of planning, few people who are willing to serve in leadership positions, and local officials who need quality information, tools, and skills to revitalize their communities.

Extension will give priority to community development, an approach which calls on educators to work with community residents to identify assets to improve the community and foster economic development and to find ways to mobilize these assets to improve business retention, expansion and start-up strategies, recreation, and tourism. A complementary priority is to build a cadre of local officials and community leaders who are well informed about their responsibilities and the issues of importance in their communities and regions and are able to serve political subdivisions and community organizations and make critical decisions. A third priority is to involve local residents from all sectors of the community, including youth, to participate in analyzing and addressing quality of life and infrastructure issues.

2. Scope of the Program

- In-State Extension
- In-State 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

[1] Community residents, given training and information, are able to develop approaches to the issues they and their communities face; [2] Local policies and environments will in turn influence business and economic development; and [3] Resources [local, state and federal] will remain adequate to fund the needed research and Extension programs.

2. Ultimate goal(s) of this Program

Researchers are studying community activism, mobilization, and leadership in rural communities to assist in developing strong institutions that will foster revitalization in rural communities and limited-resource urban neighborhoods. Extension seeks to increase the knowledge and skills of current and future leaders of local government, organizations, and agencies to make decisions that improve the economic and social conditions of targeted communities. Ultimately, Illinois communities will become more vital and sustainable with populations that are stable, with adequate community resources, and with active civic groups. The education and participation of youth in these efforts will create a personal investment in their communities, encouraging long-term commitments and connections to local communities.

V(E). Planned Program (Inputs)

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

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

V(F). Planned Program (Activity)

1. Activity for the Program

Research activities will include an exploration of the extent to which different types of involved partner violence [IPV] are associated with different patterns of judicial involvement, interventions, and legal outcomes over time and how these patterns relate to ongoing threats to mothers' safety and adjustment, work to evaluate the effectiveness of a network framework for evaluating the capacity of environmental governance structures to accommodate multiple ecosystem services and the extent to which decentralized environmental governance networks are able to incorporate justice concerns into planning processes and outcomes, research to identify chronic stressors in the lives of low-income, African-American families living in inner-city neighborhoods and the coping strategies used to address these stressors [this research is a response to theoretical discussions that argue that the compositional, social, institutional, and normative elements of impoverished inner-city communities undermine family organization and functioning], an examination into the complex relationships that exist between family socioeconomic conditions, daycare, schooling experiences, and cognitive, behavioral, and socio-emotional growth and development during childhood, and a study with the goal of improving the quality of programs for high school students by gaining knowledge of the strategies used by effective program leaders in the various challenging situations

that they face [this information will be useful for training new leaders and provide a foundation for future research on youth practice].

Extension programming with a focus on economic development will include providing decision-makers with access to relevant secondary data and education regarding strategies and government policies that support entrepreneurs, knowledge of tools that can enhance the growth of new businesses and product development, and knowledge and skill development related to customer service that includes marketing that is based on the values of various generations [as well as skills in working with various generations of volunteers and employees]. Extension Educators will also draw on and promote programs such as **Ready Business** [available from the Extension Disaster Education Network]. A two-year funded initiative with the College of Business will train individuals from impoverished Southern Illinois and Chicago communities to use the forward-looking technology of digital manufacturing [3D printing] and empower them to participate in the marketplace by enhancing their 'making' literacy skills. Extension programming focused on economic development will include providing decision-makers with access to relevant secondary data and education regarding strategies and government policies that support entrepreneurs; knowledge of tools that can enhance the growth of new businesses and product development; and knowledge and skill development related to customer service that includes marketing that is based on the values of various generations, as well as skills in working with various generations of volunteers and employees. Extension Educators will also draw on and promote programs such as **Ready Business** available from the Extension Disaster Education Network. A two-year funded initiative with the College of Business will train individuals from impoverished Southern Illinois and Chicago communities to use forward-looking technology of digital manufacturing [3D printing] and other digital making and empower them to participate in the marketplace by enhancing their "making" literacy. A second funded cross-campus initiative, **Illinois Digital Innovation Leadership Program,** will provide Mobile Digital Design and Innovation Labs and customized training and technical assistance to enable communities to explore and develop their ideas and build capacity in digital design and manufacturing.

Activities focused on developing leadership in communities and organizations will include providing resources [data and webinars] for county officials to understand their roles and responsibilities and the issues they may face [as well as strategies to address these issues], education and experiences to build leadership knowledge and skills through leadership academies and conferences for youth and adults, and online self-study modules on applied research skills.

Activities addressing community participatory planning will include efforts to identify issues through exchanges with other communities and work with units of government or other community groups to develop plans for locally-driven planning projects [or creating vision and action plans to make positive community changes such as planning for disasters]. In addition, attention will be given to providing training to ensure that youth are invited and supported as partners with adults in assuming positions on local boards and/or committees or in planning endeavors such as identifying, analyzing, and addressing a need in their community. A new two-year project will provide an opportunity for advanced undergraduate and graduate students in design and planning to work with researchers and community partners to examine the relationship between health, design, and the built environment [places where people live, learn, work and play].

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

Extension

Direct Methods	Indirect Methods

● Education Class ● Workshop ● Group Discussion ● Other 1 (Webinars) ● Other 2 (Community Forums)	● Web sites other than eXtension ● Other 1 (Fact Sheets) ● Other 2 (Podcasts)

3. Description of targeted audience

Members of the target audience will include mothers who co-parent after separation [including those who do and do not experience intimate partner violence], professionals working with mothers in the process of divorce, including family court judges, family law attorneys, parent educators, and health care providers, low-income residents receiving urban gardening assistance designated for low-income populations, low-income and minority communities experiencing environmental remediation in nearby rivers, scholars, community-based organizations and institutions, families, policy makers, researchers who study adolescence and youth programs, practitioners who run youth programs, and intermediary organizations that teach and support these practitioners. Extension audiences include elected and appointed officials, current and emerging community leaders, current or potential business owners/managers, entrepreneurs, economic development organizations, community organization leaders and youth and adult residents of targeted communities, and individuals in impoverished communities.

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 Completed Hatch 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	Number Of Individuals Reporting New Leadership Roles And Opportunities Taken
2	Number Of Plans Developed/Adopted/Adjusted By Communities Through Resident Engagement
3	Percentage Of Community Plans/Goals Implemented
4	Number And Dollar Value Of Volunteer Hours Invested In Community-Related Projects
5	Number Of Community/Organization Programs/Activities Initiated
6	Number Of Jobs Created By New Businesses
7	Improving Programs For High School Students Through A Better Understanding Of The Strategies Used By Effective Program Leaders
8	Exploring The Extent To Which Different Types Of Intimate Partner Violence Are Associated With Different Patterns Of Judicial Involvement, Interventions, And Legal Outcomes

Outcome # 1

1. Outcome Target

Number Of Individuals Reporting New Leadership Roles And Opportunities Taken

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Number Of Plans Developed/Adopted/Adjusted By Communities Through Resident Engagement

2. Outcome Type : Change in Action 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

Outcome # 3

1. Outcome Target

Percentage Of Community Plans/Goals Implemented

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 4

1. Outcome Target

Number And Dollar Value Of Volunteer Hours Invested In Community-Related Projects

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 5

1. Outcome Target

Number Of Community/Organization Programs/Activities Initiated

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 6

1. Outcome Target

Number Of Jobs Created By New Businesses

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being
- 803 - Sociological and Technological Change Affecting Individuals, Families, and Communities
- 805 - Community Institutions and Social Services

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 7

1. Outcome Target

Improving Programs For High School Students Through A Better Understanding Of The Strategies Used By Effective Program Leaders

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 8

1. Outcome Target

Exploring The Extent To Which Different Types Of Intimate Partner Violence Are Associated With Different Patterns Of Judicial Involvement, Interventions, And Legal Outcomes

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 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
- Competing Programmatic Challenges

Description

Competing public and programmatic priorities can influence the level of attention provided to community economic development by non-subject matter staff such as County Directors, as can environmental conditions that affect areas such as water quality and natural disasters. Other external factors include employment opportunities in a given community, migration into or out of the area, community funding for emergency preparedness, interactions between community, county, state, and national lawmakers, and the impacts of national priorities on local issues.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

End-of-meeting evaluation and follow-up information will be gathered via online or paper surveys from participants in the following programs: [1] Evaluations of the value of secondary data provided to decision makers; [2] **Leadership Academies** [knowledge gained and new roles taken]; [3] **On the Front Line** [customer service] workshops; [4] Training for newly elected officials [knowledge gained and use of knowledge gained in making-decisions]; [5] **Consumer Age Matters** [business marketing based on targeted generations, recruiting and working with volunteers, and/or working with employees]; and [6]

Youth civic engagement.

With respect to community planning evaluation, contact will be made by Extension Educators with the person responsible for a community plan that has been developed as a result of interactions with Extension to document plan completion, adoption, and implementation and the number of individuals involved. Contact will also be made with community leaders to determine the dollar value of resources leveraged/generated and the new community/organization programs or activities that have been initiated as a result of interaction with Extension.

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Food Safety And Food Security

2. Brief summary about Planned Program

While we have attempted to segregate programs for this Plan of Work, perhaps more so than any other theme, food safety and food security are issues that flow throughout virtually every planned program in this report. Educators under the 4-H Youth Development planned program work to fight hunger by helping youth to grow and donate food to feed the hungry and to develop healthier eating habits, work in Agricultural and Biological Engineering improves productivity in areas such as the utilization of intelligent machines, work in Agricultural and Consumer Economics in areas such as international law and improving production through better agribusiness management, Animal Health and Plant Health through production, Sustainable Energy through efforts to minimize the impact of crop use for fuel on food availability, and the obvious linkages to Human Health and Human Development. The focus of food security programs to be delivered as a part of this planned program represent the integrated efforts of research and Extension faculty and staff to strengthen the quantity and quality of food crop production and accessibility to meet both global and local needs to alleviate hunger and ensure a safe food supply.

Research on food product development and improving the safety of food processing techniques while improving the nutritional quality of food products rests with the Department of Food Science and Human Nutrition and the Division of Nutritional Sciences. The College also hosts the **National Soybean Research Laboratory,** which houses the **Illinois Center for Soy Foods**. The Center has among its interests the study of the efficacy and safety of soy food products to improve human health.

University of Illinois Extension faculty and Extension Educators who focus on local foods and small farms, horticulture, or nutrition and wellness will deliver research-based educational programming focused on safety practices related to food production, processing, and handling, as well as food preparation and service to the public based on research centered in the Department of Crop Sciences, Department of Animal Sciences, and Department of Food Science and Human Nutrition.

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

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

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

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

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
111	Conservation and Efficient Use of Water	5%		5%	
201	Plant Genome, Genetics, and Genetic Mechanisms	5%		10%	
205	Plant Management Systems	10%		0%	
501	New and Improved Food Processing Technologies	0%		10%	
502	New and Improved Food Products	0%		15%	
503	Quality Maintenance in Storing and Marketing Food Products	10%		5%	
504	Home and Commercial Food Service	15%		0%	
603	Market Economics	0%		5%	
701	Nutrient Composition of Food	0%		5%	
702	Requirements and Function of Nutrients and Other Food Components	5%		5%	
703	Nutrition Education and Behavior	15%		10%	
704	Nutrition and Hunger in the Population	15%		10%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	0%		10%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	15%		10%	
806	Youth Development	5%		0%	
	Total	100%		100%	

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

1. Situation and priorities

Given that Illinois is among the top states in corn, soybean, and hog production and accounts for nearly six percent of all agricultural exports, priority will be given to enhancing the quality of these products to meet hunger needs. Likewise, given our existing priorities in areas such as nutrition education, food development [in particular soy foods], and production efficiency, the College of Agricultural, Consumer and Environmental Sciences is well-positioned to provide solutions that will make meaningful improvements in the lives of food-insecure populations locally, nationally, and globally.

Increased demand for locally-produced foods is well documented in Illinois; however, despite increasing demand only 1.1% of all crop sales recorded in Illinois for 2007 were for fruits and vegetables and the average age of those producers was 57.7 years. Priority will be given to meeting the educational

needs of local food-insecure households through research and Extension educational support for the recruitment and development of producers of fresh produce and local food systems that can expand the production and access to adequate and healthier foods such as fresh fruits and vegetables for these households and the growing interest in locally-grown food by other population segments.

Food safety is also an issue for all individuals and families regardless of household resource level and affects food producers, processors, establishments serving food to the public, and consumers. A food production or food service contamination outbreak causing serious foodborne illnesses can also have widespread effects on innocent food producers, distributors, and retailers resulting in serious economic impacts for those in the food production and service chain and higher prices for the consumer. The misuse of animal health products can also result in the presence of residues of the medication in meat which has consequences for consumers and for the Illinois' pork industry. Education to ensure certification by those who serve food to the public will also remain a priority for University of Illinois Extension, as well as the safe production and handling of fresh produce.

2. Scope of the Program

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

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

1. Assumptions made for the Program

That even in the difficult economic climate facing our state and our nation that the importance of this issue will insure that resources are available to continue to conduct research and outreach programs addressing food safety and food security, that knowledge developed and disseminated will have a reach far beyond the borders of our state, that adaptation to increased production of food can occur without consequences to the environment, that Extension programs will provide food handlers with the skills to insure that food is handled and prepared correctly, and that economical transportation will be available to deliver food to the areas characterized by hunger. We also assume that new methods of food product development will be able to balance the competing needs of improving food safety, improving processing efficiency, lowering costs, making products more widely available, and maintaining a high level of consumer acceptance.

2. Ultimate goal(s) of this Program

Our ultimate goal with respect to food security is to use ACES expertise across the entire food security chain from production [in areas such as plant and animal health] to marketing and distribution [in areas such as agricultural and consumer economics] to consumption [in areas such as nutrition education and diet adequacy] to improving the quantity and quality of food and drinking water available to at-risk populations.

Our ultimate goals with respect to food safety are to develop safe food products and processing techniques for use by the food processing industry, and to increase the use of safe food handling practices by producers, distributors, retailers, households, consumers [adults and youth], and establishments that prepare food for public consumption.

V(E). Planned Program (Inputs)

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

Year	Extension		Research	
	1862	1890	1862	1890
2016	0.0	0.0	6.0	0.0
2017	0.0	0.0	6.0	0.0
2018	0.0	0.0	6.0	0.0
2019	0.0	0.0	6.0	0.0
2020	0.0	0.0	6.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Activities will include an effort to determine the potential of high-pressure processing to improve fresh and further-processed meat quality, a project to develop and employ effective methods for the investigation of potent odorants [aroma-active compounds] in foods, food ingredients, and various other complex materials, a study with the long-term goal of developing an effective labeling system for consumers who have health concerns related to sodium and fat to aid in making healthy food choices, work focused on the design, testing, and implementation of new alternatives to delivering micronutrients at the point of use to children using raw food materials present in country or provided through Food for Peace and other USAID/WFP managed programs [targeted technologies will be low-cost, stealth or culturally accepted, simple to use, adaptable to current deficiencies, of limited energy input, and environmentally friendly], research to improve our fundamental understanding of the interactions among bacteria, produce, sanitizer, and washing solution hydrodynamics [such knowledge is indispensable to insure produce microbial safety], a study to determine the relationship between the degree of hydrolysis of proteins in a formulation and the physical and sensory characteristics of the resulting high-protein snack product [this will further demonstrate the potential for commercialization of high-protein extruded snacks and increase utilization of whey and soy protein ingredients in a novel product concept], the formation of multidisciplinary teams to develop specific research and outreach programs to support an increase in the production and availability of fresh, local fruits and vegetables and an expansion of the number of farmers who supply fresh produce to enhance local economies, consumer health, and food security, and research to design, formulate, characterize, and assess efficacy of novel nanoemulsion systems created from ultrasonication of common and underutilized legume protein sources.

Activities will also include work with the goal of making Hispanic-style fresh cheeses safer to help meet market demand and prevent Listeria outbreaks, a study with the long-term goal of using the power of ultrasound to minimize the food safety risk of fresh produce, the identification of methods that extend the shelf life, improve the nutritional quality, and enhance the safety of fresh cut produce [this will have a significant positive impact on consumers' acceptance of these products and improve the financial return to producers], a project with the objective of attracting more customers to the farm by helping growers identify rootstocks that will reduce tree height without compromising fruit quality [another objective is to give direct market customers more selection of fruits that are tree-ripened and of superior quality], research to describe transport mechanisms and thermomechanical behavior of food biopolymers using a general

mathematical model solved with numerical simulations [this would allow the description of a diverse range of processes such as drying, frying, sorption, fluid and species transport in biological tissues, controlled release applications, and heat-flavor interactions using predictive modeling], and a project with the goal of determining the critical factors in controlled inoculation studies with human pathogens and surrogates that influence the outcome of quantitative microbial risk assessments and to evaluate and control unintentional and intentional microbial contamination of intact and fresh-cut produce.

Extension activities in this area will focus primarily on corn and soybean crop production and management, as well as fruit and vegetable production. Activities will include the statewide **Corn and Soybean Classics** with Extension specialists and educators highlighting the latest research, **Illinois Ag Masters Conferences**, regional crop management conferences, and multi-state and state conferences such as the **Small Fruit and Strawberry School** that focus on production of fruits, vegetables, other specialty crops, and organic production. Field days at research stations, pesticide safety application training, the use of webinars and web-based newsletters, and distance diagnostics of corn, soybean, and other food crop pests are other education methods that will be carried out. In addition, education and support will be provided to those interested and involved in local food systems and **Master Gardener** volunteer assistance will be provided to youth and families interested in growing fresh produce.

Extension activities that address hunger within Illinois are delivered by **Expanded Food and Nutrition Education Program** [EFNEP] staff and **Supplemental Nutrition Assistance Program - Education** [SNAP-Ed] staff members who conduct hands-on activities with those children and their parents and other adults who have limited incomes. These activities will include proper hand-washing, using food stamps, meal planning, wise shopping, and the use of food pantries. Additional Extension activities focusing on safe food handling during production, distribution, retailing, preparation, storage, and service to the public will include workshops, website postings, and presentations both in-person and via distance education. Extension Educators will continue to teach workshops: [1] For volunteers who serve or sell food to the public [**Serve It Safely**]; [2] For certification of food service handlers and food service managers involved in commercial food service establishments that sell food for public consumption; and [3] For individuals who are engaged in cottage food operations. An online course on food preservation [**Yes You Can--Preserve Food Safely**] focused on safe food handling with supplemental courses being delivered in person. In addition, a course on safely using fresh produce in school cafeterias will be developed and offered to school personnel that work in kitchens or school gardens. Training on good agricultural processes for producers of fresh produce will focus on water usage and water quality testing, worker health and hygiene, facilities and equipment sanitation, manure handling and field application, and record-keeping. Classes and online certification training addressing proper use of animal health medications to ensure pork product safety will also be delivered [the Animal Health and Production planned program also addresses food security production efforts]. It should be noted that changes being considered by the Illinois Department of Public Health for the certification of those serving food to the public may affect Extension's involvement in conducting those programs.

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

Extension

Direct Methods	Indirect Methods

● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention ● Demonstrations ● Other 1 (Webinars)	● Newsletters ● TV Media Programs ● eXtension web sites ● Web sites other than eXtension ● Other 1 (Podcasts)

3. Description of targeted audience

Members of the target audience will include farmers and the fresh produce industry, food industry professionals who work with extruded snack and cereal products, Illinois horseradish growers and scientists as well as dieticians interested in phytonutrient research in horseradish, U.S. food producers, processors, ingredient manufacturers, and flavor companies, researchers in the fields of economics, public health, and nutrition, policy makers charged with improving the well-being of low-income Americans, program administrators overseeing food assistance programs, scientists at peer institutions, officials from USAID, food industry scientists, the international food and nutrition scientific community, members of the general public who have an interest in the delivery of nutrients and nanoencapsulation, supply chain personnel, farmers' market managers, and the U.S. dairy industry.

Extension's primary audience includes over 1,500 certified crop advisers who consult with producers involved in raising 26 million acres of field crops, fruits and vegetables [at least 64 vegetable and 15 fruit crops are produced commercially in Illinois], as well as working directly with these producers and their employees. Other audiences targeted by Extension include distributors and retailers of fresh produce, individuals and entities interested in developing or participating in local food systems, small farmers, consumers [especially those who are from food-insecure households], employers and employees of establishments that prepare food for public consumption, volunteers who serve or distribute food for public consumption or teach others how to safely prepare and serve food, cottage food operators, school kitchen personnel, regulatory agencies, and youth who prepare food or who raise meat animals.

V(G). Planned Program (Outputs)

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

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

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

V(H). State Defined Outputs

1. Output Measure

- Number Of Completed Hatch 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	Number Increasing Knowledge Of New Corn And Soybean Crop Management Techniques
2	Number Of Pounds Of Food Produced Or Donated For Consumption By Vulnerable Populations
3	Number Of Food Preparers Reporting Using Proper Time And Temperature Controls
4	Number Of Food Preparers Reporting Taking Steps To Reduce Cross-Contamination
5	Number Of Growers, Producers, And Employees Completing GAPS, GMPs, HACCP, Food Safety Certification, And Onfarm BMP Programs To Increase Food Safety
6	Development Of Fortification Technologies For Developing Countries
7	Enhancement Of Microbial Safety In Fresh Produce
8	Development Of Effective Methods For The Investigation Of Potent Odorants In Foods
9	Determining The Potential Of High-Pressure Processing To Improve Fresh And Processed Meat Quality

Outcome # 1

1. Outcome Target

Number Increasing Knowledge Of New Corn And Soybean Crop Management Techniques

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 111 - Conservation and Efficient Use of Water
- 704 - Nutrition and Hunger in the Population

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Number Of Pounds Of Food Produced Or Donated For Consumption By Vulnerable Populations

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 111 - Conservation and Efficient Use of Water
- 701 - Nutrient Composition of Food
- 703 - Nutrition Education and Behavior
- 704 - Nutrition and Hunger in the Population

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

Number Of Food Preparers Reporting Using Proper Time And Temperature Controls

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 503 - Quality Maintenance in Storing and Marketing Food Products

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

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 4

1. Outcome Target

Number Of Food Preparers Reporting Taking Steps To Reduce Cross-Contamination

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 5

1. Outcome Target

Number Of Growers, Producers, And Employees Completing GAPS, GMPs, HACCP, Food Safety Certification, And Onfarm BMP Programs To Increase Food Safety

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 111 - Conservation and Efficient Use of Water
- 501 - New and Improved Food Processing Technologies
- 503 - Quality Maintenance in Storing and Marketing Food Products
- 504 - Home and Commercial Food Service
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 6

1. Outcome Target

Development Of Fortification Technologies For Developing Countries

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 502 - New and Improved Food Products
- 503 - Quality Maintenance in Storing and Marketing Food Products
- 701 - Nutrient Composition of Food
- 702 - Requirements and Function of Nutrients and Other Food Components
- 703 - Nutrition Education and Behavior
- 704 - Nutrition and Hunger in the Population

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 7

1. Outcome Target

Enhancement Of Microbial Safety In Fresh Produce

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 501 - New and Improved Food Processing Technologies
- 503 - Quality Maintenance in Storing and Marketing Food Products
- 704 - Nutrition and Hunger in the Population
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

4. Associated Institute Type(s)

- 1862 Research

Outcome # 8

1. Outcome Target

Development Of Effective Methods For The Investigation Of Potent Odorants In Foods

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 501 - New and Improved Food Processing Technologies
- 502 - New and Improved Food Products
- 503 - Quality Maintenance in Storing and Marketing Food Products
- 702 - Requirements and Function of Nutrients and Other Food Components

4. Associated Institute Type(s)

- 1862 Research

Outcome # 9

1. Outcome Target

Determining The Potential Of High-Pressure Processing To Improve Fresh And Processed Meat Quality

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 501 - New and Improved Food Processing Technologies
- 502 - New and Improved Food Products
- 503 - Quality Maintenance in Storing and Marketing Food Products
- 701 - Nutrient Composition of Food

4. Associated Institute Type(s)

- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

Description

Economic difficulties insure that food safety and food security will be top global priorities for many years to come. Natural disasters continue to influence the availability of facilities for safely developing, storing, distributing, and using food products. The changes in the economy and appropriation changes also continue to influence the resources available for research and Extension programs. Government regulations may influence food product development and processing. The economic sustainability of retailers who can provide fresh produce in communities of residents with limited incomes can affect access to adequate food. Competing priorities [public and programmatic] may influence the level of programmatic effort from Extension staff.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

1. An evaluation has been developed to follow-up with producers of fresh produce who participate in training targeted at preventing contamination that causes foodborne illness [local food systems participants]. Fresh produce growers who participate in workshops will complete end-of-meeting surveys and follow-up mail or online surveys of practice changes at the end of the growing season.

2. Evaluations will also be used to determine knowledge and practice changes of participants who serve food to the public and attend food safety certification programs. It should be noted that changes being considered by the Illinois Department of Public Health for the certification for those serving food to the public may affect Extension's involvement in teaching and evaluating changes in participants.

3. An evaluation has been developed and geared for cottage food operators. It will be distributed to participants at the end of each program.

4. Exams will be administered to participants in youth pork assurance training and quality assurance and ethics training. Passage of exams after completing **Quality Assurance and Ethics Training** required for youth exhibiting 4-H livestock projects will be tallied.

5. An evaluation will be administered to participants with small acreages at the end and in follow-up to programs that identify knowledge and confidence gained and new or improved production practices implemented for their acreages.

6.. Evaluations have been developed to identify commercial fresh produce growers knowledge and intended practice changes at the end of various state vegetable and fruit schools and the practices taught and implemented by previous school returnees.

7. An online site will be created to store data on pounds of produce donated from adult and youth community gardens.

8. Evaluations have been developed to identify commercial fresh produce growers' knowledge and intended practice changes at the end of various state vegetable and fruit schools/conferences and the practices taught and implemented by previous school returnees.

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Human Health And Human Development

2. Brief summary about Planned Program

Within the Department of Human and Community Development in the College of ACES is the **Family Resiliency Program** [www.familyresiliency.illinois.edu]. Established in 2000, the program is dedicated to enriching child, individual, and family wellbeing in the context of communities. The program supports innovative research, education, and public engagement outreach activities that hold potential for strengthening families' ability to be resilient in the face of life stressors and to successfully navigate the competing demands of work and family. The center focuses activities around three themes: [1] Positive human development; [2] Family wellness; and [3] Strengthening family and community connections.

Leadership for nutrition and obesity research and education efforts rests primarily with the Department of Food Science and Human Nutrition, the Department of Human and Community Development, the Division of Nutritional Sciences, and University of Illinois Extension. One example of the multidisciplinary efforts being made to combat childhood obesity is the **STRONG Kids** project. This project takes a comprehensive approach with the overarching vision to discover and document salient predictors of and mechanisms through which individuals develop health-related behaviors and beliefs and to develop tailored prevention and intervention programs for families and children that promote healthy development, that are evidence-based, and that are grounded in developmental theory. Another project, **Abriendo Caminos**, aims to involve the whole family in culturally-sensitive activities that promote healthy eating, positive family interactions, and active living in immigrant families with school-age children through the development of a new set of materials in an after-school program. Research evaluating the impact of the **BackPack Program**, a partnership between food banks and schools to distribute child-friendly easy-to-prepare food to children who are at risk for hunger is also in progress. **Up-Amigos** involves self-reports by college applicants to a Mexican university to explore associations between genetic predisposition, environmental factors, and obesity and related outcomes.

Ongoing University of Illinois Extension interdisciplinary programs address family issues at all stages of the life cycle from infancy through issues of aging and care of dependent adults. In addition, human development and family wellbeing is dependent on financial stability and good health. Due to the interdisciplinary focus of Extension programs, multi-county Extension Educators with assignments in nutrition and wellness, consumer economics, and family life will work together and will draw on research and expertise through the Department of Food Science and Human Nutrition, the Department of Human and Community Development, and the Division of Nutritional Sciences in the College of ACES, from the College of Applied Health Sciences, other campus colleges and institutes, and from other states' Extension programs to deliver educational programming to enhance successful physical, financial, and emotional health of individuals and families. Extension activities that address healthy food choices will be delivered by **Expanded Food and Nutrition Education Program** [EFNEP] staff and **Supplemental Nutrition Assistance Program - Education** [SNAP-Ed] staff who conduct hands-on activities with children and their parents and other adults who have limited incomes. Curriculum and training will be provided for elementary teachers to encourage healthy eating and physical activity. The **4-H Youth Development** staff has also committed to conducting programs that enhance youth health and development.

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 : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
703	Nutrition Education and Behavior	35%		20%	
704	Nutrition and Hunger in the Population	0%		10%	
724	Healthy Lifestyle	5%		20%	
801	Individual and Family Resource Management	10%		0%	
802	Human Development and Family Well-Being	30%		15%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	5%		10%	
805	Community Institutions and Social Services	5%		5%	
806	Youth Development	10%		20%	
	Total	100%		100%	

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

1. Situation and priorities

Ongoing research is focusing on how family resiliency can be enhanced. Aging Americans and their families are faced with shifting roles in care-giving and relationships within the family. In Illinois there are over 2.4 million caregivers caring for aging adults and/or children. Balancing work and family often brings increased stress, fatigue, illness, and strained relationships. Parenting can become overwhelming, often resulting in child abuse or an environment that is not supportive of the healthy development of youth because parents lack knowledge and skills regarding best parenting practices. In addition, over 200,000 Illinois children live in homes with grandparents who are responsible for them and are struggling to cope with complex changes that affect lifestyles, employment, and family relations.

Poor nutrition, the lack of physical activity, obesity, and the burden of chronic diseases such as diabetes and heart disease [the leading cause of death in Illinois] continue to negatively impact the physical health of both individuals and families. Overweight children are at risk of remaining overweight into adulthood, with being overweight by age eight predicting the most severe adult obesity. While heart disease ranks as the leading cause of death in Illinois, diabetes ranks as the seventh leading cause with more than 800,000 adults [8.2%] in the state having been diagnosed with diabetes. In addition, financial insecurity can lead to increased anxiety that can result in chronic psychological stress that contributes to a variety of health problems such as heart disease, depression and obesity.

Extension will give priority to providing education on nurturing children, supporting adult care-givers, managing work/life issues, coping with risks associated with financial wellness and security, maintaining adult cognitive health, and managing physical health including chronic diseases.

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

That resource levels will remain sufficient for family, nutrition, and consumer finance research and educational programming and that our current understanding of the complex relationships involved among family members is sufficient to provide research-based educational programming. We believe that increasing public attention to obesity and the importance of healthy eating and exercise will result in an increase in resources devoted to not only the obvious causes such as a lack of nutrition research and education but also other, often less-recognized causes such as media exposure, family stability, and peer networks.

2. Ultimate goal(s) of this Program

Researchers are studying the factors that enhance or hinder resilience in families in order to create programs and policies that will foster healthy families. Researchers are also studying the processes of positive social and emotional development in children and adolescents in order to develop ways in which parents, teachers, and other adults can foster healthy development. Work under this planned program also strives to provide research in areas such as human nutrition and family development that will help to identify the key causes of obesity.

Through Extension programs, families will thrive by managing work-life challenges, understanding children's development and how to foster it, coping with the challenges of aging and intergenerational issues, fostering financial wellness, and addressing childhood obesity and chronic diseases through diet, exercise, and social support that are relatively easy to incorporate into pre-existing lifestyle routines.

V(E). Planned Program (Inputs)

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

Year	Extension		Research	
	1862	1890	1862	1890
2016	0.2	0.0	10.0	0.0

2017	0.2	0.0	10.0	0.0
2018	0.2	0.0	10.0	0.0
2019	0.2	0.0	10.0	0.0
2020	0.2	0.0	10.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Activities will include a research program with the goal of preventing adult obesity among women [the specific purpose of this research program is to identify determinants of weight gain prevention as guided by Social Cognitive Theory], an exploration of how Latino parents balance old and new ideas and ways as they raise adolescents in different contexts in the U.S., work to improve our understanding of the protective factors that maintain relationship quality during the transitions to marriage and parenthood, work to determine how best to provide nutrients to infants when breastfeeding is undesirable or impossible, a study of family and child outcomes of stay-at-home father families, an examination of the implications of the promotion of youth participation at the global, national, and local scale, an evaluation of the effect of dietary botanical estrogens on breast cancer growth and progression using preclinical animal models, an investigation into how nutrients interact with the gastrointestinal tract to change overall physiology and behavior as measured by alterations in absorption, hormonal, and neural signaling [this research is driven by the idea that there are differences in these physiological factors between lean and obese individuals and by finding the most efficient route by which to manipulate these systems we can achieve decreases in appetite and improvements in metabolic disorders], the development of an afterschool physical activity curriculum and template to effectively support healthy weight among Latino school children [the proposed project is aimed at refining the curriculum, documenting that it is feasible to administer in an after-school setting, and demonstrating that it is effective in improving physical health], and a project with the long-term goal of determining the efficacy of encapsulated probiotic delivery systems in selected food products using simulated GI tract models.

Activities will also include an effort to translate the scientific energy balance evidence and parenting styles into practical and appropriate recommendations for training Extension health educators that work with parents, a project that will generate knowledge about multiple cultural identities in the daily lives of youth in non-metropolitan communities in the Midwest and how juggling these multiple identities may be associated with psychological well-being and attitudes towards other cultural groups [cultural identity research with rural populations lags behind studies with urban populations], ongoing implementation of the **Child Development Laboratory** [**CDL**] **Research Database Project**, ongoing work under the **GET-UP KIDS** project with the objective of integrating observed [phenotype] characteristics with genetic information and building a large cohort of data in our community [we are interested in understanding how the individual genetic material interacts with the environment to promote or delay metabolic effects that result in excessive weight gain or related diseases], work to address the need to establish an evidence-based school-friendly intervention to prevent overweight and diabetes in adolescence as well as providing teacher support at a time when school resources are being dramatically cut, a study to determine whether dietary tomato powder will slow or limit the development of castration-resistant prostate cancer, and research that will contribute to our understanding of social-emotional development among young children from rural and suburban communities.

Activities will also include a project focusing on enriching our current understanding of the role soy foods can play in colon cancer prevention [results will provide information on the practical application of soy products for daily food consumption and will be instrumental in decreasing colorectal cancer

incidence], an effort to broaden our understanding of the complex socio-behavioral mechanisms that put children at risk for obesity, a project designed to enhance our understanding of the mechanisms of healthy foods in chronic disease prevention and provide new knowledge for understanding how nutrition early in life shapes physiology and susceptibility to childhood obesity [results will provide information on practical application of daily food consumption for healthier living], and a mixed-methods study to determine and contextualize physiological stress in educators and to determine how stress and resilience impact the development of a teacher moving from the pre-service to novice years.

Extension activities will focus on multi-disciplinary areas that include: [1] Parenting and childcare education; [2] Care-giving education for those who care for adults; [3] Work-life management education; [4] Reducing the risk of and managing chronic diseases with an emphasis on proper nutrition; [5] Maintaining cognitive health; [6] Fostering financial wellness; and [7] Planning ahead for long-term care and retirement. Delivery methods will primarily include webinars, live and taped video training, informational websites, electronic newsletters, blogs, podcasts, and social media networking communities. These efforts will include maintenance of the **Parenting 24/7** and **Plan Well, Retire Well** websites and newsletters and local and regional workshops related to long-term care and self-care for caregivers [**Powerful tools for Caregiving** and **Caregiving Relationships]**; preventing and managing chronic diseases [**I on Diabetes**, **Dining with Diabetes**, **Meals for a Healthy Heart**, and **Live Well-Be Well**]; and managing the challenges of contemporary working life [**Intentional Harmony** and **Putting Wellness to Work** curricula]. Additional activities include programs related to brain fitness and maintaining cognitive health, parenting and childcare provider training, fact sheets and brochures such as the **Your Young Child** series, a bullying prevention simulation for middle school youth, and an alcohol, drug, and tobacco prevention program delivered by 4-H Youth Development Educators and teens.

Programs that address financial wellness will include **Financial Wellness for College Students** that will encompass a series of webinars, as well as in-person support through trained peer educators. Train-the-trainer discussion guides and handouts [**All My Money, Healthy Living Throughout the Lifespan**] will be provided for agencies and organizations to enable them to work with limited resource audiences and volunteers will be trained to be **Master Money Mentors.**

Extension activities that address healthy food choices will be delivered by **Expanded Food and Nutrition Education Program [EFNEP] staff** and **Supplemental Nutrition Assistance Program Education [SNAP-Ed]** staff who conduct hands-on activities with children and their parents and other adults who have limited incomes. Education regarding healthy snacks, good nutrition, and the importance of physical activity is stressed in preschool, elementary school classrooms, and summer day camps and cooking schools. In addition, websites in English and Spanish will be available that provide information on diabetes, a potential consequence of obesity and one that provides games for middle-school youth on health education via the internet. Anticipated continuing partnerships among **EFNEP, SNAP-Ed,** and **4-H** will engage teens in teaching youth about healthy food choices and physical activity. Extension staff will also be joining faculty to integrate research and Extension through the **Abriendo Caminos** project to conduct culturally-sensitive activities to promote healthy eating in after-school programs.

Completion of a funded second-year initiative to educate individuals on the improper use, storage, and disposal of **Pharmaceuticals and Personal Care Products: Extending Knowledge and Mitigation Strategies** will hopefully be continued, as well as implementation of the results of a second initiative **Health and the Built Environment** involving university students majoring in design and community leaders and residents to improve the health of built environments [places where people live, learn, work, and play]. A third "cross-campus" initiative"-**Illinois Health Care Reform Initiative** project will focus on helping college students to better understand health insurance and message strategies to assist them in accessing health insurance.

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

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention ● Demonstrations ● Other 1 (DVD's) ● Other 2 (Webinars)	● Newsletters ● Web sites other than eXtension ● Other 1 (Train The Trainer) ● Other 2 (Podcasts)

3. Description of targeted audience

Members of the target audience included young adult and midlife women, nutrition and dietetics professionals, breast cancer survivors, health care professionals, families with more than two children in the 4- to 12-year old age range, product developers who are interested in improving health benefits using microencapsulation technology, research scientists interested in early childhood obesity prevention, early childhood educators, parents of young children, Extension Educators, nutrition Extension Specialists, postdoctoral fellows in human development, family science, psychology, and related social and behavioral sciences, research scientists in childhood obesity prevention and food insecurity, parents and educators of children between birth and eight years of age, eXtension educators in nutrition and family life, policy makers interested in child health and wellbeing, university students and the administrators and educators responsible for their growth and development as emerging leaders, professionals in food science and human nutrition, commodity groups, clinicians and practitioners who serve children and families, and scientists and practitioners interested in the regulation of intestinal digestive and absorptive function.

Individuals at risk for or coping with diabetes, obesity or heart disease will be a priority recipient of Extension programming, as will families living in low-income and high-risk neighborhoods where programming will be adapted to reach racially, ethnically, and culturally diverse audiences and youth. Other target audiences include parents and childcare providers, grandparents responsible for young children, caregivers of aging adults, college students, adolescent youth, agencies and organizations working with limited resource audiences, and volunteers interested in mentoring those who seek to build financial skills.

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 Completed Hatch 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	Number Of Research Projects Utilizing The Child Development Laboratory Research Database
2	Increased Knowledge Of Children's Behavior At A Given Stage Of Development And Parenting And Childcare Providers Practices To Foster That Behavior
3	Numbers Of Individuals Taking Recommended Actions To Manage Heart Disease And Diabetes.
4	Number Of Children/Youth Who Reported Eating Healthier Foods [Those Low In Fat And High In Fiber]
5	Number Of Families/Caregivers That Gained Knowledge About Eating Healthier Foods [Those Low In Fat And High In Fiber]
6	Number Of Adults That Apply Skills As They Age In Maintaining Brain Fitness And Cognitive Health
7	Extension Of A Successful, Evidence-Based Approach For Strengthening Prosocial Sibling Relationships
8	Evaluating The Effect Of Dietary Botanical Estrogens On Breast Cancer Growth And Progression
9	Identifying The Determinants Of Weight Gain Prevention As Guided By Social Cognitive Theory [SCT]
10	Exploring How Latino Parents Balance Old And New Ideas As They Raise Adolescents In The United States
11	Translating Scientific Energy Balance Evidence And Parenting Styles Into Practical Recommendations For Training Extension Educators
12	Number Of College Students And Adults That Increased Knowledge And Skills In Managing Income And Expenses.

Outcome # 1

1. Outcome Target

Number Of Research Projects Utilizing The Child Development Laboratory Research Database

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Research

Outcome # 2

1. Outcome Target

Increased Knowledge Of Children's Behavior At A Given Stage Of Development And Parenting And Childcare Providers Practices To Foster That Behavior

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

Numbers Of Individuals Taking Recommended Actions To Manage Heart Disease And Diabetes.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 4

1. Outcome Target

Number Of Children/Youth Who Reported Eating Healthier Foods [Those Low In Fat And High In Fiber]

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 704 - Nutrition and Hunger in the Population
- 724 - Healthy Lifestyle
- 801 - Individual and Family Resource Management
- 802 - Human Development and Family Well-Being
- 805 - Community Institutions and Social Services
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 5

1. Outcome Target

Number Of Families/Caregivers That Gained Knowledge About Eating Healthier Foods [Those Low In Fat And High In Fiber]

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 6

1. Outcome Target

Number Of Adults That Apply Skills As They Age In Maintaining Brain Fitness And Cognitive Health

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 724 - Healthy Lifestyle
- 802 - Human Development and Family Well-Being

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 7

1. Outcome Target

Extension Of A Successful, Evidence-Based Approach For Strengthening Prosocial Sibling Relationships

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 8

1. Outcome Target

Evaluating The Effect Of Dietary Botanical Estrogens On Breast Cancer Growth And Progression

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 724 - Healthy Lifestyle

4. Associated Institute Type(s)

- 1862 Research

Outcome # 9

1. Outcome Target

Identifying The Determinants Of Weight Gain Prevention As Guided By Social Cognitive Theory [SCT]

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 704 - Nutrition and Hunger in the Population
- 724 - Healthy Lifestyle

4. Associated Institute Type(s)

- 1862 Research

Outcome # 10

1. Outcome Target

Exploring How Latino Parents Balance Old And New Ideas As They Raise Adolescents In The United States

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Research

Outcome # 11

1. Outcome Target

Translating Scientific Energy Balance Evidence And Parenting Styles Into Practical Recommendations For Training Extension Educators

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 704 - Nutrition and Hunger in the Population
- 724 - Healthy Lifestyle
- 801 - Individual and Family Resource Management
- 802 - Human Development and Family Well-Being
- 805 - Community Institutions and Social Services
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 12

1. Outcome Target

Number Of College Students And Adults That Increased Knowledge And Skills In Managing Income And Expenses.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 801 - Individual and Family Resource Management

4. Associated Institute Type(s)

- 1862 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Economy
- Appropriations changes

- Competing Public priorities
- Competing Programmatic Challenges

Description

Any significant trend that affects the family, including changes in divorce rates, parents delaying having children until later in life [or on the opposite side an increase in teen pregnancy], a downturn in the economy [or other forms of economic hardships], and continued migration from rural to urban areas.

External factors also include anything that could encourage or impede the ability of children and their parents to make smart food choices. These include obvious factors such as access to foods that are high both in nutritional quality and in child acceptance and access to information provided by Extension Educators in selecting foods that are both affordable and healthy. Also included is almost any factor that significantly impacts the life of a family, whether it be economic [such as a parent losing their job and feeling much more limited in the food choices they can make] or interpersonal [for example, a stable family is much more likely to engage in activities with their child, such as going for walks, that encourage physical fitness].

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

1. For the **Meals for a Healthy Heart** two-part program, evaluations will be collected from all participants to assess practice changes regarding regular meal planning, checking of blood pressure and cholesterol, reducing consumption of high fat foods and sodium, increasing use of food labels in food-purchasing decisions, and increasing physical activity. Following the **Meals for a Healthy Heart** program, an evaluation will be mailed or an e-mail directing participants to an online website will be sent to all participants to determine practice changes.

2. The **I on Diabetes** series of four 2 ½ -3 hour sessions provides information on treatment goals and self-monitoring, managing carbohydrates, sodium, cholesterol, and fat portions, planning meals, reading food labels, and using artificial sweeteners, low-fat products, and herbs and spices. Practice changes will be measured at the beginning and at the end of the series or session. Pre-and post-tests will be distributed and collected at the first and last sessions of **I on Diabetes** to identify reductions in fat intake, sodium intake, use of meal plan, increased use of food labels to plan meals, and increased physical activity.

3. **Putting Wellness to Work** is an interactive series targeted at working adults and delivered at workplace sites. Each series includes 4 classes, covering topics from nutrition, food trends, fitness, stress management, and healthy relationships. Pre-and post-tests will be administered by an Extension Educator to the participants.

4. **Breaking the Code** is a program provided by Extension staff or conducted by teachers for middle-school youth to recognize and change behaviors related to bullying using a series of simulations. The evaluation will focus on increased self-awareness changes, changes in managing and expressing emotions, and preventing and managing interpersonal conflicts. Pre-and post-tests will be administered by an educator to assess the knowledge changes of middle school youth participants.

5. A 4-H **Healthy Living Survey** that primarily draws on 4-H National Common Measures will be distributed to a sample of youth participants in nutrition and health projects, programs, and activities.

6. **Master Money Mentors** will complete an evaluation at the end of their training and their mentees will receive an evaluation to complete and document skills learned and used to improve their financial management and wellness.

7. **4-H Health Rocks!** youth participants will complete an evaluation at the end of their program designed to reduce tobacco, alcohol, and drug abuse.

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Natural Resources And The Environment

2. Brief summary about Planned Program

Leadership at the University of Illinois for the Natural Resources and the Environment planned program is provided through a multidisciplinary approach as exemplified by the College of ACES Department of Natural Resources and Environmental Sciences [NRES].

Research topics of NRES faculty and affiliates explore subjects ranging from aphids to zebra mussels, and everything from individual genes to the ecosystem of the planet earth. Hatch-sponsored projects range from researching the relationship between how humans experience being part of nature and how that in turn influences environmentally-responsible behavior to how chemical inputs from atmospheric deposition influence good nutrient management in both crop and forest systems. Of critical interest to both agriculture and ecosystem management is how fertilizer application affects nutrient management under various management scenarios.

Extension Educators with assignments in environment and energy stewardship, local food/small farms, and 4-H youth development along with campus horticulture, forestry, and agricultural engineering faculty and staff will have primary responsibility for conducting programs that address reduced tillage techniques, soil and water quality management, and environmental sustainability and stewardship in a state that is undergoing increasing urbanization, changing demographics, shifting land use, and a decline in outdoor recreational and educational activity use. Educational delivery methods for addressing these areas include online courses, conservation field days and activities, workshops, websites, forums, conferences, and volunteer training.

The efforts of the University of Illinois to address climate change span multiple departments and units, including the Department of Natural Resources and Environmental Sciences, the Department of Crop Sciences, the Department of Agricultural and Biological Engineering, and the Prairie Research Institute and are on local [such as scientists working to identify the impact of agricultural chemicals and Extension specialists working to educate farmers on how to minimize agricultural impacts without sacrificing yields], regional [such as working to determine the impact of climate change on animal habitats], and global [such as the **National Atmospheric Deposition Program** monitoring network's data, which is used to measure the rate and geographic distribution of air pollutant deposition] scales.

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 : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	30%		15%	
111	Conservation and Efficient Use of Water	5%		0%	
112	Watershed Protection and Management	15%		10%	
123	Management and Sustainability of Forest Resources	5%		10%	
132	Weather and Climate	10%		10%	
133	Pollution Prevention and Mitigation	5%		10%	
134	Outdoor Recreation	0%		10%	
135	Aquatic and Terrestrial Wildlife	0%		15%	
211	Insects, Mites, and Other Arthropods Affecting Plants	0%		10%	
405	Drainage and Irrigation Systems and Facilities	5%		5%	
605	Natural Resource and Environmental Economics	5%		5%	
806	Youth Development	20%		0%	
	Total	100%		100%	

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

1. Situation and priorities

It is more apparent than ever that being a wise steward of our natural resources not only makes for good citizenship but also makes good sense. Ensuring a safe and adequate water supply is an issue in both urban and rural areas of Illinois. Protecting the environment was the broad issue area selected by the third-largest number of respondents [85% of 9,439] who completed the 2009 Extension survey of the public's educational interests. Water quality was by far the topic of most interest under this issue area. Chemical use by agricultural producers and homeowners and soil erosion are viewed as serious contaminants of the environment. In addition, chemical use has been identified as affecting air quality and destroying beneficial plant life. Forestry management for timber, wildlife, or recreation is a high priority for landowners. Wildlife management concerns range from habitat enhancement to nuisance management. This program seeks to balance the needs and demands of resource utilization with environmental quality and sustainability. Extension priority programming will also target maintaining natural area recreation protection and invasive species control.

Scientists are certain that human activities are changing the composition of the atmosphere through increasing the concentration of greenhouse gasses, which will change the planet's climate by trapping heat on the earth's surface. Human health can be affected directly and indirectly by climate change through extreme periods of heat and cold, storms, climate-sensitive diseases such as malaria, and smog episodes. Reduction of energy-related activities is a priority because three-quarters of our human-

generated greenhouse gas emissions are carbon dioxide from burning fossil fuels. Extension can educate farm and forest landowners about the wide variety of potential carbon emission reduction methods and enhancing carbon removal from the atmosphere and storage through returning biomass to the soil [sequestration of carbon]. Other educational priorities will focus on protecting existing forests/trees [which store carbon in their biomass] and helping individuals and businesses discover ways to decrease greenhouse gas emissions, increase the nation's energy independence, and also save money.

2. Scope of the Program

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

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

1. Assumptions made for the Program

That researchers and Extension Educators will seek to optimize the rates of fertilizers and pesticides to ensure economic and environmental sustainability, that Illinois researchers and educators will continue to make significant contributions toward identifying causes and developing solutions with regard to climate change, that rapidly-growing niche markets such as organic farming are in need of science-based information in areas such as sustainability, and that even in an ever-increasingly competitive environment, stakeholders will continue to see the importance of protecting and best utilizing our natural resources.

2. Ultimate goal(s) of this Program

To balance human needs for energy, agricultural products, living space, and economic productivity with wise stewardship of our natural resources and to ensure environmental friendliness and resource utilization efficiency, best utilization of insect management in agricultural cropping systems, and minimizing agricultural impacts on the environment and to enable citizen involvement in the preservation of natural resources through forest, prairie, watershed, and wildlife management by applying research-based knowledge.

V(E). Planned Program (Inputs)

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

Year	Extension		Research	
	1862	1890	1862	1890
2016	0.0	0.0	6.0	0.0
2017	0.0	0.0	6.0	0.0
2018	0.0	0.0	6.0	0.0
2019	0.0	0.0	6.0	0.0
2020	0.0	0.0	6.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Activities will include a project with the overall goal of documenting phosphorus input and output budgets in constructed wetlands receiving tile flow from adjacent corn and soybean farm fields in central Illinois [this will allow us to determine the effectiveness of these wetlands in removing phosphorus from the tile water entering them and then place what we learn in the context of the overall Embarras River watershed], a long-term study and life-cycle assessment accounting for the inputs, outputs, and associated benefits of various soil management systems, work to improve our understanding of the role urban agriculture plays in the conservation of species and the provisioning of ecosystem services, ongoing enhancement of online interactive keys to Empoasca and related typhlocybine leafhoppers, the development of data on how two commonly used herbicides [atrazine and glyphosate] affect the life history traits of vector mosquitoes, research designed to test the response of the gypsy moth immune system to a DNA-based virus, an RNA-based virus, and two microsporidian species, work with the goal of optimizing the utility of the soil resource for maximum benefit to society and to individual landowners [large areas of Illinois have been altered by the use and misuse of soils due to compaction, contamination, and other problems related to urbanization, industrial use, or other high-impact activities], a study to determine if similarity in hydrologic regimes among restored wetlands results in the convergence of restoration trajectories on similar plant communities, research with the goal of improving our understanding of how birds select habitats [this will allow us to develop effective conservation strategies and management techniques], and a project that will use the best instruments currently available to manipulate the charge of iron in clay minerals and to analyze the consequences with respect to soil fertility and environmental remediation.

Activities will also include a research project demonstrating the usefulness of sub-lethal, physiological metrics in assessing habitat quality and restoration success [this has the potential to provide restoration practitioners with another suite of tools and techniques that can be helpful in assessing the success or failure of restoration projects], field and laboratory research to develop and calibrate a process-based model of Hg methylation in bioreactors that can be used to optimize the tradeoff between complete NO3 removal and MeHg production when designing BMPs [this will be important in order for adopters of the bioreactor BMPs to be assured that their investment of time and resources was not made in vain], the application of molecular and genomic tools to the microbial ecology of plant invasions with the goal of moving this field past the 'black box' stage that characterizes the below-ground component of much current research [a clearer focus on soil microbial ecology will help expose the mechanistic links between microbes and invaders, elucidating the belowground factors that contribute to range expansion and invasion success], research with the goal of producing results that can be used to forecast areas that will be at high risk for the establishment of Lyme disease and where targeted preventative measures may be utilized, research with the long-term goal of developing sustainable ways to manage lepidopteran corn pests, and work with the primary objective of assessing the impact of land use change on soil organic carbon dynamics and greenhouse gas emissions on the sloping, nearly level, and pothole landscapes subjected to clearing, drainage, soil erosion, cultivation, or grazing [as a result of our findings, we would then recommend land use and agricultural management practices that would increase soil organic carbon sequestration and storage and decrease greenhouse gas emissions while sustaining or improving agricultural production, maintaining soil productivity, and reducing soil erosion under changing climate conditions].

Extension Educators located at the field stations will be working with campus faculty to carry out and disseminate the results of a five-year multi-state study on the effects of climate variability and impacts on the sustainability of corn-based cropping systems. Information related to handling climate stresses and the sequestration of carbon through reduced crop land tillage and pasture management will be incorporated into conference and website postings, as will information related to harmful exotic pests that can destroy

valuable commercial and urban forests that can counteract carbon build-up in the atmosphere. Proper pesticide applicator training to prevent contamination of natural resources and online courses for certified crop advisers will be available to adults associated with horticulture and agriculture production.

A new two-year funded initiative will focus on pharmaceuticals and personal care products [PPCPs] regarding improper use, storage, and disposal working with Illinois Sustainable Technology Center and Illinois-Indiana Sea Grant faculty and staff and other campus entities to research and monitor water quality and to propose strategies to control the presence of PPCPs and identify outreach opportunities and to develop educational materials that address use, storage, and proper PPCPs disposal.

Other Extension activities will include volunteer **Weather Observers, Master Gardener**, and **Master Naturalist** training offering science-based educational opportunities that connect people with nature and help them become engaged environmental stewards. Forestry workshops will be offered in select locations in the state and multi-state conferences will be conducted to address various related topics. Camping, conservation days, and the **I Think Green** and **4-H Citizen Scientist** initiatives will engage youth in investigating how living things interact with each other and their environment.

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

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● One-on-One Intervention ● Demonstrations ● Other 1 (Online Course) ● Other 2 (Webinars)	● Newsletters ● TV Media Programs ● Web sites other than eXtension ● Other 1 (Podcasts)

3. Description of targeted audience

Members of the target audience will include gardeners/farmers growing fresh produce in an urban environment, community groups that support urban food production, Extension Educators serving the urban audience, community-based organizations [Advocates of Urban Agriculture, Growing Power, Growing Home], urban planners [City of Chicago Department of Housing and Economic Development] and urban gardeners, professional insect taxonomists, Extension specialists, professional insect diagnosticians, students, amateur naturalists, insect ecologists, academic ecologists, land managers, restoration practitioners, government agency personnel involved in planning, implementing, and regulating wetland restoration programs, conservation groups, federal conservation agencies, city storm water managers, scientists and regulators working in the area of agricultural non-point pollution control, the scientific research and regulatory community working in the area of mercury pollution, researchers working in the areas of ecology, microbial ecology, invasion biology, restoration, weed science, and agroecology, aquatic scientists, students, conservation biologists at the state, regional, and national levels, Illinois and Corn Belt corn producers, Illinois crop consultants, seed technology/biotechnology professionals, policymakers, USDA Forest Service scientists, and regional and state natural resource professionals who manage forest lands and the general public who use these forests for recreation. Extension is also targeting livestock and crop producers, woodland owners, citizens who have a strong interest and desire to volunteer to preserve and showcase natural resources, crop consultants, greenhouse managers, organic growers and growers interested in sustainable farming practices, land improvement contractors, certified crop advisers, drainage contractors, pesticide applicators, and 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 Completed Hatch 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	Number Of Individuals That Increased Knowledge Of Human Actions That Negatively Affect The Environment
2	Dissemination Of Air Quality And Atmospheric Data Through Web Hits On The National Atmospheric Deposition Program Website
3	Assessing The Feasibility Of Urban Plant Agriculture
4	Improved Development Of Conservation Strategies Through An Improved Understanding Of How The Presence Of Social Cues Affects The Occupancy And Density Of Grassland Birds
5	Estimating The Value Of Natural Resources And Environmental Amenities To Guide Resource Management Decisions
6	Number Of Pesticide Applicators Making A Decision To Avoid Harming The Environment
7	Actions Taken By Program Participants To Protect The Environment [Water Quality, Air Quality, Soil Loss, Wildlife, Natural Vegetation]

Outcome # 1

1. Outcome Target

Number Of Individuals That Increased Knowledge Of Human Actions That Negatively Affect The Environment

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Dissemination Of Air Quality And Atmospheric Data Through Web Hits On The National Atmospheric Deposition Program Website

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 112 - Watershed Protection and Management
- 123 - Management and Sustainability of Forest Resources
- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation
- 135 - Aquatic and Terrestrial Wildlife

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

Assessing The Feasibility Of Urban Plant Agriculture

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 605 - Natural Resource and Environmental Economics

4. Associated Institute Type(s)

- 1862 Research

Outcome # 4

1. Outcome Target

Improved Development Of Conservation Strategies Through An Improved Understanding Of How The Presence Of Social Cues Affects The Occupancy And Density Of Grassland Birds

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Research

Outcome # 5

1. Outcome Target

Estimating The Value Of Natural Resources And Environmental Amenities To Guide Resource Management Decisions

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

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

- 133 - Pollution Prevention and Mitigation
- 134 - Outdoor Recreation
- 605 - Natural Resource and Environmental Economics

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 6

1. Outcome Target

Number Of Pesticide Applicators Making A Decision To Avoid Harming The Environment

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 112 - Watershed Protection and Management
- 133 - Pollution Prevention and Mitigation
- 135 - Aquatic and Terrestrial Wildlife

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 7

1. Outcome Target

Actions Taken By Program Participants To Protect The Environment [Water Quality, Air Quality, Soil Loss, Wildlife, Natural Vegetation]

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 123 - Management and Sustainability of Forest Resources
- 133 - Pollution Prevention and Mitigation
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

External factors include concerns at the global level [events that have an impact on the environment as a whole such as current concerns about greenhouse gas emissions], federal and state level [most importantly revolving around governmental policy decisions and the availability of resources], and at the local level [that owners of natural resources are wise stewards not only of their own resources but are aware of the impact their actions have on the community]. With regard to work focusing on climate change, external factors include the potential for demand for information and research to increase based on issuance of any government regulations of fossil fuel emission levels, discovery of viable alternative renewable energy sources, and reduced use of non-renewable resources.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

1. **I Think Green: It Takes Small Things to Care for a World** engages youth in investigating how living things interact with each other and with their environment focusing on worms, butterflies, and insects. Pre- and post-evaluations will be developed to survey knowledge gained by youth participants.

2. End of the year evaluation of the **4-H Citizen Scientist** program to determine the knowledge changes and actions taken by youth in formal leader-led groups that participate and focus on experiences associated with natural resources.

3. **Master Naturalist** program impact evaluations will include retrospective evaluations sent to participants to determine knowledge and attitude changes and to follow up on volunteer activities undertaken.

Additional evaluation efforts may include assessing program participant knowledge change and/or decision-making to protect or restore forest or urban shade or ornamental trees in future years.

V(A). Planned Program (Summary)

Program # 8

1. Name of the Planned Program

Plant Health, Systems And Production

2. Brief summary about Planned Program

Research at the University of Illinois and its partners covers the gamut of approaches from basic plant research to applied research, all leading to improving production both commercially and for the home grower. Illinois continues to partner with others to strengthen the agriculture and food sectors of the American Midwest while seeking to improve food quality and safety.

As a contributing partner to the **North Central States Integrated Pest Management Program** [IPM], Illinois research and Extension supports the combination of research/Extension implementation projects, the development of individual pest control tactics, as well as Extension education and training. Funded research addresses emerging concerns such as the control of exotic, invasive weeds and pest management for the production of organic vegetable crops and the management of other commodity food crops and ornamental plants [See Food Safety and Food Security planned program].

Multi-county Extension Educators and State Extension Specialists [who focus on horticulture] work to assist the ornamental horticulture industry [also known as the green industry] which is comprised of a variety of businesses involved in production, distribution and services associated with ornamental plants, landscape and garden supplies, and equipment. The planned program also encompasses education for the homeowner regarding environmentally-safe practices in maintaining lawns and landscaping.

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 : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	0%		10%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		15%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	5%		0%	
205	Plant Management Systems	30%		10%	
206	Basic Plant Biology	10%		10%	
211	Insects, Mites, and Other Arthropods Affecting Plants	20%		10%	
212	Diseases and Nematodes Affecting Plants	5%		13%	
213	Weeds Affecting Plants	5%		12%	
214	Vertebrates, Mollusks, and Other Pests Affecting Plants	5%		10%	
216	Integrated Pest Management Systems	20%		10%	
	Total	100%		100%	

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

1. Situation and priorities

Illinois producers strive to produce a wide variety of crops that are affordable to consumers, while at the same time produced in a manner that is environmentally responsible. College of ACES researchers are working with producers to advance and document the frontiers of plant science and applicable disciplines to improve the quality and quantity of plants and their products, including food, feed, fuel, and fiber production while at the same time developing and enhancing plant production systems that integrate pest and other management practices while protecting the environment.

Extension priorities include addressing the threat of new invasive or exotic pests affecting the quality and economics of plants that enhance human environments both public and private, as well as management practices that ensure healthy plants and meet new and existing laws and regulations. Homeowners have been and will likely continue to be a priority audience. Although multi-county Extension Educator positions with responsibility for horticulture education continue to increase, **Master Gardener** volunteer recruitment and training will be vital to meet the needs of homeowners with respect to lawn care. Extension campus faculty and staff will share research findings with commercial entities and with officials responsible for maintaining plants [shade trees and ornaments] on private and public property.

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 a safe and affordable food supply will always be a top priority, we expect that other areas of plant production will continue to play an important role in driving this planned program, such as the demand for biofuel inputs, as well as maintaining healthy human environments. In addition, as urban growth continues, demand for ornamental horticulture by public and private property owners to enhance those properties will increase. Final assumptions are that interest will also grow with respect to maintaining those plants in a way that ensures healthy human environments and that recognition and interest in the restoration of natural areas will be economically viable.

2. Ultimate goal(s) of this Program

To maximize the benefits from specialty crop production systems, to conduct cutting edge research that will increase crop production with minimal energy input and minimal negative impact on the environment and translate the results to producers and their advisers, to identify techniques that will obviate crop production factors that result in degradation of the environment, and to increase the number of Ph.D. graduates in plant breeding and expand research in plant breeding. Extension staff will extend the achievement of these research goals so that individuals responsible for commercial ornamental horticulture production and home yard and garden care will gain knowledge and apply that knowledge through the most economically-viable management practices while using safe and recommended pest control measures and conservation of water to ensure the preservation of natural resources.

V(E). Planned Program (Inputs)

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

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

V(F). Planned Program (Activity)

1. Activity for the Program

Future activities will include the development of additional methods for the control of H. glycines to supplement existing control strategies, research with the goal of identifying and evaluating the many possible functions of cover crops and to develop strategies for their inclusion in agricultural systems that can be used to improve the sustainability of Midwestern farms, an effort to characterize the origin, evolution and structure of complete repertoires of proteins [proteomes] of organisms in the cellular and viral worlds, a study to determine the role of small RNA, sigma factors, and protein lysine acetylation in regulating virulence factors in E. amylovora [the knowledge gained will further improve our fundamental understanding of how E. amylovora infects hosts and causes disease and allow us to develop strategies to control the disease and reduce economic losses], a project that will utilize DNA-based markers for confirmation and surveys of herbicide resistance traits in waterhemp, the establishment of a long-term research experiment plot to provide necessary calibration of a decision support system for agrotechnology transfer [DSSAT], ongoing monitoring of seasonal and year-to-year patterns of pest abundance [regular insect collections from soybean and adjacent crop fields not only provide material to monitor established pest abundance and ecology, but can also be used to detect the local arrival of invasive species and to document significant changes in secondary pest abundance], efforts to improve our understanding of the pathogen and etiology and epidemiology of bacterial spot [there is currently almost no reliable information available on the etiology and epidemiology of bacterial spot on pumpkin or other cucurbit crops], and an evaluation of the effect of manipulating the disease suppressive characteristics of a soil through practices such as the addition of organic matter, cover cropping, and other soil management strategies [such practices could be used to aid in the management of diseases for which crop rotation, disease resistance, and fungicides are not effective or available, or to supplement and extend the effectiveness of these management strategies].

Future activities will also include research to improve our understanding of the intrinsic structural, chemical, and biological changes in the corn kernel and soybean seed during storage and processing [this will lead to a general understanding of how to predict the nutritional value of corn and soybeans and new food processing techniques to increase bioavailability and stability of micronutrients in fortified foods], ongoing work under the Varietal Information Program for Soybeans [VIPS] with the goal of sharing soybean production research information in a useful and cost-effective manner to enable public institutions to communicate information to growers and the agriculture community about the activities, investments, and outcomes of grower-supported public research, a project designed to contribute to our fundamental understanding of the domestication of the apple along its historical and evolutionary paths by profiling its genomic structure, research with the overall goal of determining if combinations of HPPD inhibitors and other herbicides [such as PS II inhibitors or PPO inhibitors] lead to synergistic activity on broadleaf weeds in soybean [in particular multiple-resistant waterhemp biotypes], the continuing development of improved winter wheat varieties adapted to Illinois, an effort to quantify and document the occurrence and distribution of herbicide-resistant weed populations in Illinois, the development of knowledge of the dynamic crop physiological processes that determine drought tolerance and are potentially related to differences in root architecture [with the goal of providing corn breeders with more targeted selection criteria and molecular biologists with more relevant genomic targets], work to unravel the regulation of the flavonoid pathway and enhance our understanding of plant disease resistance or the modification of flavonoid products in the seed for improved nutritional and health value, and the characterization of the roles of the FT/TFL1 gene family in photoperiodic flowering in Arabidopsis [the flowering transition is central to reproductive success in plants and for determining environmental fitness].

Extension activities in this program area will address invasive and/or exotic pest diagnosis and management such as Sudden Oak Death and Bradford Pear, integrated pest management, and selection and plant management practices for maintaining healthy lawns and commercial and public properties. Master Gardener volunteers will be recruited and trained using a statewide curriculum via online or webinar/on-site sessions and will in turn answer questions, make presentations, distribute materials, and promote an extensive set of websites that address a variety of horticulture topics. A distance diagnostic system and campus plant clinic will be staffed to identify and respond to concerns related to pests and

diseases. Extension specialists and Extension Educators will provide statewide webinars, podcasts, and use social media to share information on a timely basis with homeowners and public officials. Extension will also provide leadership for pesticide safety education and networking/partnering with commercial horticulture associations to explore educational needs and workforce training for current and future employees.

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

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention ● Demonstrations ● Other 1 (Digital Diagnostics System) ● Other 2 (Webinars/Audio Conferences)	● Newsletters ● TV Media Programs ● Web sites other than eXtension ● Other 1 (Online Courses)

3. Description of targeted audience

Members of the target audience will include nematologists and other scientists in the plant protection field, scientists in the fire blight research community and related enterobacterial areas, corn and soybean producers, commercial entomology and crop protection/pest management professionals, Extension personnel, agricultural biotechnology company representatives, college students in the agricultural sciences, the weed science community and practitioners of weed management, plant pathologists, crop scientists, researchers and practitioners focusing on grain harvest, handling, and transportation, scientists engaged in the studies of plant evolution, genetics, and breeding, retail suppliers of agricultural inputs, and public and private media sources. Extension's target audiences will also include landowners, horticulturalists, industry representatives including pesticide applicators, owners, managers, and retail employees of green industries, homeowners, and Master Gardener volunteers.

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 Completed Hatch 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	More Informed User Of Pesticides
2	Improved Control Of Waterhemp
3	Development Of New Soybean Breeding Lines
4	Evaluating The Effectiveness Of Cover Crops In Reducing Disease Severity
5	Improved Resistance To Western Corn Rootworm
6	Development Of Improved Winter Wheat Varieties Adapted To Illinois
7	Documenting The Occurrence And Distribution Of Herbicide-Resistant Weed Populations In Illinois
8	Determining The Role Of Small RNA, Sigma Factors, And Protein Lysine Acetylation In Regulating Virulence Factors In E. Amylovora
9	Increased Knowledge To Detect Invasive Pests

Outcome # 1

1. Outcome Target

More Informed User Of Pesticides

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Diseases and Nematodes Affecting Plants
- 213 - Weeds Affecting Plants
- 216 - Integrated Pest Management Systems

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Improved Control Of Waterhemp

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 206 - Basic Plant Biology
- 213 - Weeds Affecting Plants

4. Associated Institute Type(s)

- 1862 Research

Outcome # 3

1. Outcome Target

Development Of New Soybean Breeding Lines

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 206 - Basic Plant Biology
- 214 - Vertebrates, Mollusks, and Other Pests Affecting Plants

4. Associated Institute Type(s)

- 1862 Research

Outcome # 4

1. Outcome Target

Evaluating The Effectiveness Of Cover Crops In Reducing Disease Severity

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 205 - Plant Management Systems
- 206 - Basic Plant Biology
- 212 - Diseases and Nematodes Affecting Plants
- 213 - Weeds Affecting Plants
- 216 - Integrated Pest Management Systems

4. Associated Institute Type(s)

- 1862 Research

Outcome # 5

1. Outcome Target

Improved Resistance To Western Corn Rootworm

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 206 - Basic Plant Biology
- 211 - Insects, Mites, and Other Arthropods Affecting Plants

4. Associated Institute Type(s)

- 1862 Research

Outcome # 6

1. Outcome Target

Development Of Improved Winter Wheat Varieties Adapted To Illinois

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 205 - Plant Management Systems
- 206 - Basic Plant Biology
- 213 - Weeds Affecting Plants
- 216 - Integrated Pest Management Systems

4. Associated Institute Type(s)

- 1862 Research

Outcome # 7

1. Outcome Target

Documenting The Occurrence And Distribution Of Herbicide-Resistant Weed Populations In Illinois

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 205 - Plant Management Systems
- 206 - Basic Plant Biology
- 213 - Weeds Affecting Plants

4. Associated Institute Type(s)

- 1862 Research

Outcome # 8

1. Outcome Target

Determining The Role Of Small RNA, Sigma Factors, And Protein Lysine Acetylation In Regulating Virulence Factors In E. Amylovora

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 205 - Plant Management Systems
- 206 - Basic Plant Biology

4. Associated Institute Type(s)

- 1862 Research

Outcome # 9

1. Outcome Target

Increased Knowledge To Detect Invasive Pests

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Diseases and Nematodes Affecting Plants
- 213 - Weeds Affecting Plants
- 214 - Vertebrates, Mollusks, and Other Pests Affecting Plants

4. Associated Institute Type(s)

- 1862 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Since a great deal of plant research is done in the field rather than the laboratory, it is much more difficult to control for confounding variables, any one of which can make results more difficult to interpret. Examples include unusually harsh [or unusually mild] growing seasons, unforeseen invading pests, and contamination from outside pollutants. These are especially important given the long time horizon of many plant studies. These same factors affect decisions that producers, green industry businesses, and homeowners make with respect to their crop, lawn, and garden management of plants that enhance human environments.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

1. **Master Gardener** training regarding knowledge changes will be assessed using pre- and post-tests collected at new Master Gardener training sessions and, although not conducted annually, a retrospective evaluation will be collected via an online survey during certain years to determine changes in **Master Gardener** gardening practices, personal improvement skills, and experience in teaching horticulture topics.

2. A sample of calls to Extension 'hotlines' will be made to callers to determine use of the information provided to the caller.

3. Although not conducted annually, a follow-up evaluation will be used to identify practice changes of commercial pesticide applicators who participate in Extension training.

4. Online **IPM modules** [12] related to plant pathogens or pests include a short quiz at the end of each module and an evaluation before being able to print a certificate of completion.

Research data collection methods include field studies, transition trials, evaluations from research greenhouse studies, and harvesting of yield plots.

V(A). Planned Program (Summary)

Program # 9

1. Name of the Planned Program

Sustainable Energy

2. Brief summary about Planned Program

The United States is the second largest user of energy in the world, accounting for over 18% of total consumption. Thus, any change in global energy use will require a change in production and consumption of energy in the U.S. The major renewable energy systems include solar, wind, biomass, hydroelectric, and geothermal. Biofuels have been gaining ground since the 1980's, but several limitations need to be overcome before plant/crop-based resources and processes become a viable alternative to petrochemical-based systems for chemicals and energy. These include improvements in the efficiency of bioconversion of plant fibers to value-added products and extraction of high-value products.

The University of Illinois is home to the **Center for Advanced BioEnergy Research**. CABER works closely with the nine University of Illinois colleges, multi-disciplinary and professional units, and faculty and students to provide a facilitative structure for campus outreach, teaching, and research in areas related to bioenergy systems. CABER facilitates the development of cross-disciplinary research and development, education and outreach programs that promote more efficient use of bio-renewable resources and, more specifically, supports the emergence of advanced bio-fuels and chemicals. CABER focuses on sustainable bioenergy systems, downstream processing, and economics and policy issues as they relate to bio-based products.

Extension educational efforts will be provided primarily by faculty in the Department of Agricultural and Biological Engineering and the Department of Crop Science and by multi-county Extension Educators with responsibility for environment and energy stewardship programming that addresses biomass energy crop production and utilization, forestry biomass use, biomass supply chain development challenges, wind energy and solar energy decision-making, and home and business energy use reductions.

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

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

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

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

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
133	Pollution Prevention and Mitigation	30%		15%	
136	Conservation of Biological Diversity	0%		10%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		15%	
206	Basic Plant Biology	15%		15%	
402	Engineering Systems and Equipment	25%		20%	
601	Economics of Agricultural Production and Farm Management	15%		10%	
603	Market Economics	0%		10%	
801	Individual and Family Resource Management	5%		0%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	5%		5%	
806	Youth Development	5%		0%	
	Total	100%		100%	

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

1. Situation and priorities

U.S. energy consumption is expected to grow by 56 percent by 2040 according to the U.S. Energy Information Administration. Biobased renewable resources can be obtained from a wide range of agricultural crops, forestry products, and processing industries. The U.S. has access to significant amounts of bio-based resources, including those of the highly productive corn/soybean cropping system in the central U.S., arguably the largest man-made ecosystem on the planet. This agro-ecosystem is still largely focused on providing raw materials for the food, feed, and fiber industries and not on chemicals and fuels. Current research is focused on growing perennial grasses [Miscanthus and Tropical Maize] as bio-based sources of energy for heat and electricity.

In August of 2007, Illinois signed into law an energy efficiency management mandate that requires large Illinois investor-owned utilities to reduce overall consumer electric usage by 2% by 2015 and also to obtain 25% of their electricity for consumer sales from wind and other renewable energy sources by 2025. Progress toward achieving the annual renewable energy targets is not being met by the large utilities. The American Housing Survey, conducted in 2009, indicated that less than 10% of the 27 million remodeling, repair, and/or renovation jobs in the Midwest during the most recent two-year period involved insulation of HVAC systems, pointing to a need to educate owners of residential or business structures on energy efficiency options. There is increased presence of wind turbine farms and single turbines across the state subject to state regulations regarding their establishment. A resurgence of interest in solar power is related to advances in technology and associated affordability. Illinois forestry biomass, primarily located on private land, has been increasing since 1985 and is currently estimated at over 230 million dry tons.

Leftover biomass from timber management and/or harvesting can amount to up to 27% of the total biomass and has potential use for bioenergy production.

Over 8,400 [90%] of 9,349 respondents to the 2009 Extension online survey of the public's educational interests wanted to know more about high energy costs, particularly about managing home energy costs, energy efficiency, and alternative energy sources. Extension will continue to give priority to these areas as well as providing support for biobased energy research projects and dissemination of research findings.

2. Scope of the Program

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

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

1. Assumptions made for the Program

Renewable energy continues to make strides [according to 'Energy Infrastructure Update' published by the Federal Energy Regulatory Commission's Office of Energy 50% of all new electrical generation deployed in 2014 came from renewable resources]. We assume that this trend will continue and that funding will be available to allow us to take advantage of this trend. Interactions with other entities on campus for research-based information on other alternative energy sources and energy efficiency will ensure Extension's ability to provide assistance to consumers on reducing energy costs. We assume that economies of production will emerge to encourage producers to invest in growing bio-energy crops and the development of viable supply chain systems to deliver biobased energy to various energy users.

2. Ultimate goal(s) of this Program

According to the official White House website 'Leading the world in clean energy is critical to strengthening the American economy and winning the future. We can get there by creating markets for innovative clean technologies that are ready to deploy, and by funding cutting-edge research to produce the next generation of technologies.' As a member of the Midwest Consortium for Biobased Products and Bioenergy, the University of Illinois is committed to working regionally to improve on our current progress toward meeting this goal. Specific goals include providing fuel and materials for sustainability, improving biofuel production and carbon sequestration, and developing a research base that will allow for the development of management systems that efficiently and economically produce bioenergy crops. Identification and reliance on sustainable energy sources will keep energy costs reasonable and prevent adverse effects on the environment. Likewise, consumers of energy will accept responsibility for reducing their energy use leading to protection of our natural resources.

V(E). Planned Program (Inputs)

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

Year	Extension		Research	
	1862	1890	1862	1890
2016	0.0	0.0	3.0	0.0

2017	0.0	0.0	3.0	0.0
2018	0.0	0.0	3.0	0.0
2019	0.0	0.0	3.0	0.0
2020	0.0	0.0	3.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

We will combine and focus the specialized research abilities of faculty members from several disciplines to generate chemicals and biofuels from renewable biomass sources using a comparative and functional genomics approach. Future economic development aspects include technology transfer, biotech startups, attracting national talents including faculty, students and postdoctoral associates, and training of a first-class workforce.

Activities will include the application of systems thinking and the combination of deconstruction, hydrolysis, and microbiology technologies to develop an efficient, cost effective system for converting biomass into biofuels, with research focusing on: [1] Investigating the technical and economic potential for sugarcane ethanol production in Brazil and its land use implications; [2] Optimal biofuel policy in the presence of learning by doing in cellulosic biofuel production and the effectiveness of alternative policies in promoting cost-reducing innovations in the biofuel sector under alternative assumptions about market and technological conditions in the oil sector; and [3] The effects of riskiness of energy crops compared to conventional crops and its implications for crop, contract and location choices for refineries, the identification and development of high-yielding dedicated energy crops for various land types with an objective of meeting the national goal for sustainable bioenergy production using perennial grasses, research with an objective of quantifying the contribution of nitrogen-fixing bacteria to Miscanthus plant N and identifying plant and microbial traits and environmental factors that influence diazotroph colonization and activity [understanding factors that influence plant-microbe mutualisms will allow for the optimization of associative N fixation in perennial grasses, and thereby enhance sustainability of these bioenergy crops], a project focusing on producing biocrude oil from biowaste and algae, the growth of Miscanthus x giganteus in a variety of settings in the eastern U.S. to identify where it is best adapted to achieve maximum yields with the least inputs, the breeding of additional Miscanthus cultivars with improved winterhardiness and high yield-potential in the central and northern Midwest and the development of near-infrared [NIR] spectroscopy as an inexpensive and high-throughput method for evaluating quality characteristics of Miscanthus genotypes, efforts to more quickly determine biomass composition for the screening and selection of Miscanthus genotypes with properties suitable for conversion to bioenergy, biofuels, and renewable chemicals [variations in Miscanthus biomass composition can be used to identify and breed for superior germplasm with enhanced lignocellulosic properties conducive to bioenergy and renewable chemical generation], the development of data on how wildlife communities in North America will respond to plantings of the exotic Miscanthus and how biofuel crops might affect habitat connectivity, and an evaluation of the impact of sustainable modern maize crop production practices, including fertilizers, fungicides, populations, tillage, and stover management, on maize plants grown for grain yield or high-biomass varieties for renewable bioenergy and biofuels.

Extension activities will include narrated tours at field research sites, heating system conversion demonstrations using perennial grass pellets, presentations related to producing biomass energy crops through crop management conferences, forestry conferences, workshops, and podcasts, and the distribution of research reports related to costs, efficiencies, and by-products of biofuel production. In

addition, Extension staff will also support the existing working groups of representatives from industry biomass end-users, agricultural producers, government agencies, not-for-profit organizations, and University faculty and staff to advance successful and profitable use of commercialized biomass-based heat and electric energy. Extension staff will also tap into and disseminate research on other alternative energy resources such as wind through webinars, Energy Education Council web-based information, and presentations to help individuals, families, businesses, and public officials reduce the use of non-renewable energy sources as well as lowering their energy bill. Hands-on experiences and 4-H projects will continue as energy-related learning opportunities for youth.

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

Extension

Direct Methods	Indirect Methods
● Education Class ● Group Discussion ● One-on-One Intervention ● Demonstrations ● Other 1 (Experiments) ● Other 2 (Webinars)	● TV Media Programs ● Web sites other than eXtension

3. Description of targeted audience

Members of the target audience will include academic researchers, policy makers, farmers, feedstock producers, potential biomass processors, biomass feedstock researchers, microbial ecologists and researchers interested in biological nitrogen fixation in non-legumes, plant breeders who wish to develop improved cultivars of Miscanthus for bioenergy, undergraduate horticulture students and students interested in bioenergy, producers, sod growers, athletic field, golf turf, and lawn care managers, homeowners, those with an interest in the biorefinery industry, ethanol producers, starch producers, commodity associations, researchers involved with fouling phenomena, cleaning chemical suppliers and equipment suppliers, conservation biologists, wildlife ecologists, agronomists, and land managers. Extension target audiences will also include landowners [including forest owners and managers], home and business owners, power suppliers and industry segments providing supply chain components, technologies and marketing expertise, government officials, and 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 Completed Hatch 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	Number Of Program Participants Increasing Knowledge Of Bio-Energy Production/Harvesting/Storage Systems
2	Identifying And Developing High-Yielding Dedicated Energy Crops For Various Land Types
3	Rapid Determination Of Biomass Composition Of Miscanthus Genotypes
4	Determination Of How Wildlife Communities Will Respond To Plantings Of Exotic Miscanthus
5	Number Of Individuals Indicating Practice Changes To Reduce Energy Use And Cost

Outcome # 1

1. Outcome Target

Number Of Program Participants Increasing Knowledge Of Bio-Energy Production/Harvesting/Storage Systems

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 206 - Basic Plant Biology
- 402 - Engineering Systems and Equipment
- 601 - Economics of Agricultural Production and Farm Management
- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Identifying And Developing High-Yielding Dedicated Energy Crops For Various Land Types

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 133 - Pollution Prevention and Mitigation
- 136 - Conservation of Biological Diversity
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 206 - Basic Plant Biology

4. Associated Institute Type(s)

- 1862 Research

Outcome # 3

1. Outcome Target

Rapid Determination Of Biomass Composition Of Miscanthus Genotypes

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 133 - Pollution Prevention and Mitigation
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 206 - Basic Plant Biology

4. Associated Institute Type(s)

- 1862 Research

Outcome # 4

1. Outcome Target

Determination Of How Wildlife Communities Will Respond To Plantings Of Exotic Miscanthus

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 133 - Pollution Prevention and Mitigation
- 136 - Conservation of Biological Diversity
- 206 - Basic Plant Biology

4. Associated Institute Type(s)

- 1862 Research

Outcome # 5

1. Outcome Target

Number Of Individuals Indicating Practice Changes To Reduce Energy Use And Cost

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 402 - Engineering Systems and Equipment
- 801 - Individual and Family Resource Management

4. Associated Institute Type(s)

- 1862 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Programmatic Challenges

Description

Concerns, both environmental [global warming] and economic [high energy prices], will drive the demand for biofuels research. Improvements in crop productivity and the utilization of bioenergy will also continue to be important external factors. High prices of current crops may inhibit growth of other bio-based fuel products.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Visitors to the **Dudley Smith** biomass research plot will be asked to evaluate the knowledge change using a simple response form that is completed following the tour/demonstration or sent to them afterward.

Distribution of an evaluation of knowledge gained and planned implementation of practices to increase energy efficiency.

V(A). Planned Program (Summary)

Program # 10

1. Name of the Planned Program

4-H Youth Development

2. Brief summary about Planned Program

Youth development programs are designed to allow youth and adults to work together in family and community environments to create real life learning laboratories that help youth practice skills they need today and will continue to need for the rest of their lives, to reach youth in their own neighborhoods and communities with unique, hands-on learning strategies suited to their needs, to address current youth issues through positive prevention programs, and to promote positive youth/adult partnerships involving them in significant decision-making and encouraging their participation in community roles. These investments in youth through informal education are expected to continue to return significant benefits to the public while addressing important issues such as healthy lifestyles, leadership education, workforce development [especially in science, engineering, and technology], and protecting our environment.

National research continues to indicate that positive youth development involves creating opportunities to experience belonging, independence, generosity, and mastery--the focus of **4-H Youth Development Program** delivery. Drawing on research conducted in the College of ACES in nutrition and health, leadership, and youth involvement in groups, as well as the expertise of faculty in the Colleges of Engineering, Pharmacy, Dentistry, and Medicine, the National Center for Rural Health, and the Graduate School of Library and Information Science, the University of Illinois Extension 4-H Youth Development program will deliver programs that address the three national mission mandates of the National 4-H Program: Science, Engineering, and Technology [SET], Healthy Lifestyles, and Youth in Civic Engagement/Leadership.

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 : Yes

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
806	Youth Development	100%		0%	
	Total	100%		0%	

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

1. Situation and priorities

The **Search Institute** reports that less than 30% of youth are experiencing developmental assets such as positive family communication, a community that values youth and views them as a resource, adult role models, creative activities, and the opportunity to plan and make decisions. The Illinois state fiscal crisis threatens to further erode important investments in early childhood education and care, health insurance coverage, children's mental health services, family support, and other essential programs and services. The need for the University of Illinois **Positive Youth Development Program** [PYD] grows. Features of an effective PYD program are: [1] Positive and sustained relationships between youth and adults; [2] Activities that build important life skills; and [3] Opportunities for children to use these life skills as both participants and as leaders in valued community activities.

Priority will continue to be given to expanding the **4-H Club** program in Illinois to engage more youth in a sustained PYD experience through ongoing clubs and groups. This effort will include a focus on expansion of groups that involve the growing metropolitan audience and those of Hispanic ethnicity and retaining youth in clubs for at least three years. The 4-H program will also respond to the needs expressed by respondents to a 2009 public survey conducted by Extension which indicated that 48% wanted more information on expanding youth interest in science, math, and technology education, 41% on job search skills, 38% on planning for a college education, and 34% on workplace ethics. Two and four-year college graduates will be hired in increasingly larger numbers than high school graduates, making it imperative for young people to seek higher education. Occupations drawing on science, technology, engineering, and mathematics [STEM] fields play an important role in the competitiveness and economic growth of our nation's economy and are projected to grow by 17% by the year 2018 compared to 9.8% growth for non-STEM occupations. Priority will be given to building awareness of careers and preparation for such, including the development of skills to prepare youth for the workforce in these STEM occupations as well as other occupations.

2. Scope of the Program

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

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

1. Assumptions made for the Program

That funding exists and that staff and volunteers can be located to expand programs and that faculty expertise from the College of ACES, as well as corporate and community partners, can be recruited to support the development of 4-H materials and programs.

2. Ultimate goal(s) of this Program

Youth who gain a sense of belonging within their group, independence through decision-making and responsibility, a spirit of generosity toward others, and mastery through project completion, presentations, and exhibitions and who develop into adults who contribute to society. In addition, to develop youth who are: [1] Prepared and interested in pursuing careers [especially in science, engineering, and technology]; [2] Assuming leadership roles in government or community organizations that focus on community enhancement; and [3] Developing lasting habits related to caring for the environment. In addition, youth involved in 4-H activities will develop good character and exhibit social and emotional development required of adults who can contribute to society. To achieve these youth outcomes, measurement of impact will help enhance and advance procurement of an additional one million dollars and partnerships for program implementation with corporate and public investors.

V(E). Planned Program (Inputs)

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

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

V(F). Planned Program (Activity)

1. Activity for the Program

Each local program unit has identified specific program enhancements for their 4-H club program related to ways youth experience: [1] Belonging, [2] Independence; [3] Generosity; and [4] Mastery [particularly in metropolitan areas and Hispanic communities]. New 4-H clubs will be formed and activities will be conducted that promote **4-H Teen Teachers**. In addition, teens will be supported in serving in the following categories: [1] Planning; [2] Advising; [3] Promoting; [4] Mentoring; and [5] Advocating. Through **Speaking for Illinois 4-H** teens will be able to developing important communication and leadership skills. Building career awareness and skills to prepare youth for the workforce will be emphasized in programs such as **Welcome to the Real World**, **Skills to Pay the Bills**, **Illinois Summer Academies**, and **Incubation and Embryology**.

Use of Mobile Digital Design Laboratories through the **Illinois Digital Innovation Leadership Program** to engage youth in computer-aided design, audio/video production, and data visualizations, and **An Artifact Speaks** lessons and materials to share artifacts that broaden youth understanding of other cultures are two new educational projects that will hopefully be continued after a two-year funded pilot with the goal of

supporting the enhancement of youth interest in STEM careers and developing their recognition of the value of communities. A third two-year pilot project will involve developing informal computer-science activities for elementary and middle-school youth from diverse cultures and backgrounds and those who are at risk for academic failure to experience computational thinking, computer programming, and fundamental computer science concepts.

Other 4-H activities for youth are included in the following planned programs: Natural Resources and the Environment, Food Safety and Food Security, Human Health and Human Development, and Community Resource Planning and Development. In addition, online modules and training that addresses youth-adult partnerships will provide opportunities for volunteers to ensure that youth experiences include the essential elements of Positive Youth Development.

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

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● Group Discussion ● Demonstrations ● Other 1 (Camps) ● Other 2 (Webinars)	● Newsletters ● Web sites other than eXtension

3. Description of targeted audience

All youth, including special targeting to reach urban youth, youth of Hispanic ethnicity, military family youth, youth leaders [paid and volunteer], teachers, adult leaders of 4-H clubs and other youth-serving organizations, parents, and community members.

V(G). Planned Program (Outputs)

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

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

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

V(H). State Defined Outputs

1. Output Measure

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

V(I). State Defined Outcome

O. No	Outcome Name
1	Increased Knowledge About Science And Health Careers
2	Number Of 4-H Youth Applying Leadership And Teaching Skills
3	Number Of Youth Participating In Extended Positive Youth Development Experiences

Outcome # 1

1. Outcome Target

Increased Knowledge About Science And Health Careers

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Number Of 4-H Youth Applying Leadership And Teaching Skills

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

Number Of Youth Participating In Extended Positive Youth Development Experiences

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Additional loss of state funding for professional positions and subsequent reduction of Extension Educators will likely significantly affect the level of programming and youth involvement. The rising costs of a college education may affect enrollment and preparation of scientists. A number of other youth-serving organizations and activities compete for time youth have for discretionary out-of-school activities.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

1. A 4-H Science Survey that primarily draws on 4-H National Common Measures will be distributed to a sample of youth participants in science-based projects, programs and activities.

2. A 4-H Service Learning/Civic Engagement Experiences Survey that primarily draws on 4-H National Common Measures will be distributed to a sample of youth participants in related learning opportunities.

3. A 4-H Metro Program Experience Survey that primarily draws on 4-H National Universal Positive Youth Development Common Measures will be distributed to a sample of youth in clubs and groups that have intentional PYD focus.

4. A 4-H Metro Workforce Preparation Experiences Survey developed by 4-H will be distributed to a sample of youth participants in related workforce learning opportunities

Teachers who conduct the **Incubation and Embryology** project in their classrooms will be asked to assess science skills and life skills they observe in their students who participate in the program. Teacher training will include instruction on how to access, conduct, and enter data online regarding increases in a series of science skills and life skills that they are to observe and rate while implementing the incubation and embryology program in their classrooms.