

# 2014 University of Arkansas Combined Research and Extension Plan of Work

Status: Accepted

Date Accepted: 05/30/2013

## I. Plan Overview

### 1. Brief Summary about Plan Of Work

The University of Arkansas Division of Agriculture's Integrated Plan of Work continues to address many of the issues facing citizens of Arkansas, the United States and the world through concentrated efforts in both research and Extension education.

The University of Arkansas Combined Research and Extension 2014-2018 Plan of Work has been crafted to incorporate the programs and projects that will address the needs of and issues facing Arkansans. This plan of work also is based upon the major initiative areas identified in the 2011-15 Division of Agriculture Strategic Plan, which was developed based on issues and needs identified through stakeholder input and expert analysis of environmental scanning data by Division of Agriculture faculty of major trends that are expected to impact Arkansas, the nation and the world in the near future.

The Division's administration, faculty and staff will continue to commit time and resources from federal, state, county, city and private sources to address these many issues. The issues are challenging and broad and so are the planned programs. The approach will be through careful planning and the involvement of partners, volunteers, constituents, and local, state and national leaders.

Arkansas is a rich state in terms of natural resources. Agriculture is one of the largest Arkansas industries having an annual value-added economic impact of over \$17 billion and contributes 10.4% of Arkansas's Gross State Product. Agriculture accounts for about one in six jobs in the state (275,435 jobs) and an annual labor income of \$10.7 billion (17% of the state's total labor income). Agriculture in Arkansas consists of agronomic and horticultural crops, animal agriculture and forestry. Over one-half of Arkansas is in forests, much of which is owned by private landowners.

Food processing adds much value to the commodities grown in the state. Arkansas is the nation's largest rice producer, one of the top producers of poultry (2nd in broilers, 5th on turkeys and 9th in chicken eggs) and catfish (3rd) and is consistently one of the top producers of cotton (3rd) and soybeans (11th). The diversity of Arkansas agriculture also includes fruits, vegetables, nuts, beef, corn, wheat, sorghum, oats, hay and forage and many other crops. The state also ranks fourth nationally in saw-log timber production. This diversity is a major asset in helping the state's agriculture sector to weather downturns in a specific commodity.

The Division of Agriculture develops and conducts fundamental and applied research and extension programs to address the production, environmental and economic sustainability of Arkansas agriculture and the farms, farm families, and allied agricultural industries that depend on agriculture production and associated jobs. Arkansas, though a major agriculture state, has issues similar to that of the remainder of the U.S. Arkansas must address issues, such as: rapid growth in some areas of the state and declining populations and economies in other areas; health and nutrition issues, including obesity in children and adults; food insecurity for limited-resource individuals and families; food safety issues from production through consumption; unemployment; the impacts of higher energy costs on all aspects of daily life; environmental issues that both impact and are impacted by agricultural production; and many other economic and societal challenges facing Arkansas agricultural producers, families, youth and communities.

The Division of Agriculture's Plan of Work includes discovery and applied research and educational activities and programs that will result in: efficient and sustainable agricultural production and increased capacity of agricultural producers in order to meet growing food demands and in addressing food security issues; reduction in the incidences of childhood obesity; conservation and protection of Arkansas's natural resources; the development of processes and technology to help agricultural producers remain viable in

the face of climatic changes; a more safe and secure food supply for all; development and evaluation of biomass-based strategies for use in bioenergy production; developing leaders, sustaining communities, workforce preparation, parenting skills, youth development and many more.

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

Year	Extension		Research	
	1862	1890	1862	1890
2014	350.0	0.0	469.0	0.0
2015	350.0	0.0	468.0	0.0
2016	350.0	0.0	467.0	0.0
2017	350.0	0.0	466.0	0.0
2018	350.0	0.0	466.0	0.0

**II. Merit Review Process**

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

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

**2. Brief Explanation**

University of Arkansas Division of Agriculture programs are reviewed using a three-tiered review process:

1. Stakeholder program identification and review
2. Administrative approval and review
3. External review

**Stakeholder Program Identification and Review**

Stakeholder input into Division of Agriculture program identification and review continues to be derived from both formal and informal means for all program areas. Public comment on current and future research programs are obtained from county and community meetings, commodity and community associations, commodity check-off boards, state legislative committees and open public forums concerning specific issues. Open public meetings, field days and county and regional production meetings provide forums for stakeholder input and are

open to under-served or under-represented individuals, groups or organizations. For Extension, county advisory councils and program advisory groups meet annually, at a minimum, specifically to review programs and provide input, feedback and/or review of program implementation, redirection, or newly identified needs. Members of these groups are invited to participate in programs, field days, special tours, workshops and conferences throughout the year and for the duration of the program. Membership on these groups is designed to include members who are representative of the community demographic and potential clientele makeup. All reviews of research and Extension programs include stakeholder members or members of the community or industry most influenced by the program area. Open public forums are held to address specific issues of importance to the stakeholder community or industry.

#### **Administrative Approval and Review**

Identified planned program areas of research or Extension activity are administratively reviewed and approved by the University of Arkansas's Vice-President for Agriculture and the Director of the Agricultural Experiment Station or Cooperative Extension Service, as appropriate, within the context of the Division of Agriculture's 2011-2015 Strategic Plan and the specific needs identified by stakeholder groups. Smith-Lever, Hatch, McIntire-Stennis, Animal Health and regional research projects are administratively reviewed and approved by the subject matter department head and the director of the Arkansas Agricultural Experiment Station. All research projects are reviewed by three outside scientists prior to submission to the respective subject matter department head and the experiment station.

#### **External Review**

Merit review is conducted as part of the Division of Agriculture's on-going program review process. The reviews may be departmental or programmatic and cut across departments. Reviews are scheduled on a five-to-seven year cycle and conducted concurrently for research, Extension and instruction. All reviews are conducted by a team of recognized outside research, Extension and teaching professionals, balanced to reflect programmatic needs and diversity. All reviews include one or more stakeholders. The actual review process involves a period of self-study, followed by program assessment and benchmarking. The review team evaluates the program's effectiveness relative to the stated mission and goals of the department or program, as well as the needs of stakeholders. Following the outside review teams written evaluation, the department or program prepares a response to the review. The Division of Agriculture and University administration then meet with the department or program faculty one more time to develop a plan for implementing changes. Thereafter, annual progress is reported to Division and University administration.

### **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 University of Arkansas's Division of Agriculture utilizes both formal and informal mechanisms for ensuring the planned program areas address areas of strategic importance to the state. The Division of Agriculture's Combined Plan of Work reflects the priority issues identified by stakeholders from around the state during the development of the Division of Agriculture's 2011-2015 Strategic Plan. Priority programmatic areas were identified based on stakeholder needs identified through a statewide needs assessment survey and a state-level clientele listening session that provided input from current and potential clientele that was used to identify the major issue areas that will provide direction for Division of Agriculture research and extension efforts over the five years of the strategic plan. Stakeholders of specific programs such as community and economic development, 4-H and youth, and commodity

groups, research and Extension faculty and staff also identify emerging issues that can be addressed by Division of Agriculture efforts. In many cases, those who help in identifying issues are also able to provide partial funding support for those efforts.

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

University of Arkansas Division of Agriculture research and extension programs are developed and implemented to address the needs of citizens of Arkansas. Examples of multi-state or joint activities and programs that are being implemented to address needs of under-served and under-represented populations include:

4-H Afterschool Program - Provides after-school-hours educational opportunities for youth, many in urban environments, who don't have other opportunities.

SERA-37: New Hispanic South - A multi-state project to strengthen the research, outreach, and public policy work associated with Latino issues.

Southern Region Disaster Resilient Communities Project - A 5-state project (Arkansas, Florida, Louisiana, Missouri and Oklahoma) to assess current disaster-related strategies being used in rural communities, increasing disaster awareness and preparedness activities to assist communities in preparing for and responding to extreme events and the needs of disadvantaged residents.

Healthy Relationship and Marriage Education Training Project - A five-state, collaborative project (Arkansas, Georgia, Iowa, North Carolina and Missouri) to refine and deliver relationship education training to child welfare professionals to improve their capacity of dealing with their own clientele and to teach their clientele about healthy relationship practices.

HOPE 2: Nutrition Education Project - A multi-state project (working through a collaboration with the Mississippi Food Network) that includes a partnership between the Division of Agriculture Extension Service and North Little Rock School District, a large urban school district., that has Extension educators training personnel from eight elementary schools to deliver nutrition education in grades K-5 and to work with the district's food service personnel to promote better nutrition.

National Network of Forest Practitioners - A national alliance of rural people working on the ground to build a forest economy that is both ecologically sound and socially just. Members include foresters, harvesters, extension specialists, advocates, and policy makers interested in sustainable forestry.

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

Through the development of program logic models, planned programs have identified specific outputs and short, medium and long-term outcomes for the life of the programs. Program planning and accountability data will be entered by all CES faculty through the Arkansas Information Management System (AIMS), a Web-based data management system, and aggregated to identify the outcomes and impacts. Qualitative data and case studies will likewise be entered into the AIMS system, in order to produce a comprehensive understanding of the program outcomes. Research-based outputs and outcomes will be documented using annual departmental faculty review reports that include research progress, outcomes and

refereed publications and presentations.

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

Through the use of program logic models, planned programs have identified target audiences, program methods, and output and outcome measures prior to program initiation. The use of the planned program (input) elements and the faculty POW process allows faculty to identify which audiences, methods, curriculum, etc. county faculty have identified as the focus of their work each October (at the beginning of each fiscal year). This planning information allows specialists to better focus their program support efforts by understanding the scope of work for each planned program, allowing increased and timely responsiveness to specific county needs. Through the use of output and outcome indicators, uniform data collection methods, and the live Web-based AIMS database, process improvement is possible throughout the fiscal year due to the compilation of program specific data. Identification of best practices, innovative approaches, and emerging issues over the life of the program can both inform research and provide guidance for other educational resource investments.

### **IV. Stakeholder Input**

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

- 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
- Survey of traditional stakeholder individuals
- Survey specifically with non-traditional groups
- Survey specifically with non-traditional individuals
- Survey of selected individuals from the general public
- Other (County Extension Council and program advisory committee planning meetings.)

#### **Brief explanation.**

Stakeholder input into program identification and review is derived from both formal and informal means for all program areas. Public comment on current and future research programs is obtained from county and community meetings, commodity and community associations, commodity check-off boards, state legislative committees and open public forums concerning specific issues. Open public meetings, field days and county and regional production meetings provide forums for stakeholder input open to under-served or under-represented individuals, groups or organizations. For Extension, County Extension Councils and program advisory groups meet annually, at a minimum, to provide input, feedback and/or review of program implementation, redirection, or newly identified needs. Members of these groups are invited to participate in programs, field days, special tours, workshops and conferences throughout the year and for the duration of the program. All reviews of research and Extension programs include stakeholder members or members of the community or industry most influenced by the program area. Open public forums are held to address specific issues of importance to the stakeholder community or industry. In addition to the standard methods of obtaining stakeholder input described above,

In 2010, the University of Arkansas Division of Agriculture updated its strategic plan. As part of this update process, the Division conducted a state-level external stakeholder listening session and

an online survey of external stakeholders from across the state. A total of 172 external stakeholders participated in these processes. Specific surveys were conducted with individuals representing two specific underserved or underrepresented groups, women in agriculture and small farm operation producers. The result of the strategic planning effort is the 2011-2015 Division of Agriculture Strategic Plan. The strategic plan identifies those important initiative areas upon which the priorities identified in the University of Arkansas 2014-2018 NIFA Combined Research and Extension Plan of Work is based.

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

**1. Method to identify individuals and groups**

- Use Advisory Committees
- Use Internal Focus Groups
- Needs Assessments
- Use Surveys

**Brief explanation.**

Stakeholder participation on county-level advisory councils and committees is open to any interested citizen. Stakeholder members are also recruited to ensure that the councils and committees are representative of the communities in which they live. The composition of and level of activity and input from advisory councils and committees is a major component of annual county Extension reviews conducted by district administrators.

The participants in the University of Arkansas Division of Agriculture strategic planning process external stakeholder listening session were identified and recruited by a strategic planning team composed of representatives from the major units of the Division of Agriculture. In many cases, the individuals selected to participate in the listening session represented a larger group of individuals who were traditional stakeholders or represented groups whose members were non-traditional or under-served or under-represented stakeholders in Division of Agriculture programs. These individuals were brought together and led through a facilitated process to identify priority issues and needs for Division of Agriculture research and extension efforts.

Participants in the University of Arkansas Division of Agriculture stakeholder online surveys were identified by Arkansas Experiment Station faculty and administrators and by asking county Extension staffs to identify individuals in their local communities who were representative of one or more of the following nineteen stakeholder categories: social services (e.g., Dept. of Human Services, Food Bank or Pantry, non-profits); financial sector (e.g., banks, agricultural lending, investments); faith-based sector (e.g., church, youth minister); education (public, private, vocational); commercial sector (e.g., chambers of commerce, industry); health (e.g., hospital, public health, doctor); agricultural production; agricultural businesses; county Extension council; 4-H youth; 4-H adult volunteers; other youth services organizations; government officials (e.g., county, city); Extension homemakers; Extension FCS clientele; master gardeners; natural resources (e.g., wildlife, forestry, conservation); media (e.g., radio, newspaper, television); and agricultural cooperators. In addition to these criteria, Extension staffs were also asked to identify individuals within the nineteen categories who were representative of the racial make-up of the counties, to include individuals of both genders, and to identify potential participants by

their level of involvement in Division of Agriculture Extension programs in the counties.

At the local community level, individuals who serve on County Extension Councils and program advisory committees are identified and asked to participate so that the committees and advisory groups are representative of the demographics of the community and can provide insight as to the important issues of the community.

**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 specifically with non-traditional groups
- Survey specifically with non-traditional groups
- Meeting specifically with non-traditional individuals
- Meeting with invited selected individuals from the general public
- Survey of selected individuals from the general public
- Other (Meeting with regulatory groups, state agencies, & commodity prom)

**Brief explanation.**

Much of the Division of Agriculture external stakeholder input is collected through formal county-level extension councils and program advisory committees. Members of these groups assist local Extension staff in identifying local issues and problems that can be addressed through Agricultural Experiment Station research and Extension educational programs. Membership on these groups is open to any individual and is on a rotational basis to encourage new members becoming a part of these advisory groups on a regular basis. Input to guide research efforts is also collected through contacts, both formal and on-formal, with other state agency personnel, commodity group representatives and other organizations working in areas related to Division of Agriculture projects and programs.

Participants in the University of Arkansas Division of Agriculture strategic planning process external stakeholder listening session were identified and recruited by a strategic planning team composed of representatives from the major units of the Division of Agriculture. These individuals were brought together and led through a facilitated process to identify priority issues and needs for Division of Agriculture research and extension efforts. Participants in a statewide online needs assessment survey to identify priority issues that could be addressed by the Division of Agriculture were identified by county extension staff. These individuals were representative of both traditional and non-traditional Division clientele and were also identified as individuals who were representative of the racial make-up of the counties, to include individuals of both genders, and to identify potential participants by their level of involvement in Division of Agriculture research or extension programs.

### 3. A statement of how the input will be considered

- To Identify Emerging Issues
- Redirect Extension Programs
- Redirect Research Programs
- In the Action Plans
- To Set Priorities
- Other (Strategic Planning)

#### **Brief explanation.**

Stakeholder input is utilized at all levels of the Division of Agriculture in identifying priority issues and in planning and conducting research activities and extension educational programs that address those issues.

At the county level, annual plans of work are developed based on the feedback from local stakeholders about the priority issues that can be addressed through the dissemination and/or application of research-based knowledge and practices through extension education programs. Additional input to guide program direction is collected through formal and non-formal collaborations with other agencies and organizations working in extension-related areas.

Each year, the extension program plan of work is updated to reflect the needs of clientele at the local and state level through a formal review and revision process.

Research efforts are guided through feedback from external stakeholders, including advisory groups, agriculture commodity production groups, other collaborating local, state and federal agencies and other agriculture-related organizations, such as Farm Bureau. Feedback from local stakeholders through extension advisory committees and local demonstrations can also provide guidance for new directions in research activities.

Division of Agriculture Extension and Research faculty members also serve on advisory committees and work regularly with diverse stakeholder groups, including Farm Bureau, commodity promotion boards, state agency and regulatory groups, and program specific advisory groups to assist in the evaluation of current efforts and to provide feedback related to Arkansas' changing needs. Meetings are likewise conducted with internal stakeholders including county and state-level faculty, district administrators, and Experiment Station scientists to identify stakeholders and facilitate linkages between local needs and research priorities.



## V. Planned Program Table of Content

S. No.	PROGRAM NAME
1	Agricultural Production & Processing
2	Environment, Energy & Climate
3	Access to Safe & Nutritious Food
4	Increasing Opportunities for Families & Youth
5	Economic & Community Development

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

### **Program # 1**

#### **1. Name of the Planned Program**

Agricultural Production & Processing

#### **2. Brief summary about Planned Program**

Arkansas farmers, ranchers and foresters produce food and fiber for the state, nation and world. Agricultural production and processing creates one in every six jobs in Arkansas.

The University of Arkansas Division of Agriculture provides innovative and timely research and extension educational programs to help food and fiber producers and processors improve production and guarantee the sustainability of agriculture and forestry in the state.

The Division helps Arkansas's agricultural industry fulfill its roles of being a major contributor to the state's economy, being a good steward of our natural resources and remaining a sustainable producer of food and fiber for the state, the nation and the world.

Agriculture contributes more than 12 percent of Arkansas's gross domestic product, greater than any other southern state and well above the national average. Agriculture and forestry are critical to the stewardship of the state's environment, with about 54 percent of Arkansas's land base in forests and 42 percent in farms. Arkansans benefit from agriculture's contributions to maintaining a healthy, natural environment that contains a diversity of plant and animal species and provides recreational opportunities and beautiful rural landscapes. Challenges and opportunities for farmers and those engaged in processing and marketing food and fiber products range from the adoption of specific best management practices to the integration of comprehensive production and marketing systems for each enterprise. Agricultural productivity issues can be overshadowed by the needs and desires of consumers and the beliefs, attitudes and actions of the general public and of policy-makers. Sustainable agriculture and forestry industries will require continuous adaptation to changing markets, technology, environmental conditions and societal concerns. There will need to be increased emphasis on efficient production and processing, innovative marketing strategies, and an increased public knowledge about and appreciation for the sources of our food and fiber products.

#### **Efficient Production and Processing**

To stay in business, producers and processors must have the most efficient systems available. The Division works with stakeholders to improve efficiency through discovery and delivery of science-based solutions. Critical areas for the present and future include energy, water, soil nutrients, pesticides and other production inputs. Environmental impacts of production practices must continually be considered. The Division serves diverse agricultural sectors, with a wide range of plant and animal enterprises from the Delta to the Ozarks. The state is a leader in the production of major commodities, including rice, broilers, cotton, catfish, turkeys, soybeans, feed grains, beef and timber, as well as locally important enterprises such as hay, fruits, vegetables and other specialty crops.

The Division remains committed to providing cutting--edge research and unbiased diagnostic services that producers need to make informed decisions. Division researchers continue to discover methods to increase food and fiber productivity. One innovation is a new nitrogen soil test that determines fertilizer rates needed to optimize crop yields and minimize runoff in surface water. Poultry scientists are assisting that vital state industry with continual improvement in feed conversion by broilers, which is a key to efficient production. Division testing services are provided for crop varieties, soil, manure, water quality and forestry genetics. Diagnostic and analytical services are provided for animal and plant diseases, nematodes, and poultry and cattle nutrition and genetics. Food sensory analysis and other analytical services assist Arkansas's food processing industry.

#### **Competitive Marketing**

Arkansas producers and processors marketing traditional and specialty plant and animal products need assistance through research and education on identifying existing and emerging local, national and global market supply chains. Producers and processors also need to adjust to changing local and global market conditions, meet certification requirements, and respond to regulatory policies and consumer demands. The Arkansas Global Rice Model is an example of a Division program that provides insight into forces that impact commodity prices in the world market. On a smaller scale, the Division's Market Maker web site helps to match agricultural producers with existing specialty product markets. Market reporting services are provided for livestock and timber producers.

**Public Appreciation and Understanding of Agriculture**

An increasingly urbanized public needs to be educated about the importance of Arkansas agriculture and forestry to their lives and the state's economy, environment and culture.

The Division supports academic programs on university campuses and provides science--based curriculum for schools and the public. The Division produces and disseminates information for target audiences and the general public through diverse media outlets. The Division provides news releases, publications, web sites and multimedia products to help tell the story of Arkansas agriculture. The Division's 4--H youth development program provides many opportunities for Arkansas youth to participate in agriculture- related projects and explore future careers in agriculture. Division personnel communicate with individuals, small groups and local organizations in all 75 Arkansas counties about the importance of agriculture and forestry to the state.

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

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

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

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

**V(B). Program Knowledge Area(s)**

## 1. Program Knowledge Areas and Percentage

<b>KA Code</b>	<b>Knowledge Area</b>	<b>%1862 Extension</b>	<b>%1890 Extension</b>	<b>%1862 Research</b>	<b>%1890 Research</b>
101	Appraisal of Soil Resources	4%		6%	
102	Soil, Plant, Water, Nutrient Relationships	9%		9%	
111	Conservation and Efficient Use of Water	4%		5%	
112	Watershed Protection and Management	4%		5%	
201	Plant Genome, Genetics, and Genetic Mechanisms	4%		5%	
204	Plant Product Quality and Utility (Preharvest)	6%		9%	
205	Plant Management Systems	10%		13%	
206	Basic Plant Biology	10%		0%	
211	Insects, Mites, and Other Arthropods Affecting Plants	1%		1%	
212	Pathogens and Nematodes Affecting Plants	1%		1%	
213	Weeds Affecting Plants	7%		8%	
216	Integrated Pest Management Systems	20%		0%	
301	Reproductive Performance of Animals	2%		4%	
302	Nutrient Utilization in Animals	2%		4%	
303	Genetic Improvement of Animals	2%		4%	
306	Environmental Stress in Animals	4%		8%	
307	Animal Management Systems	2%		5%	
311	Animal Diseases	3%		6%	
601	Economics of Agricultural Production and Farm Management	4%		6%	
722	Zoonotic Diseases and Parasites Affecting Humans	1%		1%	
	<b>Total</b>	100%		100%	

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

## 1. Situation and priorities

Food production agriculture is a large and diverse industry in Arkansas. Research and Extension programs in rice, wheat, soybean, corn, and grain sorghum are crucial to make Arkansas competitive in the global economy. Over 6 million acres of row crops are grown annually in Arkansas,

contributing over \$3 billion to the state's economy. Although relatively small in size, fruit, nut and vegetable production is a significant and growing industry.

Increased demand for primary production products is increasing pressure on non-developed lands, especially the most biologically diverse landscapes on Earth. Increased production without increasing the land base means increased yield from current agricultural lands. This will require increased irrigation, fertilization, and pest control. A comprehensive assessment of impacts of decisions related to agricultural production is essential to make informed and rational decisions.

The Arkansas poultry and livestock industry is a major source of jobs, income and cash flow. Arkansas commodity poultry production exceeds \$3.6 billion per year and commodity livestock exceeds \$520 million per year. Arkansas has 1.8 million head of cows and calves. Increased input costs (including higher energy costs), fluctuating market prices, and production efficiency continue to be major concerns of the state's livestock and poultry industry.

Biosecurity research and education is critical to the sustainability of Arkansas agriculture. In Arkansas, diseases could cost the industries more than \$230 million a year. Since the production of poultry in Arkansas is approximately 24% of the US production total any outbreak in Arkansas or anywhere in the US would be devastating in terms of dollar value on the economy of Arkansas or the nation.

Monitoring for crop diseases, for insects and weeds is an important ongoing effort to prevent or mitigate disruption of sustainable crop production. Introduction of new pathogens and pests, and evolution of new, more aggressive strains of existing pathogens or resistant weeds and insects continues to pose biosecurity threats to crop production in Arkansas.

Agricultural producers and landowners are seeking alternative ways to generate income from their land. There is a trend of increased sales direct to the public and substantial emergence of organic and farmer markets. Growth in the organic market ranges from 15% to 20% annually since 1997. Arkansas continues to experience increased demand for locally produced food from numerous production methods.

## **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**

Some primary assumptions that are made related to this program include:

- Arkansas producers will continue to face many challenges in producing profitable crops and maintaining sustainability of land;
- Cooperative efforts with grower groups, commodity boards, regulatory agencies, and other organizations will provide valuable feedback to enhance programming on a regional and statewide basis;

- On-farm research results will generate data from which recommendations are derived; fruit, nut, and vegetable production will remain as a major emphasis area for long-range educational programs;
- New and existing horticultural production and service industries will require on-going research and educational assistance; livestock production will continue to be a major industry in Arkansas;
- Livestock producers will face ever changing challenges, and they will look to the UA Division of Agriculture to help them face those challenges;
- Demand for agricultural products will continue to increase over the next 40 years, driven by increasing populations and increasing prosperity;
- Demand for high quality food will continue expanding rapidly;
- Demand for biofuels will increase as petrochemical prices continue to climb;
- Urban landscapes will continue expanding, taking peri-urban farmlands at increasing rates;
- The result of these and other pressures on the landscape is a dramatic loss in biodiversity, as forests, wetlands and prairies are converted to urban and agricultural systems;
- Given current trends in declining numbers of farms, part-time and hobby farmers, specialized farming, and the globalization of agriculture, producers will continue to seek new and innovative ways to generate farm income, identifying niche markets and capitalizing on specialized agricultural opportunities;
- Strong livestock and poultry industries will remain vital components of Arkansas's economy;
- Water and air quality issues will continue as important issues;
- Regulations and court actions will impact manure management options;
- Economically viable alternative higher value uses of animal manure can be found;
- The classic "personal property rights vs. public good" situation will require a blend of science, economics, legal, community relations, and compromises;
- Increased collaborations will occur with regulatory officials, state health officials, policy-makers, growers/producers, and the general public to develop an effective biosecurity strategy and plan;
- Division of Agriculture testing and monitoring laboratories and facilities will continue to operate in order to process and diagnose plant, soil and animal-related samples to identify possible threats to the food-producing capability of Arkansas agriculture;
- And that a growing number of part-time and alternative agricultural producers will continually seek new and innovative ways to generate farm income, identify niche markets and capitalize on specialized agricultural opportunities as a matter of economic sustainability and cultural survival.

## **2. Ultimate goal(s) of this Program**

Through integrated UA Division of Agriculture research and education efforts, the ultimate goals of the Agricultural Production & Processing planned program include:

- Providing quantitatively rigorous geospatial predictions of crop yields globally under a variety of scenarios
- Reducing global food pressures by increasing yield in areas most threatened by climate change impacts
- Providing transparent assessments of the impact of agricultural consumer decisions on rural prosperity globally using life cycle assessment
- Developing crop production systems that are sustainable and competitive in the global marketplace while providing food to feed the growing world population
- Collaborating with industry, commodity groups, etc., to facilitate technology development and adoption
- Initiating cooperative work among scientific disciplines to fine-tune the best food production management practices over a variety of geographic regions
- Continue supporting strategic partnerships that create value-added benefits for Arkansas' environment and its people
- Expanding programs for effective sustainable agriculture systems
- Increasing and enhancing horticulture knowledge and expertise of commercial and consumer audiences and Extension staff
- Increasing number of and improving both quality and profitability of commercial fruit, nut, and

vegetable production operations

- Ensuring the viability and efficiency of the livestock, poultry and forage industries so they compete effectively in domestic and global markets
- Supporting the aquaculture industry as a sustainable alternative enterprise
- Improving animal biosecurity and reducing the risk of a disease threat in poultry and livestock operations
- Improving the security of plant health through early identification and management of invasive plant pests
- Maintaining and sustaining a viable food supply by providing the needed information on livestock manure management practices
- Enhancing economic opportunities for landowners and tenants using sustainable land management practices to improve rural economies in Arkansas.

**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
2014	119.3	0.0	266.0	0.0
2015	119.3	0.0	265.0	0.0
2016	119.3	0.0	264.0	0.0
2017	119.3	0.0	263.0	0.0
2018	119.3	0.0	0.0	0.0

**V(F). Planned Program (Activity)**

**1. Activity for the Program**

In the area of **Efficient Production & Processing**, THE U OF A DIVISION OF AGRICULTURE WILL:

- Develop and deliver efficient, sustainable agricultural production and processing best management practices.
- Discover and promote adoption of breakthrough science--based technologies.
- Analyze and explain the impact of issues affecting Arkansas agricultural production and processing.

In the area of **Competitive Marketing**, THE U OF A DIVISION OF AGRICULTURE WILL:

- Analyze global and local commodity and product market opportunities and constraints.
- Identify and address the needs of diverse agricultural enterprises related to marketing supply chains.
- Analyze and explain the impact of issues affecting Arkansas plant and animal product markets.
- Help producers and processors take advantage of market opportunities.

In the area of **Public Appreciation and Understanding of Agriculture**, THE U OF A DIVISION OF AGRICULTURE WILL:

- Increase public awareness of Arkansas agriculture's economic and environmental benefits.
- Teach the science behind agriculture through youth and adult education programs.
- Recruit and retain agricultural and forestry professionals and leaders.
- Analyze and communicate science--based information about sustainable agriculture issues to the public.

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

<b>Extension</b>	
<b>Direct Methods</b>	<b>Indirect Methods</b>
<ul style="list-style-type: none"> <li>● Education Class</li> <li>● Workshop</li> <li>● Group Discussion</li> <li>● One-on-One Intervention</li> <li>● Demonstrations</li> <li>● Other 1 (Soil/Water Testing)</li> <li>● Other 2 (Surveillance and Monitoring)</li> </ul>	<ul style="list-style-type: none"> <li>● Public Service Announcement</li> <li>● Newsletters</li> <li>● TV Media Programs</li> <li>● Web sites other than eXtension</li> <li>● Other 1 (Mass Media)</li> <li>● Other 2 (Electronic methods and Podcasts)</li> </ul>

**3. Description of targeted audience**

Target audiences for the Agricultural Production & Processing planned program include:

- Agricultural food crop growers/producers
- Livestock/poultry producers
- Commercial poultry producers
- Commercial poultry company personnel
- Aquaculture producers
- Non-farm private landowners
- Agricultural consultants
- Agribusiness/allied Industry personnel
- Horticulture production and service business personnel
- Local, state and federal agency personnel
- Master gardeners
- Community leaders
- Policy and decision makers
- Low-income families with children
- Low-income older adults
- Hispanic/Latino families
- African-American families
- Single women
- First responder emergency personnel
- Research funders
- General Public
- Policy makers (US and international agricultural water resource managers),  
 Supply chain managers (consumer package good manufacturers and biotech companies)



### **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**

- # of agronomic production education meetings related to food production
- # of demonstrations/on-farm research related to food crop production
- # of farm visits related to food crop production
- # of row crop field days related to food production
- # of educational meetings, demonstrations, field days, site visits, and other group events held to educate commercial and consumer clientele in fruit, nut, and vegetable production
- # of clientele contacts from educational classes, workshops, group discussions, one-on-one, on farm demonstration interventions, demonstrations, and other educational methods related to food crop production.
- # of livestock or poultry related educational programs, workshops, educational meetings and/or field days.
- # of clientele attending livestock or poultry related educational programs (field days, workshops, etc.)
- # of producers receiving livestock or poultry related educational materials (newsletters, fact sheets, etc.)
- # of livestock or poultry related farm visits or one-on-one consultations with producers.
- # of clientele trained on agricultural biosecurity.
- # of requested consultations related to exotic animal disease concerns.
- # of hits to the CES Website regarding avian and livestock biosecurity.
- # of farm visits or one-on-one consultations with clientele related to biosecurity.
- # attending alternative agricultural systems related education classes, workshops, demonstrations, group discussions, and other educational events.
- # of alternative agricultural systems related demonstrations (e.g., demonstration study farm, food plots, etc.)
- # of educational classes, tours, field days, and workshops related to pest management.
- # of education meetings, demonstrations, and field days related to the production of non-food agronomic and horticulture crops.
- # of clientele participating in educational events related to non-food agronomic and horticulture crop production.

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

**V(I). State Defined Outcome**

O. No	Outcome Name
1	# of clientele (non-duplicated) who use the DD50 program for improved rice production.
2	# of clientele that utilize SOYVA to assist with variety selection.
3	# of livestock producers who increased knowledge related to livestock production management practices.
4	# of livestock producers who initiated or improved their record keeping.
5	# of poultry producers who adopted new practices or technology.
6	# of livestock producers who changed an existing management practice or adopted a new practice.
7	# of growers/producers reporting knowledge gained about the need for biosecurity.
8	# of growers/producers reporting intent to adopt new biosecurity practices for animal production facilities.
9	# of diagnostic plant pest samples submitted.
10	# of diagnostic nematode samples submitted.
11	# of Asian Soybean Rust positive samples.
12	# of samples submitted for exotic animal diseases testing.
13	# of clientele who reported knowledge gained about speciality food related products.
14	# of clientele who initiated specialty food-related enterprises.
15	# of plant varieties developed.
16	# of pesticide applicator training participants certified or re-certified by passing commercial pesticide certification exams.
17	# of producers who gained knowledge in crop production and management.
18	# of Master Gardener participants trained, certified and re-certified.

**Outcome # 1**

**1. Outcome Target**

# of clientele (non-duplicated) who use the DD50 program for improved rice production.

**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
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 205 - Plant Management Systems

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 2**

**1. Outcome Target**

# of clientele that utilize SOYVA to assist with variety selection.

**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
- 204 - Plant Product Quality and Utility (Preharvest)
- 205 - Plant Management Systems

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 3**

**1. Outcome Target**

# of livestock producers who increased knowledge related to livestock production management practices.

**2. Outcome Type :** Change in Knowledge Outcome Measure

**3. Associated Knowledge Area(s)**

- 204 - Plant Product Quality and Utility (Preharvest)
- 205 - Plant Management Systems
- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 303 - Genetic Improvement of Animals
- 306 - Environmental Stress in Animals
- 307 - Animal Management Systems
- 311 - Animal Diseases
- 601 - Economics of Agricultural Production and Farm Management

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 4**

**1. Outcome Target**

# of livestock producers who initiated or improved their record keeping.

**2. Outcome Type :** Change in Action Outcome Measure

**3. Associated Knowledge Area(s)**

- 205 - Plant Management Systems
- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 303 - Genetic Improvement of Animals
- 306 - Environmental Stress in Animals
- 307 - Animal Management Systems
- 311 - Animal Diseases
- 601 - Economics of Agricultural Production and Farm Management

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 5**

**1. Outcome Target**

# of poultry producers who adopted new practices or technology.

**2. Outcome Type :** Change in Action Outcome Measure

**3. Associated Knowledge Area(s)**

- 306 - Environmental Stress in Animals
- 311 - Animal Diseases

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 6**

**1. Outcome Target**

# of livestock producers who changed an existing management practice or adopted a new practice.

**2. Outcome Type :** Change in Action Outcome Measure

**3. Associated Knowledge Area(s)**

- 204 - Plant Product Quality and Utility (Preharvest)
- 205 - Plant Management Systems
- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 303 - Genetic Improvement of Animals
- 306 - Environmental Stress in Animals
- 307 - Animal Management Systems
- 311 - Animal Diseases
- 601 - Economics of Agricultural Production and Farm Management

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 7**

**1. Outcome Target**

# of growers/producers reporting knowledge gained about the need for biosecurity.

**2. Outcome Type : Change in Knowledge Outcome Measure**

**3. Associated Knowledge Area(s)**

- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Pathogens and Nematodes Affecting Plants
- 213 - Weeds Affecting Plants
- 311 - Animal Diseases
- 722 - Zoonotic Diseases and Parasites Affecting Humans

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 8**

**1. Outcome Target**

# of growers/producers reporting intent to adopt new biosecurity practices for animal production facilities.

**2. Outcome Type : Change in Knowledge Outcome Measure**

**3. Associated Knowledge Area(s)**

- 311 - Animal Diseases
- 722 - Zoonotic Diseases and Parasites Affecting Humans

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 9**

**1. Outcome Target**

# of diagnostic plant pest samples submitted.



**2. Outcome Type** : Change in Action Outcome Measure

**3. Associated Knowledge Area(s)**

- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Pathogens and Nematodes Affecting Plants
- 213 - Weeds Affecting Plants

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 10**

**1. Outcome Target**

# of diagnostic nematode samples submitted.

**2. Outcome Type** : Change in Action Outcome Measure

**3. Associated Knowledge Area(s)**

- 212 - Pathogens and Nematodes Affecting Plants

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 11**

**1. Outcome Target**

# of Asian Soybean Rust positive samples.

**2. Outcome Type** : Change in Condition Outcome Measure

**3. Associated Knowledge Area(s)**

- 212 - Pathogens and Nematodes Affecting Plants

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 12**

**1. Outcome Target**

# of samples submitted for exotic animal diseases testing.

**2. Outcome Type** : Change in Action Outcome Measure

**3. Associated Knowledge Area(s)**

- 311 - Animal Diseases
- 722 - Zoonotic Diseases and Parasites Affecting Humans

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 13**

**1. Outcome Target**

# of clientele who reported knowledge gained about speciality food related products.

**2. Outcome Type** : Change in Knowledge Outcome Measure

**3. Associated Knowledge Area(s)**

- 102 - Soil, Plant, Water, Nutrient Relationships
- 601 - Economics of Agricultural Production and Farm Management

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 14**

**1. Outcome Target**

# of clientele who initiated specialty food-related enterprises.

**2. Outcome Type :** Change in Action Outcome Measure

**3. Associated Knowledge Area(s)**

- 102 - Soil, Plant, Water, Nutrient Relationships
- 204 - Plant Product Quality and Utility (Preharvest)
- 205 - Plant Management Systems
- 307 - Animal Management Systems
- 601 - Economics of Agricultural Production and Farm Management

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 15**

**1. Outcome Target**

# of plant varieties developed.

**2. Outcome Type :** Change in Knowledge Outcome Measure

**3. Associated Knowledge Area(s)**

- 201 - Plant Genome, Genetics, and Genetic Mechanisms

**4. Associated Institute Type(s)**

- 1862 Research

**Outcome # 16**

**1. Outcome Target**

# of pesticide applicator training participants certified or re-certified by passing commercial pesticide certification exams.

**2. Outcome Type :** Change in Knowledge Outcome Measure

**3. Associated Knowledge Area(s)**

- 112 - Watershed Protection and Management
- 205 - Plant Management Systems
- 601 - Economics of Agricultural Production and Farm Management

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 17**

**1. Outcome Target**

# of producers who gained knowledge in crop production and management.

**2. Outcome Type** : Change in Knowledge Outcome Measure

**3. Associated Knowledge Area(s)**

- 102 - Soil, Plant, Water, Nutrient Relationships
- 112 - Watershed Protection and Management
- 205 - Plant Management Systems
- 601 - Economics of Agricultural Production and Farm Management

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 18**

**1. Outcome Target**

# of Master Gardener participants trained, certified and re-certified.

**2. Outcome Type** : Change in Knowledge Outcome Measure

**3. Associated Knowledge Area(s)**

- 102 - Soil, Plant, Water, Nutrient Relationships
- 205 - Plant Management Systems

#### **4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

### **V(J). Planned Program (External Factors)**

#### **1. External Factors which may affect Outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)
- Other (Animal or plant disease outbreak)

#### **Description**

External factors that may impact outcomes within the Agricultural Production & Processing planned program area include the following: 1) program realignment and prioritization efforts within the NIFA will impact the availability and allocation of both formula and competitive grants from the Federal partner; 2) a reduction in faculty and staff (FTEs) due to budget reductions from the state and local partners may reduce the Division of Agriculture's ability to deliver educational programming in the state. State, as well as global, food production outcomes will be influenced by market conditions, including the fuel vs. food pressure, changes in payments to farmers, increased production input costs, land grant university funding, the downturn in the economy, weather conditions, natural disasters, the condition of the overall economy, changes in public policy and regulations, and outbreaks of diseases affecting plants or animals. Global climate change will alter basin-level water supplies around the world, destabilizing crop production, and potentially exacerbating already tenuous food supplies.

Other factors that could impact program outcomes would be human epidemics and bioterrorism/agroterrorism attacks. Any of these factors could cause projected outcomes to vary widely.

### **V(K). Planned Program - Planned Evaluation Studies**

#### **Description of Planned Evaluation Studies**

Comprehensive program and departmental evaluation reviews to determine the quality and efficacy of research and Extension programs are conducted on a five to seven year cycle by various research based evaluation methods. Evaluation studies within individual Extension programs that are delivered to target audiences will be conducted using accepted program evaluation methodology and tools to determine changes in knowledge, skills, attitudes, behaviors, practices, and any social, environmental or economic condition changes that occur as a result of the programs.



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

### **Program # 2**

#### **1. Name of the Planned Program**

Environment, Energy & Climate

#### **2. Brief summary about Planned Program**

The longterm strategy regarding adaptation and mitigation to environmental stresses for agriculture depends on knowledge of fundamental biological systems. Division of Agriculture faculty are committed to finding the answers to basic questions in plant and animal genetics, plant and animal physiology, soil and water conservation, nutrient management and other relevant systems.

The Energy Independence and Security Act of 2007 requires US biofuels production to increase to 36 billion gallons by 2022. Of that total, the majority (21 billion gallons) must be derived from advanced biofuels such as cellulosic ethanol and biomass-based diesel; the remaining 15 billion gallons may be made from conventional feedstocks such as corn and sugarcane. Arkansas is well positioned for bioenergy production with large areas of cropland and forest and an innovative processing industry for agricultural and forest products. The University of Arkansas, Division of Agriculture has made investments in sustainable energy, including biodiesel fuel, biomass crop production, and public issue education.

The Division of Agriculture faculty conduct field based research into potential crop and fast growing tree species that show potential for bioenergy production. However, reaching the sustainable energy goals outlined by the Federal government involves policy analysis, policy issue education, and understanding public perceptions about sustainable energy. Managing biomass crops can impact the environment especially if increased application of fertilizer and pesticides are required. Division faculty work across several disciplines to investigate the potential impacts of biomass production and biofuel use on water quality, forest sustainability, soil nutrients, and other environmental concerns to help Arkansans understand the benefits and costs of biofuel production.

The sustainable energy program is an essential integrated research and extension program that keeps Arkansans, including row crop and livestock producers, up to date on the state of sustainable energy research, policy, and applications. The goal is to contribute to energy independence by investigating and designing optimum forestry and crops for bioenergy production while ensuring sustainable and adaptive management practices.

About 5,000 acres of Miscanthus have been planted under a MFA based BCAP program in Missouri. Proximity to Memphis Bioworks and the Tennessee and Oklahoma biofuels development programs may also encourage Arkansas farmers to explore new crop alternatives. Biofuels crops pose potential threats to the historical base of agriculture in the state by adding to the demand for irrigation systems and competing directly for an already compromised water supply.

Arkansas will face competing demands for water quantity and quality, forest stewardship and health, wildlife habitat management and ecosystem services. The state is writing an updated Water Plan which will require input and attention from the Division. Nutrient sensitive areas have been declared by the state. Farmers and farm service providers in the identified areas require assistance, planning support and nutrient management education beyond anything traditionally provided by Extension educators. Land managers require updated information relevant to changing policy related to natural resource management issues such as: carbon trading and credits; nutrient trading and credits; water quality regulations; best management practices for the range of agriculture production management situations; Spill Prevention Control and Countermeasures (SPCC) rules for agriculture; pesticide application permit rules; animal manure and mortality management rules, etc. The issues impact both the health of the

natural environment and the health of all Arkansas citizens.

The Division of Agriculture developed the Center for Agricultural and Rural Sustainability (CARS) in 2007 in order to better coordinate, integrate, and motivate innovation in research, outreach, and education into land-based prosperity. CARS has initiated a series of projects aimed at measuring and reducing greenhouse gas (GHG) emissions from agricultural production, processing, and distribution practices. CARS has pioneered use of life cycle analyses (LCAs) in US agriculture using high spatial resolution data. The three major projects are: 1. Dairy LCA for liquid milk, from cradle to grave; 2. Cotton LCA for GHG emissions from seed to farm gate; 3. Pork LCA from cradle to grave. These projects will provide the most comprehensive and geographically explicit LCAs for US agriculture ever conducted, and will support innovations in reductions of GHG emissions across agricultural production practices. In addition, CARS is spearheading a global initiative on the impact of climate change on crop production at high spatial resolution. Additional research efforts are focused on direct quantification of GHG emissions from rice; assessments of soil carbon storage and sequestration; and evaluations of potential economic and impacts of various production practices based on their carbon footprints and how potential policies variations may affect production agriculture in Arkansas. Collectively, these efforts are focused on i) generating knowledge to develop agricultural systems that maintain high productivity in the face of climate changes and reduce greenhouse gas emissions, and ii) helping producers to plan and make decisions in adapting to changing environments, sustaining economic vitality, and taking advantage of emerging economic opportunities offered by climate change mitigation technologies.

Arkansas is the nation's leading producer of rice. Rice production is a major consumer of water and nitrogen in Arkansas. Division of Agriculture Scientists have developed a novel soil test for rice producers called N-STaR, a superior prediction model of nitrogen needs of rice grown on silt loam soils in Arkansas. If N-STaR is adopted by rice producers, nitrogen use efficiency should increase in many fields and nitrogen rates may be reduced on many fields. The principles involved in creating N-STaR will be tested on clay soils for rice, for corn production and for wheat production.

**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

<b>KA Code</b>	<b>Knowledge Area</b>	<b>%1862 Extension</b>	<b>%1890 Extension</b>	<b>%1862 Research</b>	<b>%1890 Research</b>
101	Appraisal of Soil Resources	10%		10%	
102	Soil, Plant, Water, Nutrient Relationships	12%		15%	
111	Conservation and Efficient Use of Water	2%		3%	
112	Watershed Protection and Management	10%		12%	
123	Management and Sustainability of Forest Resources	15%		15%	
133	Pollution Prevention and Mitigation	8%		8%	
136	Conservation of Biological Diversity	2%		2%	
141	Air Resource Protection and Management	2%		2%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		3%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		4%	
204	Plant Product Quality and Utility (Preharvest)	5%		5%	
402	Engineering Systems and Equipment	5%		2%	
403	Waste Disposal, Recycling, and Reuse	5%		1%	
511	New and Improved Non-Food Products and Processes	5%		5%	
601	Economics of Agricultural Production and Farm Management	9%		5%	
605	Natural Resource and Environmental Economics	5%		5%	
610	Domestic Policy Analysis	5%		3%	
	<b>Total</b>	100%		100%	

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

Arkansas has abundant potential for providing feedstock for production of biofuels. Exploiting those existing biomass sources and developing them into viable biofuels must be balanced with maintaining the integrity the existing agricultural infrastructure and land use. The State of Arkansas and its agronomic, economic, and business-related resources are well positioned to meet this challenge. As incentive programs for bioenergy programs decline, we must work toward building a sustainable bioenergy program that serves Arkansas and needs little external support.

Increased resources devoted to bioenergy production must be accompanied by best practices, including management of inputs such as fertilizers and pesticides. Adherence to Best Practices can avoid or

mitigate environmental quality issues including water pollution, declining soil fertility, introduction of invasive species. The ability to rapidly assess potential impacts of new technologies and practices of biofeedstock production on water quality, spatial distribution of biomass crops, spatial location of potential markets and other data in production decisions is critical, especially given emerging technologies and evolving needs. There is also a need to assess the impact of bioenergy products on the environment and local economy.

Educating producers, stakeholders and consumers on sustainable bioenergy production and applications is a priority in building a sustainable energy economy. Building a sustainable bioenergy economy will depend on educating producers, stakeholders, consumers, and policy makers.

Agriculture is commonly cited as a major source of GHGs. However, agricultural production practices can significantly reduce the emission rate of GHGs, and in some cases convert agricultural practices to a net sink for carbon. Demand for food, feed, fiber, and now fuel from agricultural production systems may have to increase by 50 to 100 percent in the next 40 years in order to meet the global food needs of the projected 9.25 billion people in 2050. This increase in demand for land-based primary production products is increasing pressure on non-developed lands, especially the most biologically diverse landscapes on Earth: rainforests, wetlands, and prairies. Increasing production without increasing the land base means increasing yield from current agricultural lands. This will require increased energy and fertilizer inputs. Understanding where the pressures are greatest, and the opportunities for increasing yield while decreasing GHGs will allow for a more strategic expansion of agricultural technology globally. The complexity of global food production has led to deep fragmentation of knowledge across supply chains.

As a natural resource rich and dependent state, Arkansas' economic well being is constantly affected by the marketplace. High commodity prices are offset by extremely low forest products values, natural disasters, high energy input and equipment costs. The margins for error are minute. The farmer population is both aging and declining. The 2007 Census of Agriculture depicts the average age of the Arkansas farmer as 57 years. The total farm operations in 2007 numbered 49,346, down from the 49,493 farms of record in 1997 (NASS).

Energy issues are also driving investment in crops grown specifically for the fiber, oil and ethanol markets, primarily outside the state of Arkansas. Arkansas has in development, 5,000 plus acres of Miscanthus under the guidance of a MFA based BCAP program in Missouri. Proximity to Memphis Bioworks and the Tennessee and Oklahoma biofuels development programs will also continue to pressure Arkansas farmers to explore new crop alternatives. All of this pressure to explore plant and plant products comes at a time when the University of Arkansas Research faculty has released one of the highest performing public varieties of cotton in the system's history.

These high value crops pose potential threats to the historical base of agriculture in the state by adding to the demand for irrigation systems and competing directly for an already compromised water supply.

Natural resource concerns continue. Water quantity and quality, forest stewardship and health, wildlife habitat management, life cycle analysis and ecosystem services are all issues that challenge the institutions in Arkansas. The state is entering a three year Water Plan development process that will require significant time and attention from the Division. Nutrient sensitive areas have been declared by the state. Farmers and farm service providers in the identified areas require assistance, planning support and nutrient management education beyond anything traditionally provided by Extension educators.

Land managers are in constant search for answers to changing policy questions related to natural resource management issues such as: carbon trading and credits; nutrient trading and credits; water quality regulations; best management practices for the range of agriculture production management

situations; Spill Prevention Control and Countermeasures (SPCC) rules for agriculture; pesticide application permit rules; animal manure and mortality management rules, etc. The list is long and growing. These issues are grounded in both the health of the natural environment and the health of citizens working and recreating therein.

## **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**

Renewable alternative fuels have already had a major impact on Arkansas agriculture. Increased demand for corn, soybeans and other oilseeds used for bio-fuel has resulted in higher prices and larger acreages of those crops in the state. The next generation of bio-fuel technology is expected to use non-food, cellulosic bio-mass, such as the fast-growing grass and tree species being field tested Division of Agriculture experiment station locations.

We cannot assume that federal and state incentives for biofuel production and use will continue. Further, we cannot shift large amounts of production capacity from food to energy. Increases in production of biofeedstocks must come largely from non-food input sources and through increased efficiencies in production practices.

The University of Arkansas, Division of Agriculture will continue research and education into developing biomass crop and forestry systems for sustainable energy production. Evidence: Field tests of bioenergy crops will continue to be conducted at a number of Division of Agriculture locations, including the Southeast Research and Extension Center at Monticello, Southwest Research and Extension Center at Hope, Lon Mann Cotton Research Center at Marianna, Pine Tree Research Center at Colt, Northeast Research and Extension Center at Keiser, Rohwer Research Station, Arkansas Agricultural Research and Extension Center at Fayetteville and in fields of cooperating farmers.

Interdisciplinary teams in research and extension are necessary to address critical issues in sustainable bioenergy. The Division of Agriculture faculty will work across disciplines and departments to investigate sustainable energy projects, issues, and policies through the integrated missions of research, education, and Extension outreach - Evidence: Formation of the UA Environmental Task Force charged with inventorying existing research and extension activities, setting priorities and, where needed, initiating new programs. The Task Force will continue to work across departments on critical sustainable energy issues.

The Division of Agriculture will continue to seek financial support in our effort to address the key issues mentioned above -and it is assumed that funding will be available. The Division of Agriculture will continue to produce timely educational products.

Cooperative relationships with grower groups, commodity boards, regulatory agencies, and other organizations is the best available system for providing information needed to design education programs suited to the needs of the audience.

On-farm research provides necessary and trusted data from which defensible management recommendations can be derived.

Best management practices designed to protect water quality and support broad sustainability objectives must be a component of the continuing research agenda.

Local County Extension Counsels provide a strong connection to the needs and priorities of local businesses, agriculture enterprises and communities.

Regional Research and Extension networks will continue to be encouraged and supported by both state and USDA NIFA organizations.

The University of Arkansas Division of Agriculture will continue to encourage and support multi-disciplinary teams of faculty in targeted natural resource management research, extension and education projects.

The University of Arkansas Division of Agriculture will continue to seek and support efforts to obtain the funding necessary to support on-going research and extension efforts associated with natural resource management and sustainability.

The program assumes that demand for agricultural products will continue to increase over the next 40 years. This increase in demand will be driven by increasing populations and increasing prosperity. The rate of population growth measured as numbers of people added to Earth per year has never been greater. The rate of increase in prosperity, especially in Asia, has never been higher, as a percent or total numbers. The program assumes demand for high quality food will continue expanding rapidly. Concurrent with this expansion, the biofuels revolution is well under way. Demand for biofuels will increase as petrochemical prices continue to climb. The program assumes that the result of these and other pressures on the landscape is a dramatic loss in biodiversity, as forests, wetlands and prairies are converted to urban and agricultural systems. The program assumes that demand for forest products like paper, lumber, biofuels feedstocks will increase in the long term, but will remain relatively stable in the next five years.

The Division of Agriculture assumes that creating efficiency (whether by reducing inputs without sacrificing yield, by increasing yields without increased inputs, or by increasing yields by superior management of inputs) is creating Climate Change mitigation. The program does not assume that all Climate Change mitigation can be profitably adopted, rather that some Climate Change mitigating practices will be adopted slowly or not at all due to increased risk or loss of profitability.

## **2. Ultimate goal(s) of this Program**

Increase production of available renewable bio-based energy.

Increased production and use of fast growing woody biomass for bioenergy production.

Increase available energy from biomass sources while maintaining and sustaining a viable food and fiber supply.

Evaluate the impact of biomass production on water quality and ecosystem health.

Educate stakeholders to make informed decisions regarding bioenergy production and use.

**\*\* Climate Change\*\***

The ultimate goals of this program are to provide quantitatively rigorous analyses of crop production practice impacts on GHG emissions and carbon footprints, provide strategies that seek to mitigate GHG emissions from crop and forestry production, and production strategies which allow adaptation to Climate Change which do not compromise yield and profitability.

**\*\*Environment\*\***

Identify and assist in the adoption of new technologies and practices that enhance profitability and manage risk, while protecting the environment and ensuring long term sustainability.

Position policy decision-makers at all levels to understand and use the policy tools important to community, regional, and state-wide economic viability.

Help Arkansas to achieve a high degree of competitiveness in a global economy.

Continue to support strategic partnerships that create value-added benefits for Arkansas' environment and citizens.

Remain vigilant and adaptive, responsive to locally identified concerns as they emerge.

Conserve habitat and water resources at the wildland/urban interface.

Increase the knowledge of community and business leaders regarding bioenergy and biofuel production and processing systems.

**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
2014	18.3	0.0	25.0	0.0
2015	18.3	0.0	22.0	0.0
2016	18.3	0.0	20.0	0.0
2017	18.3	0.0	20.0	0.0
2018	18.3	0.0	0.0	0.0

**V(F). Planned Program (Activity)**

**1. Activity for the Program**

In the area of Conserving Water Resources, the U of A Division of Agriculture will:

- Improve efficient use and conservation of water resources through research and education.
- Educate Arkansans about competing demands for water quantity and quality for agricultural, residential, recreational, wildlife, industrial and municipal needs.
- Inform decision makers with science-based information on water quantity and quality.
- Collaborate with state and federal agencies to sustain water resources.
- Provide the science-based information needed to understand changing environmental regulations.

In the area of Alternative Energy & Conservation, the U of A Division of Agriculture will:

- Develop sustainable and regionally appropriate bio-energy production systems.
- Evaluate and demonstrate energy efficiency and conservation for agricultural and residential applications.
- Provide science-based information to guide public understanding of alternative energy sources.
- 

Collaborate with state and federal agencies on assessing alternative energy options and measuring impacts.

- Conduct research on the impact of energy-based resource extraction on natural ecosystems and communities.

In the area of Natural Resource Sustainability, the U of A Division of Agriculture will:

- Determine the effects of urbanization and changing rural ownership patterns on natural resources.
- Develop natural resource management strategies, balancing socioeconomic development and environmental protection.
- Provide science-based information to reduce negative impacts of invasive species.
- Provide consumers information to make educated decisions regarding "green" choices.

In the area of Climate Variations and Policy, the U of A Division of Agriculture will:

- Help Arkansas's communities and agricultural sector adapt to climate variations and extreme weather or climate-related events.
- Analyze and explain local impact of national and international climate policies.
- Provide unbiased information about the science behind the climate debate.
- Evaluate agricultural production practices to reduce greenhouse gas emissions and sequester carbon.

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

**Extension**

<b>Direct Methods</b>	<b>Indirect Methods</b>
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<ul style="list-style-type: none"><li>● Education Class</li><li>● Workshop</li><li>● Group Discussion</li><li>● One-on-One Intervention</li><li>● Demonstrations</li><li>● Other 1 (Online Class)</li></ul>	<ul style="list-style-type: none"><li>● Newsletters</li><li>● Web sites other than eXtension</li><li>● Other 1 (Podcasts)</li></ul>
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**3. Description of targeted audience**

- Youth
- Agri Business
- Row Crop Agricultural Producers
- Consultants
- Forest Landowner Groups
- Forest Industry
- Loggers
- Natural Resource Professionals
- Landowners
- Educators
- Agency personnel
- Livestock producers
- Watershed and other Not-for-profit organizations
- General public
- Researchers
- Policy makers
- Research funding personnel and agencies

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

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

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

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

## **V(H). State Defined Outputs**

### **1. Output Measure**

- Number of educational programs and events held related to Environment, Energy & Climate.
- Number of field days related to Environment, Energy & Climate.
- Number of educational materials, curricula, newsletters, web-based modules and fact sheets developed, produced and delivered related to Environment, Energy & Climate.
- Number of locations for bioenergy crop demonstrations.
- Number of research-based, non-refereed publications published related to Environment, Energy & Climate.
- Number of research-based scientific presentations at scientific or professional meetings related to Environment, Energy & Climate.
- Number of research projects on biomass crops conducted in Arkansas.
- Number of research projects on biofuels performance and emissions conducted in Arkansas.
- Funded research amounts (in dollars) related to Environment, Energy & Climate.
- Number of current year Environment, Energy & Climate relevant research programs.
- Number of current year Environment, Energy & Climate relevant educational programs.
- 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 adopting one practice from the recommended list of energy conserving practices.
2	Number of energy audits conducted.
3	Number of graduate students working on bioenergy projects or biofuels labs.
4	Life cycle inventory methodology and data for row crops for greenhouse gases.
5	Number of N-StaR samples processed.
6	Number of new assessment and management tools developed, including models and measurements of greenhouse gas emmissions
7	Number of current year citations of climate related publications.
8	Number of program participants who indicate a change in behavior, based on lessons learned during Environment, Energy & Climate programs.
9	Number of participants (both youth and adult) indicating new knowledge gained as a result of Environment, Energy & Climate programs.
10	Number of program participants indicating new knowledge of water quality and conservation best management practices
11	Number of producers who changed or adopted new production and/or conservation management practices or technologies
12	Number of program participants indicating the adoption or implementation of new water quality and conservation best management practices.

**Outcome # 1**

**1. Outcome Target**

Number of individuals adopting one practice from the recommended list of energy conserving practices.

**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
- 136 - Conservation of Biological Diversity
- 402 - Engineering Systems and Equipment
- 403 - Waste Disposal, Recycling, and Reuse
- 601 - Economics of Agricultural Production and Farm Management
- 605 - Natural Resource and Environmental Economics
- 610 - Domestic Policy Analysis

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 2**

**1. Outcome Target**

Number of energy audits conducted.

**2. Outcome Type : Change in Action Outcome Measure**

**3. Associated Knowledge Area(s)**

- 605 - Natural Resource and Environmental Economics

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

### **Outcome # 3**

#### **1. Outcome Target**

Number of graduate students working on bioenergy projects or biofuels labs.

#### **2. Outcome Type : Change in Action Outcome Measure**

#### **3. Associated Knowledge Area(s)**

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 112 - Watershed Protection and Management
- 123 - Management and Sustainability of Forest Resources
- 133 - Pollution Prevention and Mitigation
- 204 - Plant Product Quality and Utility (Preharvest)
- 402 - Engineering Systems and Equipment
- 403 - Waste Disposal, Recycling, and Reuse
- 511 - New and Improved Non-Food Products and Processes
- 601 - Economics of Agricultural Production and Farm Management

#### **4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

### **Outcome # 4**

#### **1. Outcome Target**

Life cycle inventory methodology and data for row crops for greenhouse gases.

#### **2. Outcome Type : Change in Action Outcome Measure**

#### **3. Associated Knowledge Area(s)**

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 112 - Watershed Protection and Management
- 136 - Conservation of Biological Diversity
- 601 - Economics of Agricultural Production and Farm Management

#### **4. Associated Institute Type(s)**

- 1862 Research

#### **Outcome # 5**

##### **1. Outcome Target**

Number of N-StaR samples processed.

##### **2. Outcome Type : Change in Knowledge Outcome Measure**

##### **3. Associated Knowledge Area(s)**

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 601 - Economics of Agricultural Production and Farm Management

##### **4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

#### **Outcome # 6**

##### **1. Outcome Target**

Number of new assessment and management tools developed, including models and measurements of greenhouse gas emissions

##### **2. Outcome Type : Change in Knowledge Outcome Measure**

##### **3. Associated Knowledge Area(s)**

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 601 - Economics of Agricultural Production and Farm Management

##### **4. Associated Institute Type(s)**

- 1862 Research

**Outcome # 7**

**1. Outcome Target**

Number of current year citations of climate related publications.

**2. Outcome Type** : Change in Knowledge Outcome Measure

**3. Associated Knowledge Area(s)**

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 123 - Management and Sustainability of Forest Resources
- 601 - Economics of Agricultural Production and Farm Management

**4. Associated Institute Type(s)**

- 1862 Research

**Outcome # 8**

**1. Outcome Target**

Number of program participants who indicate a change in behavior, based on lessons learned during Environment, Energy & Climate programs.

**2. Outcome Type** : Change in Action Outcome Measure

**3. Associated Knowledge Area(s)**

- 101 - Appraisal of Soil Resources
- 112 - Watershed Protection and Management
- 123 - Management and Sustainability of Forest Resources
- 133 - Pollution Prevention and Mitigation
- 136 - Conservation of Biological Diversity
- 403 - Waste Disposal, Recycling, and Reuse

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 9**

**1. Outcome Target**

Number of participants (both youth and adult) indicating new knowledge gained as a result of Environment, Energy & Climate programs.

**2. Outcome Type** : Change in Knowledge Outcome Measure

**3. Associated Knowledge Area(s)**

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 112 - Watershed Protection and Management
- 123 - Management and Sustainability of Forest Resources
- 133 - Pollution Prevention and Mitigation
- 136 - Conservation of Biological Diversity
- 204 - Plant Product Quality and Utility (Preharvest)
- 402 - Engineering Systems and Equipment
- 403 - Waste Disposal, Recycling, and Reuse
- 511 - New and Improved Non-Food Products and Processes
- 601 - Economics of Agricultural Production and Farm Management
- 605 - Natural Resource and Environmental Economics
- 610 - Domestic Policy Analysis

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 10**

**1. Outcome Target**

Number of program participants indicating new knowledge of water quality and conservation best management practices

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

#### **4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

#### **Outcome # 11**

##### **1. Outcome Target**

Number of producers who changed or adopted new production and/or conservation management practices or technologies

**2. Outcome Type** : Change in Action Outcome Measure

##### **3. Associated Knowledge Area(s)**

- 101 - Appraisal of Soil Resources
- 102 - Soil, Plant, Water, Nutrient Relationships
- 112 - Watershed Protection and Management
- 123 - Management and Sustainability of Forest Resources
- 133 - Pollution Prevention and Mitigation
- 136 - Conservation of Biological Diversity
- 403 - Waste Disposal, Recycling, and Reuse
- 511 - New and Improved Non-Food Products and Processes
- 601 - Economics of Agricultural Production and Farm Management
- 605 - Natural Resource and Environmental Economics

#### **4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

#### **Outcome # 12**

##### **1. Outcome Target**

Number of program participants indicating the adoption or implementation of new water quality and conservation best management practices.

**2. Outcome Type** : Change in Action Outcome Measure

##### **3. Associated Knowledge Area(s)**

- 102 - Soil, Plant, Water, Nutrient Relationships
- 112 - Watershed Protection and Management

- 403 - Waste Disposal, Recycling, and Reuse
- 601 - Economics of Agricultural Production and Farm Management

#### **4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

### **V(J). Planned Program (External Factors)**

#### **1. External Factors which may affect Outcomes**

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

#### **Description**

Sustainable energy crops are easily impacted by external forces beyond our control. These diverse external factors can include changes in the economy, regulations, markets for other energy sources, shifts in public policy, and technology. For example, a downturn in economy may reduce the ability of landowners to adopt alternative crops/production practices. Government regulations can have significant impact on where and what practices can be adopted. Competition for natural resources such as land, water etc. may limit the choices available to landowners. Assignment of duties can impact the staff support available for this program area.

Plan implementation processes must constantly adapt to the circumstance of time and place: the economic condition within and surrounding Arkansas; the public policy landscape; program leadership; staffing; clientele interest and capacity; environmental circumstance; natural disaster; and other unforeseen changes in the community of constituents we serve, provides a challenging and fluid basis for the success of everything planned. Fortunately, the University of Arkansas Division of Agriculture's faculty and staff are well positioned and have the experience necessary to serve and adapt as the circumstance warrants. The Division's leadership has the proven intent to keep the organization constituent grounded, agile, appropriately staffed, and adequately financed to meet the needs of each new program situation.

Rainfall and temperature regimes affect agricultural practices. Arkansas can experience wide temperature and rainfall ranges from year-to-year. Additionally, Arkansas can experience prolonged flooding and drought in a single season which may affect outcomes.

The effects of Global Climate change have not been fully and clearly elucidated; thus adaptation outcomes are nearly impossible to foresee.



## **V(K). Planned Program - Planned Evaluation Studies**

### **Description of Planned Evaluation Studies**

Programs in sustainable energy are relatively new therefore the evaluation process is in its early stages. For example, field demonstrations indicate that the technological processes for developing sustainable energy through biomass sources exist however, the economic viability is unknown. We will also be conducting evaluations on economic viability, bio energy, and evaluations of educational program effectiveness. Such evaluations may include: benefit/cost analyses, participant surveys of knowledge gained, and adoption of recommended practices.

Development and implementation of greenhouse gas (GHG) estimates from agricultural supply chains requires a retrospective assessment of the activities associated with production of an agricultural product, inventorying current activities, and analysis of case studies for validation of the analyses. Innovations for reducing GHG emissions require comparisons by regions.

Adoption of N-STaR can be predicted and quantified by the number of soil samples submitted for N-STaR analysis.

Several strategies will be initiated and utilized for collecting program assessment information to determine program results, outcomes and impacts. Extension educators will use a variety of recommended methods to gather needed information. Collection methodology and assessment tools will be programmatic and audience centered. Programs focusing on physical activity will use skill-based assessments, before-after program assessments, behavioral changes, observation, and questionnaires. Nutrition and health related activities will use anecdotal information, pre-test assessments and self-report of practice change. Unobtrusive means (request for additional information, purchase of videos and materials, increased participation and observation) will also be used to capture information.

Comprehensive program and departmental evaluation reviews for Research, Extension and Teaching Programs are conducted on a five to seven year cycle by various research based evaluation methods. Data relevant to shifts in production methods, acreage, cropping systems, and enrollment will be compared to historic levels and trends.

Longitudinal evaluation will be conducted by subcomponents of this program through various research based methods. Data will be collected from producers, consultants, and other agricultural practitioners, through telephone and mail surveys and questionnaires at producer meetings and other on-site visits and observations made by Extension faculty. NASS will continue to be a dependable source of indirect data. Electronic audience response (clickers) will be increasingly available and useful in broad based audience participation. Methodologies and survey content is being explored and tested in the current fiscal year.

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

### **Program # 3**

#### **1. Name of the Planned Program**

Access to Safe & Nutritious Food

#### **2. Brief summary about Planned Program**

Recent studies have found more than 75 percent of American consumers want to know where and how their food is grown and processed. However, when making choices, most consumers consider taste and hunger satisfaction over questions about the health benefits of food consumed. Science-based information gained through research focused on food production, processing and consumption plays a vital role in the health of Arkansans.

##### Safe Food Supply

The Centers for Disease Control estimate that foodborne pathogens are responsible each year in the United States for millions of cases of illness. For example, incidents stemming from Campylobacter, Salmonella, Listeria, E. coli O157:H7 and Shigella account for nearly 4 million cases annually. A viral foodborne pathogen such as Norwalklike virus is estimated to account for almost 10 million illnesses annually. The estimate of total costs of these cases of foodborne illness approaches \$50 billion.

Division programs educate food producers, retailers, processors and consumers about food safety.

THE U OF A DIVISION OF AGRICULTURE WILL:

- Conduct research to control foodborne pathogens and toxins in the food supply.
- Educate Arkansans how to minimize risks of agroterrorism.
- Develop innovative methods to detect, identify and control foodborne pathogens, toxins and contaminants in agricultural production and processing.
- Educate food producers, retailers, processors and consumers about food safety.
- Investigate economical, practical and naturally occurring antimicrobials and other compounds that target food pathogens.

##### Food Industry Innovation

The long-term growth of the food industry in Arkansas is dependent upon the industry's ability to innovate, to respond to consumers' taste and expectations, to employ a quality workforce and to minimize environmental impacts and the use of natural resources while maintaining economic viability. New products that meet individual consumer's nutritional needs, deliver health benefits and satisfy the desire for natural ingredients will be in demand.

THE U OF A DIVISION OF AGRICULTURE WILL:

- Educate consumers about the value of foods that promote optimal health, the safety of ingredients in food products and the impact of emerging food technologies.
- Train a qualified workforce for the food processing industry.
- Improve existing, and develop new, processing technologies to produce healthy, high quality foods and reduce environmental impact.
- Continue partnerships with industry to facilitate technology development and implementation.
- Assist new food business entrepreneurs.
- Conduct research to enhance the nutritional value and consumer acceptance of foods, the efficiency of food processes and the use of food byproducts.

##### Food Security

Arkansas has the third highest poverty rate in the nation, with one in four children living in poverty. Food security is defined as access at all times to enough nutritional foods for an active and healthy lifestyle. Arkansans in many areas of the state have limited access to nutritious and affordable food.

The Division of Agriculture's Supplemental Nutrition Assistance Program (SNAPed) and the Expanded Food and Nutrition Education Program (EFNEP) teach families with limited resources to select, prepare and preserve healthy foods. The Division of Agriculture's Cooperative Extension Service provides science based information and educational programs to help families, communities and schools develop gardens and other resources to increase access to healthy food.

THE U OF A DIVISION OF AGRICULTURE WILL:

- Increase food security in Arkansas by teaching consumers how to locate, select, prepare and preserve economical and nutritious foods.
- Increase awareness among low-income households of available nutrition assistance programs.
- Engage volunteers to help develop home, school and community gardens.
- Inform decision makers about best practices for increasing community food security.

Healthy Food Choices

Obesity is a significant and growing public health problem. Arkansas is disproportionately burdened with obesity, having the eighth highest obesity rate among adults at 30 percent, and seventh highest obesity rate among children at 20 percent. U.S. health officials estimate obesity costs the health care system approximately \$147 billion annually -- nearly 10 percent of all health care expenditures. Obesity-associated complications such as diabetes, heart disease, asthma, sleep disorders and social and emotional problems are increasingly seen in adolescents. Early intervention to prevent obesity is crucial for the health of future generations. While many factors contribute to obesity, achieving a balance between calories we consume and calories we burn is the overall key to healthy weight. Nutritious food is also essential for wellbeing. Fruits, vegetables, whole grains and certain vegetable oils contain bioactive substances that provide benefits beyond basic nutrition and should be part of a healthy diet.

THE U OF A DIVISION OF AGRICULTURE WILL:

- Expand its nutrition education programs in all 75 counties targeting the reduction of childhood and adult obesity.
- Improve consumer nutrition literacy and cooking skills in preparing and consuming healthy foods.
- Promote farmers' markets and other venues for locally grown foods.
- Conduct research on obesity, energy balance, nutrient density, behavior modification and food choices.

**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

<b>KA Code</b>	<b>Knowledge Area</b>	<b>%1862 Extension</b>	<b>%1890 Extension</b>	<b>%1862 Research</b>	<b>%1890 Research</b>
501	New and Improved Food Processing Technologies	10%		20%	
504	Home and Commercial Food Service	10%		0%	
701	Nutrient Composition of Food	0%		10%	
702	Requirements and Function of Nutrients and Other Food Components	10%		40%	
703	Nutrition Education and Behavior	20%		10%	
704	Nutrition and Hunger in the Population	15%		0%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	10%		20%	
724	Healthy Lifestyle	15%		0%	
806	Youth Development	10%		0%	
	<b>Total</b>	100%		100%	

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

Obese adults are at increased risk for many serious health conditions including coronary heart disease, hypertension, stroke, type 2 diabetes, certain types of cancer, and premature death. Adult obesity also is associated with reduced quality of life, social stigmatization, and discrimination. A recent study (Finkelstein 2009) showed that obese persons have estimated medical costs that are \$ 1,429 higher than persons of healthy weight.

Sixty-seven percent of adults and 38 percent of youth in grades K-12 are overweight or obese. Lifestyles are directly related to these diseases. Less than half of Arkansas' adults and youth get the recommended amount of daily moderate physical activity, About one half of adolescents are trying to lose weight and more than 10% are using unhealthy practices to decrease weight. One fourth of children in Arkansas are at risk for hunger which has been linked to an increase in obesity in adults.

Unhealthy lifestyles, including poor diet and, physical inactivity, cost Arkansas taxpayers millions of dollars each year in health care costs and lost productivity. Lifestyle changes can prevent at least 20 percent of annual deaths from heart disease, cancer, stroke and diabetes while lowering lifetime medical costs.

Food production and processing is a large business in Arkansas. Approximately 25% of all manufacturing in Arkansas is food processing, representing an \$11 billion per year business. There are 232 food processing establishments in Arkansas directly employing over 55,000 people. The Centers for Disease Control has estimated that 46 million persons in the United States are affected by food borne illness. The costs for persons infected include those associated with health care for afflicted individuals, costs related to caring for those who are ill, absenteeism from work and school, as well as travel costs to seek medical care. For these reasons, it is paramount that the

University of Arkansas maintains a viable and active research and extension program in food safety.

The success of our food safety programs is due to our excellent research and extension functions and their work across department and college lines.

The Extension/Research integration and proximity of Extension and Experiment Station faculty/staff who work on food safety and food processing technologies which are disseminated in Extension workshops, newsletters, roundtables, etc. contributes to this success. The quarterly HACCP Roundtables serve not only state companies but are regional in scope and serve as a model at the national level as an example of food companies cooperating along with USDA through the University of Arkansas to address food safety issues.

## **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**

Our Extension education process is a straight-forward approach to Arkansas health issues. Arkansans will choose to be active participants in the decisions that affect their health to remain active and healthy. Evidence-based education can enable rural individuals and families to better maintain healthy lifestyles and manage physical health. Nutrition education is based on the belief that: 1) Participants have access to and consume specific foods, 2) Targeted audiences are willing and able to participate in nutrition education programs, 3) Knowledge change can lead to behavior change, 4) People will be motivated to learn/change, 5) Targeted audiences are willing and able to make healthy food choices.

Research activities in food chemistry, food processing, food safety and nutrition is dependent on grant funding and the extent of the research depends on extramural funding.

The Better Process Control School is a nationally-mandated program, and other food safety programs are at the request of food processing companies, entrepreneurs, retail establishments, and consumers. Since the programs are clientele-driven, it is believed that they represent the concerns and needs of the food processing industry. It is also assumed that the Experiment Station scientists will continue to secure grant funding to assist in developing new information and technologies and to assist the delivery of outreach programs. Finally, it is assumed that by working with food scientists and agricultural economists, entrepreneurs will continue to be identified and assisted to ultimately establish more successful food industry programs.

### **2. Ultimate goal(s) of this Program**

#### **Healthy Food Choices**

- Educate and encourage individuals and families to adopt nutrition behaviors and lifestyles that

promote health and prevent disease thus increasing longevity and reducing health care costs.

- Reduce risk factors for lifestyle-related chronic diseases.
- Assist individuals in achieving healthier weight
- Develop knowledge through basic and applied research to better understand the relationship between food, diet and human health.
- Increase the knowledge and improve behavioral practices of youth and families/caregivers to engage in healthy food consumption practices based on the US Dietary Guidelines for Americans.

**Food Industry Innovation**

- Educate consumers about the value of foods that promote optimal health, the safety of ingredients in food products and the impact of emerging food technologies.
- Train a qualified workforce for the food processing industry.
- Improve existing, and develop new, processing technologies to produce healthy, high quality foods and reduce environmental impact.
- Continue partnerships with industry to facilitate technology development and implementation.
- Assist new food business entrepreneurs.
- Conduct research to enhance the nutritional value and consumer acceptance of foods, the efficiency of food processes and the use of food byproducts.

**Food Safety**

- Reduce the incidence of food-borne illness
- Increase the number of viable technologies to improve food safety
- Increase the adoption of recommended safe food handling practices at the individual, family, community, production, and supply system level
- Increase the understanding of the ecology of threats to food safety from microbial and chemical sources
- Improve the food processing/safety aspects of manufacturing to foster growth of food manufacturers and entrepreneurs in Arkansas.
- Improve the efficiency and competitiveness of Arkansas and U.S. food industries through improvements in food safety and quality control programs.

**Food Security**

- Increase food security in Arkansas by teaching consumers how to locate, select, prepare and preserve economical and nutritious foods.
- Increase awareness among low-income households of available nutrition assistance programs.
- Engage volunteers to help develop home, school and community gardens.
- Inform decision makers about best practices for increasing community food security.

**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
2014	51.1	0.0	82.0	0.0
2015	51.1	0.0	80.0	0.0
2016	51.1	0.0	80.0	0.0

Year	Extension		Research	
	1862	1890	1862	1890
2017	51.1	0.0	80.0	0.0
2018	51.1	0.0	80.0	0.0

**V(F). Planned Program (Activity)**

**1. Activity for the Program**

Division of Agriculture faculty will develop, evaluate, and disseminate education programs and curricula, incorporating new research and emphasizing healthy lifestyles to prevent and/or reduce childhood obesity. Programs Include but are not limited to:

- Supplemental Nutrition Assistance Program Education (SNAP- Ed) Adults and Youth
- Expanded Food and Nutrition Education Program (EFNEP) Adults and Youth
- Reshape Yourself Healthy Weight Program
- Walk Across Arkansas Youth
- BodyWalk
- Adventures in Grandparenting

Division of Agriculture faculty will conduct novel research to determine the impact of diet and food composition and functional food components on body weight.

The Division of Agriculture faculty and staff will develop, evaluate and disseminate education and curricula incorporating research and teaching. Programs include:

- Quarterly HACCP Roundtable meeting
- HACCP workshops
- Food safety and preservation workshops
- Better Process Control School
- Labeling workshop
- ServSafe workshops
- Culinary arts training for food industry personnel
- Online distance education in food safety and manufacturing
- Assistance to small food companies and entrepreneurs in the form of services, workshops, and consulting.

Research activities in food safety include work to better understand the ecology of food pathogens, improve food processing systems to minimize food pathogens and to improve detection systems for Listeria, Salmonella, EColi and other major food pathogens.

Research activities in food chemistry and food processing include work to (1) improve the quality of rice and improve rice processes, (2) expand the utilization of soybeans and its co-products, (3) assess the health benefits associated with processed specialty crops and (4) improve the sensory quality of processed foods.

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

**Extension**

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> <li>● Education Class</li> <li>● Workshop</li> <li>● Group Discussion</li> <li>● One-on-One Intervention</li> <li>● Demonstrations</li> <li>● Other 1 (On-line classes)</li> <li>● Other 2 (Fact sheets)</li> </ul>	<ul style="list-style-type: none"> <li>● Public Service Announcement</li> <li>● Newsletters</li> <li>● Web sites other than eXtension</li> <li>● Other 1 (Grant Development)</li> <li>● Other 2 (Podcast &amp; Online Education)</li> </ul>

**3. Description of targeted audience**

- Youth
- School personnel
- Parents
- Adults
- Grandparents
- Child Care Providers
- Researchers
- Food Manufacturers
  - Farmers (Farmer's Markets)
- Entrepreneurs and Restaurants
- Food Service Employees and/or Food Handlers
- Employers & Employees
- Health Professionals
- Consumers



### **V(G). Planned Program (Outputs)**

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

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

## **V(H). State Defined Outputs**

### **1. Output Measure**

- # of 4-H/Youth Food, Nutrition and Physical activity programs delivered related to eating healthy and being active
- # of youth contacts in 4-H/ Youth Food, Nutrition, and Physical Activity programs related to eating healthy and being active
- # of adult clientele contacts from educational events (educational classes, workshops, group discussions, one-on-one interventions, demonstrations and other educational activities) related to eating healthy and being active
- Number of Online Master of Agriculture (Food Safety Emphasis) students enrolled in courses
- Number of projects focused on increased understanding of the ecology of fecal indicators and pathogens
- Number of projects focused on increased understanding of preharvest and postharvest processes impacts on microbial and chemical threats
- Number of projects focused on novel food processing technologies
- Number of projects focused on improving the quality of food
- Number of projects focused on the impact of food on nutrition and health
- Total competitive federal Grant \$ for program area
- Total other competitive grant \$ for program area
- Number of participants in educational programs leading to graduation from the Better Process Control School
- Number of participants in educational programs leading to ServSafe certification for food handlers
- Number of participants in quarterly HACCP roundtables
- Number of culinary workshops for food technologists
- Number of participants in culinary workshops for food technologists leading to certification as Certified Culinary Scientist
- Number of culinary workshop participants completing 120 hours of required contact time for the Certified Culinary Scientist recognition
- Number of food processing laboratory services provided
- Number of nutritional labels developed
- Number of food processing approvals developed (2541a)

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

**V(I). State Defined Outcome**

O. No	Outcome Name
1	Number of participants receiving certification in Better Process Control
2	Number of participants receiving certification in ServSafe
3	Number of participants in other workshops related to Food Safety including HACCP, food safety, food defense, food labeling, and food microbiology workshops receiving attendance certification
4	Number of growers and producers receiving GAP certification or equivalent
5	Number of youth demonstrating improved knowledge of food safety or hand washing
6	Number of Online Master of Agriculture (Food Safety Emphasis) graduates employed in the food industry
7	Number of viable technologies developed or modified for the detection and characterization of foodborne pathogens
8	Number of viable prevention, control and intervention strategies for food borne threats in the food system
9	Culinary workshop participants passing the examination to become a Certified Culinary Scientist
10	Number of viable technologies developed or modified for improving food processing systems
11	Number of viable technologies developed or modified to improve the nutritive quality of foods
12	Number of small businesses started as a result of the food entrepreneur assistance program
13	Number of children who practice healthy eating
14	Number of children who engage in healthy levels of physical activity
15	Number of families, children, and youth who have access to healthy foods

**Outcome # 1**

**1. Outcome Target**

Number of participants receiving certification in Better Process Control

**2. Outcome Type** : Change in Knowledge Outcome Measure

**3. Associated Knowledge Area(s)**

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

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 2**

**1. Outcome Target**

Number of participants receiving certification in ServSafe

**2. Outcome Type** : Change in Knowledge Outcome Measure

**3. Associated Knowledge Area(s)**

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

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 3**

**1. Outcome Target**

Number of participants in other workshops related to Food Safety including HACCP, food safety, food defense, food labeling, and food microbiology workshops receiving attendance certification

**2. Outcome Type** : Change in Knowledge Outcome Measure

**3. Associated Knowledge Area(s)**

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

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 4**

**1. Outcome Target**

Number of growers and producers receiving GAP certification or equivalent

**2. Outcome Type :** Change in Knowledge Outcome Measure

**3. Associated Knowledge Area(s)**

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

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 5**

**1. Outcome Target**

Number of youth demonstrating improved knowledge of food safety or hand washing

**2. Outcome Type :** Change in Knowledge Outcome Measure

**3. Associated Knowledge Area(s)**

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

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 6**

**1. Outcome Target**

Number of Online Master of Agriculture (Food Safety Emphasis) graduates employed in the food industry

**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
- 1862 Research

**Outcome # 7**

**1. Outcome Target**

Number of viable technologies developed or modified for the detection and characterization of foodborne pathogens

**2. Outcome Type :** Change in Action Outcome Measure

**3. Associated Knowledge Area(s)**

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

Number of viable prevention, control and intervention strategies for food borne threats in the food system

**2. Outcome Type :** Change in Action Outcome Measure

**3. Associated Knowledge Area(s)**

- 501 - New and Improved Food Processing Technologies
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

**4. Associated Institute Type(s)**

- 1862 Research

**Outcome # 9**

**1. Outcome Target**

Culinary workshop participants passing the examination to become a Certified Culinary Scientist

**2. Outcome Type : Change in Condition Outcome Measure**

**3. Associated Knowledge Area(s)**

- 504 - Home and Commercial Food Service

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 10**

**1. Outcome Target**

Number of viable technologies developed or modified for improving food processing systems

**2. Outcome Type : Change in Knowledge Outcome Measure**

**3. Associated Knowledge Area(s)**

- 501 - New and Improved Food Processing Technologies

**4. Associated Institute Type(s)**

- 1862 Research

**Outcome # 11**

**1. Outcome Target**

Number of viable technologies developed or modified to improve the nutritive quality of foods

**2. Outcome Type : Change in Knowledge Outcome Measure**

**3. Associated Knowledge Area(s)**

- 501 - New and Improved Food Processing Technologies
- 701 - Nutrient Composition of Food
- 702 - Requirements and Function of Nutrients and Other Food Components



**4. Associated Institute Type(s)**

- 1862 Research

**Outcome # 12**

**1. Outcome Target**

Number of small businesses started as a result of the food entrepreneur assistance program

**2. Outcome Type : Change in Condition Outcome Measure**

**3. Associated Knowledge Area(s)**

- 501 - New and Improved Food Processing Technologies
- 504 - Home and Commercial Food Service

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 13**

**1. Outcome Target**

Number of children who practice healthy eating

**2. Outcome Type : Change in Action Outcome Measure**

**3. Associated Knowledge Area(s)**

- 501 - New and Improved Food Processing Technologies
- 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
- 724 - Healthy Lifestyle
- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 14**

**1. Outcome Target**

Number of children who engage in healthy levels of physical activity

**2. Outcome Type : Change in Action 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
- 1862 Research

**Outcome # 15**

**1. Outcome Target**

Number of families, children, and youth who have access to healthy foods

**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

**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
- Public Policy changes
- Government Regulations

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

### **Description**

The University of Arkansas Division of Agriculture is positioned to respond proactively through educational and research activities to policy, regulatory, economic and demographic changes that affect the quality of life for Arkansans and assist food processors to improve their economic position.

## **V(K). Planned Program - Planned Evaluation Studies**

### **Description of Planned Evaluation Studies**

Several strategies will be initiated and utilized for collecting program assessment information to determine program results, outcomes and impacts. Extension educators will use a variety of recommended methods to gather needed information. Collection methodology and assessment tools will be programmatic- and audience- centered. Programs focusing on physical activity will use skill-based change assessments, before-after program assessments, behavioral changes, surveys, observation, and questionnaires.

Nutrition and health- related activities will use anecdotal information; pre-test, post-test assessments; and self-reports of practice change. The SNAP-Ed youth program has evaluation instruments specific to curricula used. Most instruments are paper-based pre- and posttests, however, some instruments have been adapted for handheld electronic audience response devices. Pre-posttests measure changes in eating and activity practices or intent to change eating and activity practices as a result of nutrition education. Youth programs are also evaluated using post-surveys sent home to parents/caregivers. These surveys provide insight into nutrition and physical activity information youth share with parents/caregivers and reveal whether parents have made positive changes to food and activity practices of the household. The parent survey has provided valuable information on the benefits of school-based nutrition education programs for several years. UA Division of Agriculture is in the process of validating the survey via focus groups with parents around the state.

Adult EFNEP programs and SNAP-Ed participants in a series of lessons are evaluated using the EFNEP Behavior Checklist or an adaptation of that instrument. This is a self-report pre- and post-survey that assesses behavior change in nutrition, resource management and food safety practices. Follow-up surveys measure sustainability of changed behavior.

Adult healthy weight programs utilize a self-report retrospective pre-posttest to capture changes in eating practices; and changes in weight, waist circumference, blood pressure, blood lipid and blood glucose levels as a result of weight loss and/or adoption of healthier eating and activity practices.

Unobtrusive means (requests for additional information, purchase of video's and materials, increased participation and observation) will also be used to capture information.

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

### **Program # 4**

#### **1. Name of the Planned Program**

Increasing Opportunities for Families & Youth

#### **2. Brief summary about Planned Program**

The Increasing Opportunities for Families & Youth planned program is uniquely positioned to address challenges such as Arkansas' poverty rate of 18.8%, the second highest in the country, a high divorce rate, low child well-being rate, limited leadership and community engagement by youth within communities, sedentary lifestyles among state residents, personal savings rates at 2.4%, much lower than the 10% minimum recommended by most personal finance experts, and an aging population. Components of the program include: Living Healthy, Aging Well, Strengthening Families, Family Economics, and Empowering Youth.

##### **Living Healthy:**

Nationally, Arkansas ranks in the top 10 for both adult and childhood obesity rates. Obesity contributes to Type II diabetes, heart disease, lowered life expectancy, decreased quality of life and many chronic disorders. National health care costs attributed to obesity are approximately \$147 billion annually. The Division is conducting obesity research projects and offering educational programs such as Walk Across Arkansas and Reshape Yourself. The majority of adults are inactive and the Extension Wellness Ambassador Program will train lay leaders to teach community based programs to help residents of Arkansas live healthier lives.

Arkansas ranks as one of the highest states in the nation for deaths from many chronic diseases. Heart disease and stroke are the leading causes of death for Arkansas adults.

Equally alarming is the number of deaths in Arkansas because of risky behaviors among teens. The Division's ATV Safety course addresses the increasing rate of death and disability from ATV accidents, for adults as well as youth. Research on substance abuse and Extension programs like Be MedWise Arkansas address the alarming rise in prescription drug abuse by children as young as 12.

Most people spend more than 90 percent of their time indoors. Air inside a home can often pose greater health risks than outdoor air because of hazards like mold, carbon monoxide and household toxins. Healthy Homes, Healthy People is an example of an extension program that helps Arkansans deal with indoor air quality and home safety.

##### **Aging Well:**

Arkansas's senior adult population is growing faster than the overall population. This is projected to continue as Baby Boomers age. The aging process results in higher rates of disabilities and diseases and increases strains on families and communities in dealing with these issues. The Division conducts research on how aging, caregiving, and use of health care services affect individuals and families. Division programs like Aging in Place and the Arkansas AgrAbility project help older Arkansans extend productivity and independence into later life, which saves the state millions of dollars each year.

##### **Strengthening Families:**

Environmental and economic problems, interpersonal violence, substance abuse and military deployments contribute to depression and stress-related illnesses. Division research is addressing topics such as violence, substance abuse and depression. Extension programs like Managing Stress and Operation Military Kids help Arkansans manage their challenges and live better lives.

Arkansas's approximately 17,000 divorces every year cost taxpayers an estimated \$30,000 each or \$500 million annually. The Division's educational marriage programs and research help Arkansas families face the challenges of economic stress and couple relationships.

Parenthood in an increasingly complex society now includes single parenting, step-parenting and grandparents raising grandchildren. The Division's research and extension programs such as The Parenting Journey and Adventures in Grandparenting prepare adults for this vital and challenging role.

The limited availability of quality early childhood education programs is exacerbated by poor preparation and high turnover rates among early childhood professionals. The Division is actively involved with preparing high-quality early childhood education professionals.

#### **Family Economics:**

Many Arkansas consumers don't have the knowledge and skills necessary to build wealth. Research shows that during times of economic uncertainty, consumers who follow recommended money management practices will be more likely to maintain financial security.

The Division of Agriculture continues to be a leader in non-formal, personal finance education. Our programs help consumers learn ways to stay financially stable during tough economic times. We are uniquely situated to respond to Arkansans' needs for financial literacy. The Cooperative Extension Service continues to be a leader in non-formal, personal finance education. Our programs help consumers learn ways to stay financially stable during tough economic times. We are uniquely situated to respond to Arkansans' needs for financial literacy. The Cooperative Extension Service continues to be a leader in non-formal, personal finance education. Our programs help consumers learn ways to stay financially stable during tough economic times. We are uniquely situated to respond to Arkansans' needs for financial literacy. The Cooperative Extension Service continues to be a leader in non-formal, personal finance education. Our programs help consumers learn ways to stay financially stable during tough economic times. We are uniquely situated to respond to Arkansans' needs for financial literacy. ii

#### **Empowering Youth:**

Arkansas youth face a growing list of challenges. As one of the largest and oldest youth-serving organizations in Arkansas, 4-H has a significant statewide impact through hands-on educational programs. This experiential method increases learning, retention and application. The teaching of life skills, like effective communication, leadership training and decision making, helps youth become responsible adults.

The need for science, technology, engineering and math education is at an all-time high. The Division is uniquely positioned to teach and demonstrate scientific exploration and application to Arkansas youth. The Division's programming helps young people explore career choices through diverse education, extension and science-based programming.

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

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

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

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

**V(B). Program Knowledge Area(s)**

## 1. Program Knowledge Areas and Percentage

<b>KA Code</b>	<b>Knowledge Area</b>	<b>%1862 Extension</b>	<b>%1890 Extension</b>	<b>%1862 Research</b>	<b>%1890 Research</b>
607	Consumer Economics	5%		0%	
723	Hazards to Human Health and Safety	10%		0%	
724	Healthy Lifestyle	10%		0%	
801	Individual and Family Resource Management	10%		0%	
802	Human Development and Family Well-Being	10%		0%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	10%		0%	
805	Community Institutions, Health, and Social Services	10%		0%	
806	Youth Development	35%		0%	
	<b>Total</b>	100%		0%	

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

## 1. Situation and priorities

Arkansas is home to more than 680 thousand youth under the age of eighteen. Twenty percent of these young people live in poverty and more than 160 thousand live in single parent families. Arkansas has the second highest divorce rate in the nation, costing taxpayers more than \$500 million annually. The state also ranks near the bottom at 47th nationally in a state-by-state study on the well-being of America's children. These circumstances, compounded by the current economic state and limited job prospects, leaves little in the way of family based resources available to nurture and support children. These beleaguered parents and guardians gain markedly from programs designed to strengthen their parenting and relationship building skills.

Add to the above circumstance the increasing Hispanic youth population (more than 32,000 children under the age of 18) and language becomes an additional hurdle for children and families.

Child care professionals are increasingly called to be a major contributor to the mentoring and nurturing needs of children. These professionals need on-going opportunities to update knowledge, skills and other aspects of their professional development.

Human well-being also comes into play as a part of the Division's investment in Food, Nutrition and Health. Sixty-seven percent of adults and 38 percent of youth in grades K-12 are overweight or obese. Lifestyles are directly related to chronic diseases. Less than half of the state's adults and youth get the recommended amount of daily moderate physical activity. Twenty percent of youth and adults smoke and twenty-two percent of Arkansas teens have abused prescription drugs by the time they reach their senior year in high school. Approximately, thirty percent of adults, report regular use of "over-the-counter" medication in amounts exceeding recommended drug label doses. This misuse of medications places a tremendous cost and services burden on the state's health care system. Finally, seven percent

of Arkansas adults have asthma. This incidence is the fifth highest prevalence of any state in the U.S.

The Increasing Opportunities For Families & Youth planned program efforts are prioritized into five main categories: Living Healthy, Aging Well, Strengthening Families, Family Economics, and Empowering Youth.

## **2. Scope of the Program**

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

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

### **1. Assumptions made for the Program**

The theory of Positive Youth Development guides program development for the Arkansas 4-H Program. The research-based Targeting Life Skills Model is the foundation for measuring life skill development. Eight life skills have been selected to measure statewide. They include: decision-making; wise use of resources; communication; accepting differences; leadership; useful/marketable skills; healthy lifestyle choices; and self-responsibility.

Childcare training will continue to be needed because of state licensing requirements and the nature of families and the workforce.

Regional Research and Extension networks will continue to be encouraged and supported by both state and USDA NIFA organizations.

The University of Arkansas Division of Agriculture will continue to seek and support efforts to obtain the funding necessary to support on-going research and extension efforts associated with increasing opportunities for families & youth.

Arkansas has significant potential to better the lives of individuals and families through improved diets, healthy lifestyles and better managed physical health. A core piece of this effort is health education.

Arkansas will continue to have one of the highest percentages of senior adult populations in the country while, at the same time, the general population will remain one of the unhealthiest states, therefore, the need for health and aging programs continues.

The promotion of better health and increased wealth is tied to critical societal needs and to the Living Well national Initiative of the National Extension Association of Family and Consumer Sciences.

Cooperative Extension educators value collaboration and volunteerism and will partner with others to deliver the SSHW program.

People are motivated to change their behavior when user-friendly structures are provided for goal-setting and accountability.

**2. Ultimate goal(s) of this Program**

Quality parenting that leads to socially competent children.

Individuals (teens and adults achieve personal well-being through skill development, attitude change and adoption of effective practices).

Improved quality care for Arkansas' children.

Improved social and economic well-being for Arkansas communities of interest through research based educational programming that increases knowledge, skills and participation in creating a desired future.

Marriage and couple relationships strengthened and enhanced.

Implement research programs that provide insight into the strengths and needs of at-risk individuals, families and communities.

Raise medication literacy awareness to prevent over-medication and drug interaction errors.

Educate and encourage adoption of healthy lifestyles, thus reducing long term health care cost.

Educate rural audiences on primary and secondary prevention of common farm-related accidents.

Through education, information and referral help senior adult adults live productive lives for a long as possible.

Educate and increase consumers awareness as to ways to stay financially stable during tough economic times.

Increase access to healthy lifestyle programs through training volunteer lay leaders.

**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
2014	132.2	0.0	0.0	0.0
2015	132.2	0.0	0.0	0.0
2016	132.2	0.0	0.0	0.0
2017	132.2	0.0	0.0	0.0
2018	132.2	0.0	0.0	0.0



**V(F). Planned Program (Activity)**

**1. Activity for the Program**

In the area of **Living Healthy**, THE U OF A DIVISION OF AGRICULTURE WILL:

- Address the obesity epidemic through research and education.
- Conduct research about healthy life choices and deliver programs promoting safe and healthy families.
  - Provide families with science--based information on the safe use and disposal of medicines and supplements.
  - Deliver science--based information to help people maintain healthy indoor environments.

In the area of **Aging Well**, THE U OF A DIVISION OF AGRICULTURE WILL:

- Conduct research about how age related diseases and disabilities impact families and teach prevention and coping skills.
- Provide educational resources that enable older persons to live long, healthy and independent lives.
- Conduct research and provide education about the impacts of caregiving on families.

In the area of **Strengthening Families**, THE U OF A DIVISION OF AGRICULTURE WILL:

- Provide practical science-based knowledge to help people form and sustain healthy relationships, manage stress, and increase their well--being.
- Equip adults with practical science--based practices to raise resilient and caring children.
- Teach early childhood professionals practical science--based knowledge to help them provide care and education for children.

In the area of **Family Economics**, THE U OF A DIVISION OF AGRICULTURE WILL :

- Provide practical information to Arkansans to increase financial well-being
- Explore common strategies that can be used to improve both health and finances

In the area of **Empowering Youth**, THE U OF A DIVISION OF AGRICULTURE WILL:

- Expand access to quality 4--H programming in Arkansas.
- Teach life skills to prepare youth for adulthood.
- Help youth explore career and entrepreneurship possibilities.
- Provide programs that involve youth in science, technology, engineering and math.
- Raise awareness of the connections between food, agriculture and the natural world.

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

**Extension**

<b>Direct Methods</b>	<b>Indirect Methods</b>
-----------------------	-------------------------

- |   |  |
|---|--|
| <ul style="list-style-type: none"><li>● Education Class</li><li>● Workshop</li><li>● Group Discussion</li><li>● One-on-One Intervention</li><li>● Demonstrations</li><li>● Other 1 (Online Class)</li></ul> | <ul style="list-style-type: none"><li>● Public Service Announcement</li><li>● Newsletters</li><li>● TV Media Programs</li><li>● eXtension web sites</li><li>● Web sites other than eXtension</li><li>● Other 1 (Grant Development)</li><li>● Other 2 (Podcasts and online education)</li></ul> |
|---|--|

### 3. Description of targeted audience

Employers and Employees  
Consumers  
Farmers - regardless of agriculture enterprise or means capability or ethnicity  
Health Professionals  
School personnel  
Child Care Providers  
Adults  
Youth  
Entrepreneurs, Hotel management, Restaurant management  
Master Gardeners, Extension Homemakers (Councils), County Extension Councils  
Military Families  
Homeowners  
State and Federal Agency Personnel  
General Public  
Project and program funding organizations  
Public Health Officials  
Policy Decision-makers  
Civic leaders and organizations  
Married couples or those considering marriage  
Business leaders - Industry, small, large, rural, urban, consultants and other  
Parents, Grandparents, caregivers, volunteers, 4-H 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**

- Number of organized clubs and groups supported by Division of Agriculture Research and Extension resources
  - Number of educational products and materials developed or updated for print, electronic media, radio, podcasts or display
  - Number of clientele in individual & family resource management programs
  - Number of clientele contacts resulting from education classes, workshops, group discussions, one-on-one interventions, demonstrations, and other educational methods
  - Number of educational materials, curricula, newsletters, web-based modules and fact sheets developed, produced and delivered
  - Web content utilization data tracking including hits, clicks and content utilized
  - Number of Health and Aging programs delivered
  - Number of participants in Health & Aging programs
  - Number of grants and dollars generated by grant and contract development efforts
  - Number of youth and their families participating in 4-H Healthy Living learning opportunities
  - Number of youth participating in science, engineering and technology program and activities
  - Number of youth participating in community service and volunteering
  - Number of Small Steps to Health and Wealth program participants
- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

**V(I). State Defined Outcome**

O. No	Outcome Name
1	Number of participants (youth and adult) who report conducting programs, community service projects, adopting new skills or accepting new leadership roles as a result of leadership development education programs
2	Estimated dollar value of program support volunteers (includes: EH; 4-H, Master Gardeners; Leadership students, etc.)
3	Number of program participants who indicate a change in behavior, based on lessons learned from <u>Division of Agriculture sponsored Research and Extension programs</u>
4	Number of participants who adopted at least one positive health practice
5	Number of participants reporting a reduction of at least one risk factor for chronic disease after completing a health education program
6	Number of participants reporting an increase in physical activity after completing an <u>Extension Exercise and/or health education program</u>
7	Number of youth that demonstrated leadership efficacy
8	Number of youth increasing awareness of community and community issues
9	Number of adopting behaviors to prevent injury prevention behaviors such as: seatbelt use, helmet use, <u>distraction-free driving, ATV use, bicycle, shooting sports safety, etc.</u>
10	Number of 4-H youth that ate more healthy foods
11	Number of youth adopting behaviors to reduce sedentary activity
12	Number of youth that practiced positive communication skills
13	Number of youth that increased their understanding of the consequences of risk behaviors
14	Number of youth adopting Positive Attitudes and Aspirations toward Science
15	Number of Small Steps to Health & Wealth participants who report increased personal financial well-being
16	Number of Small Steps to Health & Wealth participants who report increased health well-being
17	Number of Small Steps to Health and Wealth participants who report behavior change
18	Number of adult participants who report conducting programs, community service projects, adopting new skills or accepting new leadership roles as a result of <u>Extension Wellness Programs</u>
19	Number of Marriage, Parenting, and Family Life participants who changed at least one <u>behavior/practice</u>
20	Number of child care provider training program participants who changed at least one <u>behavior/practice.</u>
21	Number of Marriage, Parenting and Family Life program participants who indicate their knowledge has increased.

**Outcome # 1**

**1. Outcome Target**

Number of participants (youth and adult) who report conducting programs, community service projects, adopting new skills or accepting new leadership roles as a result of leadership development education programs

**2. Outcome Type :** Change in Action Outcome Measure

**3. Associated Knowledge Area(s)**

- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 2**

**1. Outcome Target**

Estimated dollar value of program support volunteers (includes: EH; 4-H, Master Gardeners; Leadership students, etc.)

**2. Outcome Type :** Change in Condition Outcome Measure

**3. Associated Knowledge Area(s)**

- 607 - Consumer Economics
- 724 - Healthy Lifestyle
- 802 - Human Development and Family Well-Being
- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 3**

**1. Outcome Target**

Number of program participants who indicate a change in behavior, based on lessons learned from Division of Agriculture sponsored Research and Extension programs

**2. Outcome Type :** Change in Action Outcome Measure

**3. Associated Knowledge Area(s)**

- 607 - Consumer Economics
- 724 - Healthy Lifestyle
- 802 - Human Development and Family Well-Being
- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 4**

**1. Outcome Target**

Number of participants who adopted at least one positive health practice

**2. Outcome Type : Change in Action Outcome Measure**

**3. Associated Knowledge Area(s)**

- 607 - Consumer Economics
- 723 - Hazards to Human Health and Safety
- 724 - Healthy Lifestyle
- 802 - Human Development and Family Well-Being
- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 5**

**1. Outcome Target**

Number of participants reporting a reduction of at least one risk factor for chronic disease after completing a health education program

**2. Outcome Type : Change in Condition Outcome Measure**

**3. Associated Knowledge Area(s)**

- 723 - Hazards to Human Health and Safety
- 724 - Healthy Lifestyle
- 802 - Human Development and Family Well-Being
- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 6**

**1. Outcome Target**

Number of participants reporting an increase in physical activity after completing an Extension Exercise and/or health education program

**2. Outcome Type : Change in Action Outcome Measure**

**3. Associated Knowledge Area(s)**

- 723 - Hazards to Human Health and Safety
- 724 - Healthy Lifestyle
- 802 - Human Development and Family Well-Being
- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 7**

**1. Outcome Target**

Number of youth that demonstrated leadership efficacy

**2. Outcome Type : Change in Action Outcome Measure**

**3. Associated Knowledge Area(s)**

- 806 - Youth Development



**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 8**

**1. Outcome Target**

Number of youth increasing awareness of community and community issues

**2. Outcome Type : Change in Knowledge Outcome Measure**

**3. Associated Knowledge Area(s)**

- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 9**

**1. Outcome Target**

Number of adopting behaviors to prevent injury prevention behaviors such as: seatbelt use, helmet use, distraction-free driving, ATV use, bicycle, shooting sports safety, etc.

**2. Outcome Type : Change in Action Outcome Measure**

**3. Associated Knowledge Area(s)**

- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 10**

**1. Outcome Target**

Number of 4-H youth that ate more healthy foods

**2. Outcome Type : Change in Knowledge Outcome Measure**

**3. Associated Knowledge Area(s)**

- 724 - Healthy Lifestyle
- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 11**

**1. Outcome Target**

Number of youth adopting behaviors to reduce sedentary activity

**2. Outcome Type** : Change in Action Outcome Measure

**3. Associated Knowledge Area(s)**

- 724 - Healthy Lifestyle
- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 12**

**1. Outcome Target**

Number of youth that practiced positive communication 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 # 13**

**1. Outcome Target**

Number of youth that increased their understanding of the consequences of risk behaviors

**2. Outcome Type :** Change in Knowledge Outcome Measure

**3. Associated Knowledge Area(s)**

- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 14**

**1. Outcome Target**

Number of youth adopting Positive Attitudes and Aspirations toward Science

**2. Outcome Type :** Change in Action Outcome Measure

**3. Associated Knowledge Area(s)**

- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 15**

**1. Outcome Target**

Number of Small Steps to Health & Wealth participants who report increased personal financial well-being

**2. Outcome Type :** Change in Condition Outcome Measure

**3. Associated Knowledge Area(s)**

- 607 - Consumer Economics
- 801 - Individual and Family Resource Management

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 16**

**1. Outcome Target**

Number of Small Steps to Health & Wealth participants who report increased health well-being

**2. Outcome Type** : Change in Condition Outcome Measure

**3. Associated Knowledge Area(s)**

- 724 - Healthy Lifestyle

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 17**

**1. Outcome Target**

Number of Small Steps to Health and Wealth participants who report behavior change

**2. Outcome Type** : Change in Action Outcome Measure

**3. Associated Knowledge Area(s)**

- 607 - Consumer Economics
- 724 - Healthy Lifestyle
- 801 - Individual and Family Resource Management

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 18**

**1. Outcome Target**

Number of adult participants who report conducting programs, community service projects, adopting new skills or accepting new leadership roles as a result of Extension Wellness Programs

**2. Outcome Type** : Change in Action Outcome Measure

**3. Associated Knowledge Area(s)**

- 723 - Hazards to Human Health and Safety
- 724 - Healthy Lifestyle
- 805 - Community Institutions, Health, and Social Services

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 19**

**1. Outcome Target**

Number of Marriage, Parenting, and Family Life participants who changed at least one behavior/practice

**2. Outcome Type :** Change in Action Outcome Measure

**3. Associated Knowledge Area(s)**

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

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 20**

**1. Outcome Target**

Number of child care provider training program participants who changed at least one behavior/practice.

**2. Outcome Type :** Change in Action Outcome Measure

**3. Associated Knowledge Area(s)**

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

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 21**

**1. Outcome Target**

Number of Marriage, Parenting and Family Life program participants who indicate their knowledge has increased.

**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

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

**1. External Factors which may affect Outcomes**

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

**Description**

Plan implementation processes must constantly adapt to the circumstance of time and place: the economic condition within and surrounding Arkansas; the public policy landscape; program leadership; staffing; clientele interest and capacity; environmental circumstance; natural disaster; and other unforeseen changes in the community of constituents we serve, provides a challenging and fluid basis for the success of everything planned. Fortunately, the University of Arkansas Division of Agriculture's faculty and staff are well positioned and have the experience necessary to serve and adapt as the circumstance warrants. The Division's leadership has the proven intent to keep the organization constituent grounded, agile, appropriately staffed, and adequately financed to meet the needs of each new program situation.

**V(K). Planned Program - Planned Evaluation Studies**

**Description of Planned Evaluation Studies**

Several strategies will be initiated and utilized for collecting program assessment information to determine program results, outcomes and impacts. Extension educators will use a variety of recommended methods to gather needed information. Collection methodology and assessment tools will be programmatic and audience centered. Programs focusing on physical activity will use skill-based assessments, before-after program assessments, behavioral changes, observation, and questionnaires. Nutrition and health related activities will use anecdotal information, pre-test assessments and self-report of practice change. Unobtrusive means (request for additional information, purchase of videos

materials, increased participation and observation) will also be used to capture information.

Each of the Marriage, Parenting, and Family Life core program areas (i.e., Personal Well-being, Couple Relationships, Parenting, and Child Care Provider Training) has a brief evaluation instrument. These instruments are administered to program participants immediately at the end of a given program. The instruments allow county agents to gather data about the number of program participants, whether their knowledge increased, whether they intend to make a change as a result of their program participation, and if so, what they plan or hope to do. Participant contact information is also collected. This contact information allows county agents to contact program participants one month following program completion to see what changes they have actually made.

The Small Steps to Health and Wealth program will utilize the following tools:

- Personal Finance Well-being survey (pre,post,and follow-up online survey)
- Health Well-being survey (pre, post, and follow-up online survey)
- SSHW online challenge (behavior self-reports in online tracking system)
- Focus groups to evaluate implementation of the SSHW worksite impact program

Comprehensive program and departmental evaluation reviews for Research, Extension and Teaching Programs are conducted on a five to seven year cycle by various research based evaluation methods.

Longitudinal evaluation will be conducted by subcomponents of this program through various research based methods. NASS will continue to be a dependable source of indirect data. Electronic audience response (clickers) will be increasingly available and useful in broad based audience participation. Methodologies and survey content is being explored and tested in the current fiscal year.

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

### **Program # 5**

#### **1. Name of the Planned Program**

Economic & Community Development

#### **2. Brief summary about Planned Program**

Changes in the economy, technology, and population are transforming the ways Arkansans live and work. Between 2001 and 2008, the state lost nearly 44,000 manufacturing jobs, with 65 of the 75 Arkansas counties having a net loss during this period.

Rural areas were hit hard, losing 20 percent of their manufacturing jobs. With broad programs and a presence in all 75 counties, the Division is uniquely positioned to support economic and community development. Efforts are focused in five areas: Economic Viability and Sustainability; Rural Infrastructure; Leadership Development and Community Involvement; Quality of Life; and Population Composition and Change.

##### **Economic Viability and Sustainability:**

Many Arkansas communities and regions are facing severe economic conditions. Jobs are limited in many communities. People are migrating to urban areas, reducing revenue needed to maintain basic rural services. Small business owners and entrepreneurs are critical for the viability of Arkansas communities and regions. At a household level, earnings per job recently increased in most Arkansas counties, median household incomes have declined and today's consumer averages 13 credit obligations on record at a credit bureau. Research shows financial literacy is low.

##### **Rural Infrastructure:**

Due to limited resources in many communities, it is increasingly difficult to maintain or expand infrastructure capacity. Roads, public utilities and other facilities are needed to maintain community viability and long term quality of life. An area of particular concern is access to advanced telecommunications. Communities, schools and businesses without access to high-speed Internet are at a distinct disadvantage.

Broadband connectivity is critical to Arkansas's efforts to create and attract knowledge-based industries. The Division is poised to provide tools to help communities and regions assess and address their infrastructure needs.

##### **Leadership and Community Involvement:**

Effective and inclusive leaders are vital to sustainable and economically viable communities. Community planning is often based on the decisions of a select few. Some residents and youth may be excluded from local decision making and strategic planning processes, even when these decisions affect them.

Diversity of populations and ideas is increasingly important to community planning, public support and effective implementation of plans. Engaging the public, expanding the local knowledge base on public issues, and creating a local environment that encourages collaboration and innovation are critical for community leaders to be successful in today's economy and in maintaining a high quality of life.

##### **Quality of Life:**

In an era of increasing mobility, quality of life is a key factor in attracting and retaining families, retirees, workers and businesses. Arkansas has an abundance of attractive natural resources and amenities. Communities often fail to take advantage of these assets.

Arkansas communities and regions can take a proactive approach to create a high quality of place and



life. Quality of life includes basic services, education, health care, recreational opportunities, and financial and retail services. Successful communities build a sense of identity and leverage their unique assets, such as historical, cultural, natural or other features.

**Population Composition and Change:**

The social and cultural landscape of Arkansas is being reshaped by an aging population, ethnic diversification and

shifts at the rural/urban interface. Arkansas is experiencing the social and economic impact of retirement--age Baby Boomers. The rapid migration of ethnic minorities into rural areas highlights important cultural differences and needs. Challenges exist where urban and rural meet.

Changes within the agricultural community are driven by an aging farm population and a lack of farmers to succeed them, as well as an increase in women- and minority--owned farms. The Division of Agriculture is assisting individuals and communities in addressing challenges and maximizing opportunities created as populations change.

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

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

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

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

**V(B). Program Knowledge Area(s)**

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
112	Watershed Protection and Management	10%		0%	
602	Business Management, Finance, and Taxation	20%		0%	
607	Consumer Economics	5%		0%	
608	Community Resource Planning and Development	25%		0%	
609	Economic Theory and Methods	20%		0%	
610	Domestic Policy Analysis	5%		0%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	5%		0%	
806	Youth Development	10%		0%	
	<b>Total</b>	100%		0%	

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

**1. Situation and priorities**

Many rural communities are experiencing population declines, threatening the basic services

necessary to community success. Strong forward thinking leaders are needed to both understand the current challenges and see opportunities for adapting successfully to this changing world.

The distinct differences between rural and urban areas of the state are underscored by the poverty statistics. Seventeen of Arkansas' most rural counties have the distinction of being designated as "persistent poverty" counties, where more than 20% of their people have lived in poverty for 30 years or more ([www.ers.usda.gov/briefing/Rural/Typology/](http://www.ers.usda.gov/briefing/Rural/Typology/)) and four Delta counties continue to register poverty rates of 30% or greater (U.S. Census Bureau). These same statistics inform the infrastructure development and maintenance difficulties in rural counties. Population declines, unemployment increases, mass lay-off events and a persistently low graduation rate and college attendance level further defines both the need and potential for positive intervention.

Thirty-three of Arkansas' seventy-five counties meet the Federal criteria of being distressed from an economic development /employment perspective (DLA). Add to these challenges the natural disaster circumstances of the most recent five years - tornados, 100 year flood events in the Arkansas delta, the 2011 and 2012 droughts, and extremes of ice and snow storms and the financial toll is difficult to assess or even imagine.

These stressful times, bring opportunity for new approaches, new alliances and efforts to overcome and build from a new stronger foundation. Arkansas citizens and communities are resilient. There is a creative spirit and work ethic that provides the basis for investment in a shared future of promise. The UA Division of Agriculture's Community and Economic Development program is a well respected and valued resource to aid in achieving the promise of community designed goals.

## **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**

- Youth and adults need leadership, government, citizenship, civic engagement, and issue based knowledge and skills to better engage and serve local communities.
- Community based stakeholders will engage in a process of identifying needs and opportunities for research and education in service to their economic and social interests.
- Rural communities are willing to invest their own resources to build community capacity for economic development and long term planning,

- Citizens are willing to learn new skills and obtain the knowledge necessary to yield productive change.
- Members of the rural agriculture and business community are in search of new and innovative ways to generate income, while protecting the long term sustainability of their enterprise.
- Communities will overcome traditional boundaries and organize around a regional economic development model.
- Communities will invest in non-formal citizen education as a function of their municipal service responsibility.
- Voters want a better understanding of issues on their state and local ballot.

**2. Ultimate goal(s) of this Program**

The goal of the Economics & Community Development planned program is to improve the social and economic well being of Arkansas citizens and communities.

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

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

Year	Extension		Research	
	1862	1890	1862	1890
2014	20.2	0.0	2.0	0.0
2015	20.2	0.0	2.0	0.0
2016	20.2	0.0	2.0	0.0
2017	20.2	0.0	2.0	0.0
2018	20.2	0.0	2.0	0.0

**V(F). Planned Program (Activity)**

**1. Activity for the Program**

In the area of **Economic Viability and Sustainability**, THE U OF A DIVISION OF AGRICULTURE WILL:

- Identify trends affecting Arkansas communities and regions.
- Help Arkansas communities and regions identify and implement innovative economic development strategies.
- Provide education and technical assistance to Arkansas businesses and entrepreneurs.
- Provide personal financial management education for youth and adults.
- Help local governments explore innovative solutions and optimize resources.

In the area of **Rural Infrastructure**, THE U OF A DIVISION OF AGRICULTURE WILL:

- Provide tools for communities to assess infrastructure needs.
- Assist in identifying local, state and federal resources to address infrastructure challenges.
- Support communities' efforts to obtain and use information technologies, including broadband connectivity.

In the area of **Leadership and Community Involvement**, THE U OF A DIVISION OF AGRICULTURE WILL:

- Provide leadership education for youth and adults.
- Assist local coalitions to develop and implement strategic plans.
- Work with communities and leaders to create environments that encourage innovation.
- Teach citizen involvement to enhance the vitality of Arkansas communities and regions.
- Engage diverse and under-served populations in civic involvement.
- Provide science--based information and education about public issues.

In the area of **Quality of Life**, THE U OF A DIVISION OF AGRICULTURE WILL:

- Provide tools to help communities evaluate and enhance their quality of life assets and opportunities.
- Assist communities in quality of life marketing to targeted audiences.

In the area of **Population Composition and Change**, THE U OF A DIVISION OF AGRICULTURE WILL:

- Inform policymakers and community leaders of pertinent population trends.
- Deliver programs that help leaders anticipate impacts of population changes.
- Develop and deliver programs for specific population groups based on demographic changes.
- Help Arkansans understand and address opportunities and challenges of the rural/urban interface.

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

**Extension**

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> <li>• Education Class</li> <li>• Workshop</li> <li>• Group Discussion</li> <li>• One-on-One Intervention</li> <li>• Demonstrations</li> <li>• Other 1 (Issue Forums)</li> <li>• Other 2 (Watershed Groups)</li> </ul>	<ul style="list-style-type: none"> <li>• Public Service Announcement</li> <li>• Newsletters</li> <li>• TV Media Programs</li> <li>• Web sites other than eXtension</li> <li>• Other 1 (Podcasts)</li> <li>• Other 2 (Social Media)</li> </ul>

**3. Description of targeted audience**

- Farmers Market and Agritourism
- Producers - Small, large, limited resource, retirement, and other
- Non-Farm Private Landowners
- Businesses - Industry, small, large, rural, urban, consultants, and other
- Consumers - Limited resource, families, retired, youth, middle age, and other
- Elected Officials - city, county, state, and federal
- Organizations - Civic, community, producer, consumer, nonprofit and other

- Government Personnel - Public agencies and administrators, and other
- Voters
- Research, Extension and teaching professionals
- General Public

### **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 clientele contacts resulting from education classes, workshops, group discussions, one-on-one interventions, demonstrations, and other educational methods
- Number of educational materials, curricula, newsletters, web-based modules and fact sheets developed, produced and delivered
- Number of grants and dollars generated by grant and contract development efforts
- Number of issue groups formed
- Number of organized watershed groups
- Number of public meetings held for issue and watershed groups

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

**V(I). State Defined Outcome**

O. No	Outcome Name
1	Number of participants (youth and adult) who report conducting programs, community service projects, adopting new skills or accepting new leadership roles as a result of leadership development education programs
2	Estimated dollar value of program support volunteers (includes: EH; 4-H, Master Gardeners; Leadership students, etc.)
3	Total annual revenue generated by active APAC business clients
4	Number who indicate a change in behavior, based on lessons learned from Community & Economic Development programs
5	Number who indicate new knowledge gained based on lessons learned from Community & Economic Development programs
6	Number of Tax Preparers certified through Tax Schools
7	Number of floodplain managers certified
8	Number of citizens participating in ballot issues education who indicate an intent vote
9	Number of community actions taken as a result of participating in a Breakthrough Solutions program

**Outcome # 1**

**1. Outcome Target**

Number of participants (youth and adult) who report conducting programs, community service projects, adopting new skills or accepting new leadership roles as a result of leadership development education programs

**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

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 2**

**1. Outcome Target**

Estimated dollar value of program support volunteers (includes: EH; 4-H, Master Gardeners; Leadership students, etc.)

**2. Outcome Type :** Change in Condition Outcome Measure

**3. Associated Knowledge Area(s)**

- 607 - Consumer Economics
- 608 - Community Resource Planning and Development
- 803 - Sociological and Technological Change Affecting Individuals, Families, and Communities

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 3**

**1. Outcome Target**

Total annual revenue generated by active APAC business clients

**2. Outcome Type :** Change in Condition Outcome Measure

**3. Associated Knowledge Area(s)**

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

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 4**

**1. Outcome Target**

Number who indicate a change in behavior, based on lessons learned from Community & Economic Development programs

**2. Outcome Type :** Change in Action Outcome Measure

**3. Associated Knowledge Area(s)**

- 602 - Business Management, Finance, and Taxation
- 608 - Community Resource Planning and Development
- 803 - Sociological and Technological Change Affecting Individuals, Families, and Communities
- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 5**

**1. Outcome Target**

Number who indicate new knowledge gained based on lessons learned from Community & Economic Development programs

**2. Outcome Type :** Change in Knowledge Outcome Measure

**3. Associated Knowledge Area(s)**

- 602 - Business Management, Finance, and Taxation
- 607 - Consumer Economics
- 608 - Community Resource Planning and Development
- 610 - Domestic Policy Analysis
- 806 - Youth Development



**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 6**

**1. Outcome Target**

Number of Tax Preparers certified through Tax Schools

**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

**Outcome # 7**

**1. Outcome Target**

Number of floodplain managers certified

**2. Outcome Type : Change in Action Outcome Measure**

**3. Associated Knowledge Area(s)**

- 112 - Watershed Protection and Management
- 608 - Community Resource Planning and Development
- 610 - Domestic Policy Analysis

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 8**

**1. Outcome Target**

Number of citizens participating in ballot issues education who indicate an intent vote

**2. Outcome Type :** Change in Action Outcome Measure

**3. Associated Knowledge Area(s)**

- 610 - Domestic Policy Analysis

**4. Associated Institute Type(s)**

- 1862 Extension

**Outcome # 9**

**1. Outcome Target**

Number of community actions taken as a result of participating in a Breakthrough Solutions program

**2. Outcome Type :** Change in Action Outcome Measure

**3. Associated Knowledge Area(s)**

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

**4. Associated Institute Type(s)**

- 1862 Extension

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

**1. External Factors which may affect Outcomes**

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

**Description**

Arkansas is a small state with limited resources, which makes all plans subject to the crisis of the moment. While external factors may negatively influence the timing of outputs and outcomes, those are

generally met.

## **V(K). Planned Program - Planned Evaluation Studies**

### **Description of Planned Evaluation Studies**

Several strategies will be initiated and utilized for collecting program assessment information to determine program results, outcomes and impacts. Extension educators will use a variety of recommended methods to gather needed information. Collection methodology and assessment tools will be programmatic and audience centered. Unobtrusive means (request for additional information, purchase of videos and materials, increased participation and observation) will also be used to capture information. We will continue to gather economic data and conduct trend analysis to better inform programs and policy choices.