2013 University of Arkansas Combined Research and Extension Annual Report of Accomplishments and Results

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I. Report Overview

1. Executive Summary

University of Arkansas (UA) Division of Agriculture faculty, staff and facilities are located on five university campuses, five regional Research and Extension Centers, six Research Stations, three Extension Centers, and in 75 counties. Unlike most states today, the UA Division of Agriculture remains committed to this statewide infrastructure with a presence in all 75 Arkansas counties; ensuring that researchers and Extension educators are readily available to address the science and business of agriculture and the broader needs of families and the communities we serve.

Consistent with the land grant mission, the UA Division of Agriculture research and Extension faculty have a long history of providing leadership in the development and dissemination of innovative practices and emerging technology. Division researchers conduct basic and applied research for Arkansas producers, businesses, communities and families. During FY2013, Division of Agriculture research efforts resulted in the submission of 53 patent applications. Division Extension educators delivered research-based education through 1,616,854 educational contacts with Arkansans. Extension educators employed diverse educational methods statewide including: 26,239 educational classes, 23,973 landowner visits, 77,000 individual consultations, 1,026 school enrichment programs, 3,494 demonstrations, 1,777 field days/tours/camps, and 1,054 4-H enrichment programs.

In order to be responsive to the changing needs of our clientele, in 2013, the Division engaged in an extensive process to revise and revamp the content, the look and the accessibility of the Division and Cooperative Extension Service websites. The new websites will be launched in early 2014.

During 2013, the Division also delivered timely and responsive distance education webinars through the National Center for Agricultural Law on emerging issues including: Animal Welfare Statutes; county of Origin Labeling; Farm & Ranch Leases; Aquaculture/The Lacey Act; the Food Safety Modernization Act; Agritourism; and Right to Farm Statutes. The National Center for Agricultural Law also developed digital strategies to support Hmong producers in Missouri, Arkansas, and nationwide. Extension education for Arkansas clientele is also increasingly available 24/7/365 through web-based instruction at the Extension online course website http://courses.uaex.edu. Family and consumer science and agriculture and natural resource online extension education was delivered to and completed by 7,250 participants this past fiscal year through 71 course offerings.

The focus of work conducted by Division of Agriculture continues to be guided annually by grass-roots, community-based input from a diverse range of Arkansas citizens. The UA Division of Agriculture formally engaged a large pool of stakeholders (including individual clientele, producers, schools, partner agencies and organizations, state government officials, community leaders, underserved groups, and legislators) in the design and development of the 2011-2015 Strategic Plan. Based on broad stakeholder feedback, the Division identified five emphasis areas to focus our efforts that include:

- Access to Safe and Nutritious Food;
- Agricultural Production and Processing;
- Economic and Community Development;
- Environment, Energy and Climate; and

- Increasing Opportunities for Families and Youth.

These five emphasis areas help to provide guidance for Division research and Extension programs and help to support integrated research/extension efforts in these areas.

With NIFA's change in Planned Program title requirements, the UA Division of Agriculture also chose to make significant changes in our NIFA plan of work and annual report to align planned efforts with these strategic emphasis areas.

2013 Division of Agriculture Planned Program Impact Highlights

Access to Safe and Nutritious Food

Food Safety

The Division of Agriculture continues to have a strong emphasis on Food Safety with efforts in both basic and applied research and supporting extension efforts for youth, the public and the food industry. Research efforts are focused mostly on protein foods and specialty crops and an emphasis is placed on basic research on pathogens such as Listeria monocytogenes, E-Coli and Salmonella and viruses such as Norovirus. An example of current research includes the development of forestry derived antimicrobials. Essential oils from pine by-products in combination with bacteriophages are used to combat antibiotic resistant Staphylococcus Aureus. Success of this project would generate value-added forestry products from part of the biomass that is currently either left to rot or simply underutilized. The market potential for these byproducts could also be substantial for the State of Arkansas.

In addition, Arkansas has a large food industry with needs for food safety education of their workforce. These food safety educational programs help food processing companies remain nationally competitive and prevent foodborne illness. One such program is the Better Process Control School which has certified over 3,500 food processing employees since its inception in 1973. In addition, the University of Arkansas Division of Agriculture offers restaurant managers, employees and food handlers the opportunity to take classes and an exam to become a Certified Food Protection Manager. In FY2013, 119 food industry employees received certification in Better Process Control, 583 foodservice managers and associates took a ServSafe class from the Division of Agriculture with an 87% pass rate to become a Certified Food Protection Manager. Improvements in restaurant and food service food safety have the potential to save Arkansas money and time by way of reducing cases of foodborne illnesses.

Food Processing Innovation

The state of Arkansas has a large food manufacturing sector that needs a qualified workforce. To this end, Division of Agriculture faculty have developed programs addressing the needs of the industry. Of particular importance is the development of Culinary training for Research & Development personnel working in the poultry industry. The curriculum developed has allowed numerous employees to achieve the status of Certified Culinary Scientist. This experience is meant to enable the food technologist to understand what the R & D chef wants and be better able to translate that vision and taste to the production plant floor. In addition, the Division of Agriculture contributes the State's economic development by providing assistance to entrepreneurs.The Arkansas Food Innovation Center assists small food processing companies and entrepreneurs by providing necessary services such as product development assistance, sample production, FDA process approval (FDA form 2541a), measuring pH, water activity (Aw), providing nutritional labels, developing food labels, delivering food related workshops and other forms of technical and business assistance much of which is available through a dedicated website for entrepreneurs. The program generally assists 15-25 entrepreneurs each year. The efforts of the program and making the Division of Agriculture's food pilot processing plant to entrepreneurs has resulted in 6 different start-up food companies launching food products in FY13. Over the past several years, several

food companies have emerged with the assistance of the program.

Division of Agriculture faculty also conduct innovative research in food processing. For example, the efficiency of on-farm rice drying was investigated on Arkansas farms. Results of the investigation found wide discrepancy in drying efficiencies of on-farm driers. Division of Agriculture faculty developed equations to predict thermal energy use based on ambient air temperature and the amount of water removed from the rice. The use of these tools will improve the logistical operation of on-farm driers, maximize energy efficiency, minimize costs to farmers and improve their bottom line.

In another research project, a Division of Agriculture faculty identified rice and soybean peptides with significant health promotion and cancer inhibiting properties. In particular, a rice bran derived pentapeptide was found to have significant inhibitory effect against breast cancer onset. These studies provides information on bioactivities of peptides derived from food source co-products and their potential drug-like property and nutrigenomics effect on cancer, obesity, and Alzheimer's disease. The information could open avenues for the use of the bioactive peptides for future novel nutraceutical diet development and promising alternative strategy to current expensive drugs.

Nutritious Food, Food Security and Childhood Obesity

Arkansas face challenges when it comes to obesity and food insecurity. With a population of 2,949,131 in 2013 Arkansas is ranked 2nd in the nation for household food insecurity at 19.7% and has high childhood food insecurity rates at 28.4%. The University of Arkansas Division of Agriculture Cooperative Extension Service's Supplemental Nutrition Assistance Program - Education (SNAP-Ed) and Expanded Food and Nutrition Education Program (EFNEP) were delivered in every Arkansan county in FY2013. They provided Arkansas's most vulnerable families and youth with hands-on opportunities to address food security challenges. SNAP-Ed programs were conducted at 563 locations throughout Arkansas including schools, Head Starts, senior centers, food banks and pantries, shelters, DHS offices, WIC offices and grocery stores. Lessons focused on: making healthy choices within a limited budget, learning how to read food labels, cook, grocery shop and increase physical activity.

Extension programing evaluation showed some of the significant impact of these programs. For example, 65% of EFNEP adult graduates more often planned meals in advance, 1144 EFNEP and SNAP-Ed adult graduates less often ran out of food before the end of the month while 1316 EFNEP adult graduates reported an average grocery bill savings of $10.20. With a focus on practical food preparation, cooking, tasting, and shopping the Division of Agriculture Extension programing is having a measurable impact on reducing food insecurity in Arkansas.

Research within the Division of Agriculture focuses on various aspects of adult and children health. For example, researchers are establishing causal linkages between childhood obesity outcomes and features of the food and social environment such as food store access, food deserts and fast food establishments. Findings, published in the American Journal of Agricultural Economics, Economics and Human Biology, and Applied Economic Perspective and Policy, are providing a better understanding of the effect of supermarket access, the proximity of fast foods around schools and residences, and the role of peers on childhood obesity outcomes.

In other research, Division of Agriculture faculty investigated the role of energy metabolism, food intake and glycemic response in children. The research shows that a protein-based breakfast significantly reduces hunger after breakfast compared to the carbohydrate-based breakfast. In addition, consumption of a protein-based breakfast results in lower caloric intake at lunch compared to the carbohydrate-based breakfast and increased energy expenditure by 10% in overweight/obese children. This research could have a significant on the breakfast food recommendations and have a positive impact on childhood obesity rates.

Agricultural Production & Processing

Agriculture contributes $17 billion per year to the Arkansas economy, the largest activity sector in the state. The continued productivity of agriculture relies on the abundant resources in the state, including good soils, abundant water, favorable climate, and hard-working people.

Challenges to agriculture are increasing, with the issues of diminishing ground water and water quality growing in importance, along with more intense environmental monitoring and regulations. Globalization of markets has also become a major risk factor in both livestock and crop production, and the growing availability of ideological and belief-driven opinions as "facts" in the "information age" have complicated the research-based mission the Division has in disseminating information through education and extension.

In 2011, Arkansas had about 48,000 farms that generated $1.4 billion in net farm income, along with $3.4 billion in exports. Overall crop and livestock production ranked the state 15th in agricultural cash receipts at $8.4 billion, with $4 billion in crops and $4.4 billion in livestock, poultry and aquaculture. The public value of our agricultural environment includes enhanced natural beauty, diversity of plant and animal life, and rural charm.

Animal agriculture includes production and processing of poultry, eggs, beef, dairy, swine, and small ruminants. Beef cattle and poultry are companion enterprises on many farms with poultry providing cash flow and fertilizer for pastures. The direct contribution of animal agriculture to the State of Arkansas is 52,000 jobs, wages equal to $1.4 million, labor income equaling $1.7 million and $2.9 million in added value.

A major challenge in 2013 was high feed prices resulting from global competition for domestic grain supplies. Division scientists have been working constantly on alternative feedstocks, such as improved pastures and forages, as well as improving feed efficiency in poultry and livestock. Another major challenge for the state's livestock industry occurred from 2010 - 2012, when a major drought destroyed pastures and caused a sell-off in cattle thru 2013. Research conducted by the Division of Agriculture, reported that the 2012 drought alone cost the Arkansas beef cattle industry $128 million. During 2013, Division scientists implemented a comprehensive extension educational program to help livestock producers recover from the drought, including national, regional and county presentations, videos, electronic newsletters, news releases, TV interviews (local and RFD-TV, radio interviews, demonstrations and electronic communication via the Animal Science blog). Demonstrations to show farmers how to recover faster included planting winter annuals, stockpiling cool and/or warm season grasses, containing cattle into a single pasture allowing other pastures to maintain grass residue, minimizing the number of cattle to sell, rationing out forage and hay to reduce pasture damage and developing forage management plans when conditions improved.

Given that Arkansas ranks 1st in rice; 4th in cotton; 4th in sorghum; 10th in soybean; 17th in corn; and 20th in wheat production, the Division of Agriculture has a large and diverse agronomic research and extension program. Research and extension activities focused on agronomic crops include plant breeding and genetics, general agronomic production, soil fertility and plant nutrition, plant physiology, weed science, plant pathology, entomology, agricultural engineering, environmental quality, grain drying/processing, sustainability, water quality, irrigation and economics. Program focus has been on the development and delivery of relevant, research-based recommendations and novel solutions to improve production and processing efficiency, to position growers more competitively in the global marketplace, and to promote public understanding of the soundness of modern agriculture best management practices. A major effort to implement the new nitrogen soil test for rice (N-STAR) (and other crops) on whole farms was again conducted in 2013.

Commercial Horticulture encompasses production of fruits, vegetables, turf, and ornamentals.

Arkansas ranks 5th in sweet potatoes; 12th in pecans, watermelons and tomatoes; 13th in blueberries and grapes; 16th in sod; and 19th in peaches. These crops are big business and provide the "growing local foods" movement and farmers' markets essential supplies of fresh, locally-grown produce. The objective research and extension programming of the Division of Agriculture assisted stakeholders to improve efficiency, profitability, sustainability and environmental stewardship in this area. A major effort to improve the pecan industry in the state; to "jump-start" high tunnel fruit production; and providing the lead for a large grant to improve strawberry production in the U.S. were highlights of this area during 2013.

The Division has an experienced Integrated Pest Management (IPM) group of scientists and educators, working each year in applied and basic research, as well as extension, to manage the ever-changing array of insect pests, diseases and weeds. Extension education programs in IPM at county and state levels are coordinated by an IPM local grants program as well as one-on-one problem-solving visits, constituent meetings, field demonstrations, training workshops and field days. In 2013, efforts focused on managing pesticide-resistant pathogens like strobilurin-resistant frogeye leaf spot in soybean and glyphosate-resistant pigweed in several crops. Division researchers and Extension educators also explored novel technologies to manage resistance and provide better stewardship education of transgenic technology to delay the development of resistance.

Irrigation is the key to successful and efficient crop production in Arkansas. Without irrigation, we could not reliably grow crops today. However, groundwater in the Arkansas Delta is declining rapidly and the infrastructure to capture and store surface water is inadequate. Division scientists and Extension educators have studied the latest technologies used to conserve water, measure irrigation usage, properly schedule irrigation, and enhance pumping plant performance. All these factors, if applied by growers, would conserve groundwater, lower crop production risk and save growers money. A major effort by the Division of Agriculture to educate crop producers on irrigation scheduling, simple soil deficit monitoring, and proper maintenance and testing of irrigation pumps and motors was very successful in 2013.

The Division of Agriculture continued to offer Arkansas and regional stakeholders modern diagnostic services for little or no cost to help improve efficiency and lower costs of production. Modern animal and plant diagnostics, soil testing, forage testing, nematode diagnostics, and biosecurity education are all offered routinely. Field diagnostics training is offered to county agents, consultants and interested growers. This is frequently important as new animal and plant pests and diseases arrive in the state from time to time.

In 2013, the spotted-winged Drosophila, a new fruit pest, was discovered in Arkansas. Several advanced trainings and monitoring programs were hosted during the year to minimize its impact. In addition, an outbreak of avian influenza in one poultry flock in western Arkansas initiated an industry panic in 2013. Timely response by the Division and other governmental agencies quickly controlled the situation. As a result of these efforts, many other growers received new information on dealing with disease outbreaks and quarantines. The importance of this work can be seen as the result of the industry panic over a small outbreak in one flock resulted in a loss of poultry exports that cost the state millions.

Competitive agricultural product marketing is a challenge today, given the modern risks of production and the pace of global trading. Effective forecast models, such as the Arkansas Global Rice Model developed by Division economists, offer assistance. In addition, the connections for local food buyers and producers have been enhanced by modern web-based programs like MarketMaker, managed in Arkansas by the Division of Agriculture.

Division of Agriculture economics and ag business faculty focus on development of best economic practices and policies to support competitive marketing worldwide and identify new marketing opportunities in alternative agricultural enterprises, specialty crops, and traditional livestock or cropping activities. Value-added research and extension programs have been foundational to the state's growing

agricultural processing industry. The Division houses the Southern Risk Management Education Center, which sponsors Trade Assistance education as well as many agricultural risk management projects thru grants. For row crops, the economics group specialized in farm bill analysis and improved web-based crop enterprise budgets for the major commodities grown in Arkansas.

The general public remains largely removed from food production and processing, assuming products simply will "be on the shelf" when needed. The information age has apparently led to a lessened understanding of fact, critical thinking, and science. On the other hand, the information age has brought new communication and education technology that provides an opportunity for the Division to educate stakeholders and the public about agriculture and science. For example, Division engineers released "Corn Advisor," a native app featuring a comprehensive knowledge base for corn production in the MidSouth. This app was installed on 600 smartphones after release. and the app is targeted toward producers, consultants and industry personnel. Another native app called "Hort Plants" was installed on 1,864 devices. This app targets the broader public interested in landscape plants and gardening. Based on media coverage in 2013, the public was fascinated by robotic technology and Division engineers continued progress in the development of high-tech unmanned aerial vehicle (UAV) robots to monitor crop health and catalog nursery species remotely.

Another venue for public education by the Division of agriculture is gardening, the most popular pastime in Arkansas, with edible gardening gaining in popularity each year. From backyard gardens to school gardens and community gardens, the local food movement has peaked interest in growing food. This interest offers an opportunity to improve public appreciation and understanding of agricultural principles and food production science. The Division features one of the most active Master Gardener programs in the nation. Our employees and volunteers use community projects, blogs, garden shows, and social media to educate the public on gardening science. The annual Master Gardener garden calendar, with monthly tips, is a popular tool with thousands distributed each year. The "In the Garden" blog, with Extension horticulturalist Janet Carson, grew to 595 daily followers and 44,000 views in 2013. The annual Master Gardener conference in Rogers, AR drew 600 attendees and increased the local economy by $125,000 in May 2013.

Economic and Community Development.

Business resource support provided by the Division of Agriculture is delivered through the following programs: entrepreneurial development for both youth and adults; specially tailored programs for Hispanic audiences; and programs for agricultural businesses identified with Agri-tourism, cottage food production and farmers' markets. Other business-centered Extension education and program support is delivered through the Arkansas Procurement Assistance Center (APAC) and annual Income Tax Schools for accountants and professional tax preparers. These programs are focused to the needs of both established and start-up business professionals in ethnically and economically diverse communities.

Entrepreneurial development efforts are focused on the potential within the Latino community, those individuals interested in downtown revitalization, e-commerce opportunities and 4-H youth interested in starting a business. These programs have a broad youth and adult audience and involve a youth teaching/youth mentoring program. Program participants develop business plans, learn about rules and regulations governing small business, experience the application of new technologies, explore financing options, and learn financial management and accounting principles.

Community and economic development programming through APAC's procurement assistance counseling continues to produce significant value for Arkansans. In 2013, approximately 30 million dollars in contract value was secured by Arkansas' five hundred client businesses. The federal formula for economic activity related to jobs credited this program with producing more than 650 jobs in Arkansas. Since 1993, APAC has produced more than 1.3 billion dollars in contract revenue for

businesses in the state. The most recent five-year program review shows a return on investment of 142 to 1.

UA Division of Agriculture community development efforts are also targeted to strengthen and build local capacity for both economic well-being today and prepared resiliency for dealing with future issues. Programs included visioning, strategic planning, and strategies for effective economic development. These programs are based on multi-state collaborative efforts including: established and reported commonly used metrics for the Southern Region; program outcome aggregation at the regional level; and shared investment in the Southern Rural Development Center and the Program Leadership Network.

Public Policy education is the newest formal component of the Division's Community and Economic Development effort. The Division of Agriculture's Public Policy Center houses the core capacity for this effort and includes both Extension and research responsibilities. The base effort is centered in statewide issue elections and the public understanding of ballot measures whether proposed by the legislative process or public referendum. Citizens are engaged through in-depth analysis of issues which is policy-neutral and without the language of advocacy. Educational materials and program components are developed in collaboration with the National Center for Agriculture Law and the UA Center for Agriculture and Rural Sustainability.

Policy research and education remain important program components, in terms of training County Agents to deal with controversial issues, developing unbiased policy representative educational materials and educating the public regarding complex ballot questions and policy issues. In 2013, the Public Policy Center began the research and material development effort for the 2014 statewide ballot. The Center also supported education efforts regarding local ballot initiatives and controversial policy issues as requested by county Extension agents statewide.

The impact of the Division of Agriculture on leadership development in Arkansas communities has been evident since the early days of the 20th century through county Extension agent mentoring of farmers and rural people. Leadership program support is currently accomplished through both local and statewide leadership training seminars and fellowships. This system engages resources of the UA Division of Agriculture at every level. Leadership efforts span the program emphasis areas and demographics of Extension clientele. Our core leadership effort, LeadAR is connected to an international network of leadership programs (IPAL) and alumni of the LeadAR program are connected through the International Leadership Association Conference (ILAC). The LeadAR program has proven effective in educating a diverse pool of leaders from the public, non-profit and private sectors. In 2013, the Arkansas LeadAR program started its sixteenth class. The network of trained leaders now counts over 430 people as LeadAR alumni.

Environment, Energy and Climate

Arkansas has tremendous soil, water and air resources that provide a multitude of beneficial uses. These resources support a highly productive, efficient agricultural system that annually accounts for $17 billion of value-added to the Arkansas economy. Yet, Arkansas still remains the "Natural State," as its scenic beauty attracts many outdoor enthusiasts and generates over $5.7 billion in tourism expenditures annually.

Managing Arkansas's natural resources to protect and sustain these multiple beneficial uses for future generations is not without its challenges. Air and water quality concerns have evoked lawsuits, new state and federal regulations, as well as voluntary natural resource conservation programs, such as USDA-NRCS' and Mississippi Healthy River Basin Initiative (MRBI). The State of Arkansas is also in the process of updating its State Water Plan, as mandated by the State's General Assembly.

Monitoring water quality and nutrient levels on a tributary to the Buffalo National River was assigned to an environmental task force in late 2013 by the Arkansas Governor's office and a subcommittee of the Arkansas General Assembly. This action was in response to public interest in a federally-permitted swine farm in the Big Creek watershed. The Big Creek Research & Extension Team was formed in fall 2013 and received $340,000 from the governor's office to initiate the environmental study and monitor potential environmental impacts of the swine operation. Members of this team include Division of Agriculture research and Extension faculty and staff.

Efforts to reconcile competing agricultural and environmental interests are often hampered by a lack of definitive best practices. The Division of Agriculture has created a multidisciplinary, team approach to discovery, demonstration and promotion of agricultural/environmental best practices. The Center for Agricultural and Rural Sustainability (CARS), the Arkansas Water Resources Center and the Environmental Task Force represent team efforts that range from basic discovery to economic consequences of implementing best practices.

Agricultural production and processing sustainability has been a focus of the Division of Agriculture for many years. Evidence of this is the Division's hosting of the Center for Agricultural and Rural Sustainability (CARS), a nationally known center of excellence. Faculty associated with the Center have pioneered life cycle analysis of cropping practices, studied alternative production and marketing systems, organic agriculture, phytoremediation, alternative residue and water management, and trace gas emissions. In 2013, CARS was awarded a $3 million grant by the Walmart Foundation to improve fresh strawberry production in the U.S.

CARS faculty and staff led the selection and coordination of projects that demonstrate success across economic, environmental, and social metrics of sustainability, with a view to additional grower engagement to fill gaps in regions or technologies. Several NSSI projects focused on climate change or energy issues, including three projects in California investigating alternatives to methyl bromide (considered a greenhouse gas pollutant) and nine projects (in Arkansas, Arizona, Kansas, Mississippi, Minnesota, Nebraska, Texas) focused on increasing regional strawberry production, which would reduce energy used in transportation. The NSSI website (http://strawberry.uark.edu/), which launched March 1, 2013, had over 20,000 page views.

The Nitrogen Soil Test for Rice (N-STaR) was merely a research tool just a few years ago. In 2013, roughly 4,000 N-STaR samples were processed for determining the optimal nitrogen (N) rate for rice on both silt loam soils and clay soils. For many fields, N applications were reduced without sacrificing yield, thus reducing potential greenhouse gas (GHG) emissions and reducing potential N losses to watersheds.

Increasing Opportunities for Families and Youth

The need for quality care for Arkansas's children is greater than ever. To provide the best care possible, Arkansas's child care professionals are required to complete a minimum of 10 hours per year of verified training to maintain their licensure. The Division of Agriculture's Best Care, Best Care Connected, and Guiding Children Successfully programs provide Arkansas's child care professionals with the verified training they need. These programs are delivered through Extension's statewide network so they are readily available to Arkansans in all 75 counties. The programs are also available in multiple formats (i.e., face-to-face, online, and self-guided) to accommodate different learning styles and work schedules.

Research indicates that for every dollar spent on early childhood intervention programs, there is a $2.50-4.00 return on investment (ROI). That means the ROI within the state of Arkansas for our child care training programs is between $1.19-$1.90 million dollars. In 2013, with a budget of $475,000 in external funding, 5,972 Arkansas child care professionals successfully completed 38,760 hours of training. These

participants had statistically significant increases in their levels of understanding of all lesson topics after participating in the training. As a result of the training, 98% of participants indicated their knowledge of effective child care practices increased and 96% of participants did something new to be a better child care professionals.

People are spending more time than ever surfing the Web, checking emails, and using social media outlets, such as Facebook, Twitter, and Pinterest. To better reach this audience, UA Division of Agriculture Extension expanded efforts to provide Arkansans with quality, research-based family life education online. In 2013, family life web pages received 288,983 hits, 87,442 page views, and had 55,449 unique visitors. In addition to the brisk activity on the website, the Navigating Life's Journey (NLJ) program provided weekly e-mails with quotes and invitations to apply them to their lives to 2,150 subscribers over the past year. This digital outreach included 153 subscribers to the NLJ blog, 512 Facebook followers and 386 Twitter followers. A survey of NLJ subscribers revealed that 100% of them said the weekly NLJ emails are valuable to them and 94% of them said their lives and relationships are better as a result of the NLJ messages.

Much of Arkansas's population is economically vulnerable. Many Arkansas counties are primarily rural, with limited access to educational resources. In both rural and urban areas of the state, Cooperative Extension Service programs provide Arkansans with the knowledge and skills they need to build financial stability. More than 2,000 individuals participated in Extension Family and Consumer Economics educational programs, with $73,928 reported dollars saved and debt reduced by those participants. Of the 2,193 early childhood educators who participated in Family and Consumer Economics training; 1,968 indicated that they changed at least one practice based on what they learned. Consumer Credit Counseling (CCC), a division of Family Service Agency, sub-contracted with Extension to have Extension provide personal finance education. Due to the success of this collaborative effort, CCC will be adding additional sites in 2014. County Extension agents also provided quarterly personal finance education for housing development residents in five counties, with 32 presentations in 2013.

The Division of Agriculture conducts research on how aging, caregiving, and use of health care services affect individuals and families. The population of older adults in the U.S. continues to increase. With 15% of Arkansas residents age 65+ (up 12% since 2010, ranked 10th nationally), the health issues that accompany growing older, e.g., chronic disease, disability, and dependence, are of particular importance, as they bring diminished quality of life and increase costs to the public.

Arkansas continues to rank 48th or 49th in the nation in overall health outcomes. Programs like "Aging in Place", "Acknowledging Aging", the "AgrAbility" project, and arthritis education programs help older Arkansans extend productivity and independence into later life, saving the state millions of dollars each year. Programs like "Extension Get Fit", which includes "Strong Women & Men", "Walk Across Arkansas", and "Fit in 10", help young and old Arkansans increase physical activity, improve health, and improve quality of life. Low levels of health literacy contribute to poor health outcomes as well. "Be Medwise", a medication literacy program, helps Arkansans better manage their own health and health care.

4-H programs are delivered primarily through volunteer leaders; ensuring thousands of young people have opportunities to participate with a caring adult. Volunteers are critical to 4-H program success. According to the National Framework for 4-H Volunteerism vision, "Quality volunteer systems connect young people with caring adults leading to positive outcomes for youth."

Arkansas 4-H has been delivering citizenship and leadership training for many years. A new multi-session citizenship curriculum was introduced in 2012 for integration into the county outreach efforts. Community engagement, citizenship and youth adult partnerships empowered young people to become well-informed and involved citizens within their communities. In 2013, more than 30 communities were

involved in these efforts through 46 different projects. Seven hundred and thirty three (733) 4-H members and 145 non-4-H members participated in these citizenship projects.

Adult volunteer leaders trained by county Cooperative Extension Service Faculty, use the "learn by doing" method to teach 4-H youth. Leadership, citizenship, and other skills acquired through training and mentorship guide 4-H'ers to success in adulthood. During 2013, planning meetings were conducted for volunteer leaders in three forums across the state. These regional planning meetings focused on volunteer development and club management. Required trainings were implemented to educate volunteers on positive youth development techniques to provide a more cohesive state 4-H program. Twenty-eight (28) percent of Arkansas youth in grades K-12 are involved in 4-H programs and activities across the state. Nearly 19,000 volunteers guide the 134,213 youth reached annually through Arkansas 4-H programs. On average, a volunteer will contribute 100 hours of service in a year. Overall volunteer service value topped $43 million to the Arkansas 4-H program this past year.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Plan	370.0	0.0	484.0	0.0
Actual	444.0	0.0	464.0	0.0

II. Merit Review Process

1. The Merit Review Process that was Employed for this year

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

2. Brief Explanation

Programs went through 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 program identification and review was derived from both formal and informal means for all program areas. Public comment on current and future Extension and research programs was obtained from county and community meetings, commodity and community associations, commodity check-off boards, state legistlative committees and open public forms concerning specific issues. Open public meetings, field days and county and regional production meetings provided forums for stakeholder input open to under-served or under-represented individuals, groups or organizations.

For Extension, county councils and advisory groups met during the summer of 2013 (at a minimum) to provide input, feedback and/or review of program implementation, redirection, or newly identified needs. Members of these groups were 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 included a stakeholder member or members of the community or industry most influenced by the program area. Open public forums were held to address specific issues of importance to the stakeholder community or industry.

Administrative Approval and Review

Identified planned program areas for research and Extension activities were administratively reviewed and approved by the Director of the Agricultural Experiment Station and/or Cooperative Extension Service, as appropriate, within the context of the Division of Agriculture's Strategic Plan and the specific needs identified by stakeholder groups. Smith-Lever, Hatch, McIntire-Stennis, Animal Health and regional research projects were administratively reviewed and approved by the subject matter department head and the director of the Arkansas Agricultural Station. All research projects were 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 have been department 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 have been conducted by a team of recognized outside research, Extension and teaching professionals balanced to reflect the 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 bench marking. The review team evaluates the programs' 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. As a result, annual progress is reported to Division and University administration.

III. Stakeholder Input

1. Actions taken to seek stakeholder input that encouraged 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.

The University of Arkansas Division of Agriculture has utilized both formal and informal mechanisms for ensuring the planned programs address areas of strategic importance to the

state. Each planned program was based on the needs identiifed in a series of regional and statewide listening sessions with current and potential stakeholders representing the diversity of the population in the regions and state. Single issue meetings were held as needed to address emerging issues and to craft additional program responses if needed to promptly address the problem.

2(A). A brief statement of the process that was 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.

In 2013, the University of Arkansas Division of Agriculture sought input from diverse stakeholder groups. Stakeholders serve on county councils, advisory committees, and boards that advise and oversee the work of the Division. Individuals and stakeholder groups were identified by Arkansas Experiment Station faculty and administratators and by asking county Extension staffs to identify individuals in their local communities who were representative of one or more of the following fifteen stakeholder categories: county services (e.g., DHS, Food Bank or Pantry); 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 program (e.g., leader, teen, alumni, foundation); government official (e.g., county, city); Extension homemaker; natural resources (e.g., wildlife, forestry, conservation); media (e.g., radio, newspaper, television); and youth services (e.g., community center, youth organizations). In addition to these criteria, Extension agents were also asked to identify individuals within the fifteen categories who were representative of the gender, racial, ethnic, and socioeconomic demographic make-up of the counties.

2(B). A brief statement of the process that was 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.

During the summer of 2013, Extension faculty met with county council members and program sub-committees to identify local needs for the program planning year beginning October

first. County profiles developed by state faculty were utilized to examine the diversity of needs and to understand the changing demographics within each county . Stakeholder-developed materials, such as the Farm Bureau policy development process was used to identify research needs. Several priority-setting activities were scheduled during 2013 with specific commodity and stakeholder groups to seek input on the research planning process.

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. The 2011-2015 strategic plan for the Division included input from internal and external stakeholders statewide. A total of 780 internal and external stakeholders participated in these processes. Specific surveys were conducted with individuals representing underserved or under-represented groups, women in agriculture and small farm operation producers.

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.

Research and Extension faculty and scientists met with UA Division of Agriculture administration to discuss stakeholder needs solicited at meetings throughout the year. Identified needs were integrated into the Extension and research planning process to ensure program relevance. Several departments and many of our institutes and centers maintain external advisory boards that provide direct feedback to the unit on the specific research or educational program. Stakeholder representatives served on most policy-setting groups or program reviews to ensure that the public has a voice in the decision-making process and in program evaluation. Special meetings were held as needed to address major issues impacting any stakeholder group. Stakeholder input remains vital to ensuring program relevance, and each year pragrams are adjusted to address identified needs.

Brief Explanation of what you learned from your Stakeholders

Stakeholders want to be involved. Due to the size and scope of the University of Arkansas Division of Agriculture, reporting all specific stakeholder feedback would exceed the space allocation for this item. Stakeholders participate in establishing annual Cooperative Extension program priorities for each of the 75 counties in Arkansas. Stakeholders are also involved in identification of research needs and priorities.

During the statewide listening sessions in support of our new five-year strategic plan, 172 policy makers and key community and state organizational leaders considered critical and emerging needs within our state, and the role of the Division in addressing those needs. This group voiced their concerns about population changes across the state and challenges facing communities in a competitive economy. We heard comments concerning the different issues Arkansans must struggle with every day, including maintaining a competitive edge in agriculture and childhood health and obesity.

The following emphasis areas were identified for 2011-2015:

- Agricultural Production and Processing
- Environment, Energy and Climate
- Access to Safe and Nutritious Food
- Increasing Opportunities for Families and Youth
- Economic and Community Development

The Division's 2011-2015 Strategic Plan outlines the specific objectives for each area and is based on what we learned from our stakeholders.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
5416607	0	3911365	0

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	6873142	0	3911365	0
Actual Matching	5416607	0	55831042	0
Actual All Other	44182766	0	10715355	0
Total Actual Expended	56472515	0	70457762	0

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous				
Carryover	6063613	0	0	0

V. Planned Program Table of Content

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Childhood Obesity

☐ Reporting on this Program

Reason for not reporting

PLEASE NOTE:
The University of Arkansas Division of Agriculture chose to align our Planned Programs to our Division of Agriculture Strategic Plan program areas. This decision will allow Arkansas to better communicate our efforts back to NIFA.

The data and information that would have been reported to Childhood Obesity is now located under either the new planned program "Access to Safe & Nutritious Food" or the new planned program "Increasing Opportunities for Families & Youth."

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Plan	25.0	0.0	8.0	0.0
Actual Paid Professional	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
Actual Volunteer	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 Matching	1890 Matching	1862 Matching	1890 Matching
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 All Other	1890 All Other	1862 All Other	1890 All Other
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

V(D). Planned Program (Activity)

1. Brief description of the Activity

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.

2. Brief description of the target audience

Youth
School personnel
Parents
Adults
Grandparents
Child Care Providers
County, State and Federal Agency Employees

Researchers

3. How was eXtension used?

{No Data Entered}

V(E). Planned Program (Outputs)

1. Standard output measures

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2013
Actual: {No Data Entered}

Patents listed
{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	2	20	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # grants/contracts funded in support of childhood obesity issues

Year	Actual
2013	0

Output #2

Output Measure

- # of 4-H/Youth Food, Nutrition and Physical activity programs delivered related to eating healthy and being active

Year	Actual
2013	0

Output #3

Output Measure

- # of youth contacts in 4-H/ Youth Food, Nutrition, and Physical Activity programs related to eating healthy and being active

Year	Actual
2013	0

Output #4

Output Measure

- # of funded Federal grants and/or contracts

Year	Actual
2013	0

Output #5

Output Measure

- # 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

Year	Actual
2013	0

Output #6

Output Measure

- # of active research projects on the development or adoption of healthy eating guidelines and childhood obesity.

Year	Actual
2013	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	# of children and youth who increased consumption of foods recommended by the U.S. Dietary Guidelines for Americans.
2	# of families/caregivers who increased consumption of foods recommended by the U.S. Dietary Guidelines for Americans.
3	# of Children/Youth who intend to adopt healthy eating patterns.
4	# of families/caregivers who intend to adopt healthy eating patterns.
5	# of Children/Youth who gained knowledge about healthy eating patterns (foods to increase and/or decrease).
6	# of families/caregivers who gained knowledge about healthy eating patterns (foods to increase and/or decrease).
7	# of Children/Youth who increased their physical activity and/or reduced sedentary time.
8	# of families/caregivers that reported spending time together in physical activity.
9	# of Children/Youth who increased physical activity to 60 minutes or more daily.
10	# of Children/Youth who understand the importance of balancing food intake and physical activity.
11	# of new delivery systems/access points offering healthy foods (farmers markets, produce at corner stores, and school food programs).
12	# of families with children that report an intention to access/produce/preserve healthy foods.
13	# of children who increased consumption of fruits and vegetables.
14	# of children who decreased consumption of sugar sweetened beverages.

Outcome #1

1. Outcome Measures

# of children and youth who increased consumption of foods recommended by the U.S. Dietary Guidelines for Americans.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #2

1. Outcome Measures

# of families/caregivers who increased consumption of foods recommended by the U.S. Dietary Guidelines for Americans.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #3

1. Outcome Measures

# of Children/Youth who intend to adopt healthy eating patterns.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual

2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #4

1. Outcome Measures

# of families/caregivers who intend to adopt healthy eating patterns.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #5

1. Outcome Measures

# of Children/Youth who gained knowledge about healthy eating patterns (foods to increase and/or decrease).

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #6

1. Outcome Measures

# of families/caregivers who gained knowledge about healthy eating patterns (foods to increase and/or decrease).

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #7

1. Outcome Measures

# of Children/Youth who increased their physical activity and/or reduced sedentary time.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #8

1. Outcome Measures

# of families/caregivers that reported spending time together in physical activity.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual

2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #9

1. Outcome Measures

# of Children/Youth who increased physical activity to 60 minutes or more daily.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #10

1. Outcome Measures

# of Children/Youth who understand the importance of balancing food intake and physical activity.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #11

1. Outcome Measures

of new delivery systems/access points offering healthy foods (farmers markets, produce at corner stores, and school food programs).

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #12

1. Outcome Measures

of families with children that report an intention to access/produce/preserve healthy foods.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #13

1. Outcome Measures

# of children who increased consumption of fruits and vegetables.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual

2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #14

1. Outcome Measures

# of children who decreased consumption of sugar sweetened beverages.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Food Safety

☐ Reporting on this Program

Reason for not reporting

PLEASE NOTE:
The University of Arkansas Division of Agriculture chose to re-align our NIFA Planned Programs to our Division of Agriculture Strategic Plan program areas. This decision will allow Arkansas to better communicate our efforts back to NIFA.

The data and information that would have been reported to Childhood Obesity is now located under the new planned program "Access to Safe & Nutritious Food."

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Plan	3.5	0.0	74.0	0.0
Actual Paid Professional	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
Actual Volunteer	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 Matching	1890 Matching	1862 Matching	1890 Matching
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 All Other	1890 All Other	1862 All Other	1890 All Other
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

V(D). Planned Program (Activity)

1. Brief description of the Activity

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
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.

2. Brief description of the target audience

Food Manufacturers
Farmers (Farmer's Markets)
Entrepreneurs and Restaurants
Food Service Employees and/or Food Handlers
Employers & Employees
Health Professionals
Consumers
Youth

3. How was eXtension used?

{No Data Entered}

V(E). Planned Program (Outputs)

1. Standard output measures

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2013
Actual: {No Data Entered}

Patents listed
{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	3	20	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of participants in educational programs leading to certification for food handlers (ServSafe and Better Process Control School)

Year	Actual
2013	0

Output #2

Output Measure

- Number of participants in quarterly HACCP roundtables

Year	Actual
2013	0

Output #3

Output Measure

- Number of ServSafe classes offered

Year	Actual
2013	0

Output #4

Output Measure

- Number of Food Safety education classes, workshops, group discussions, one-on-one interventions, demonstrations, and other educational events

Year	Actual
2013	0

Output #5

Output Measure

- Numbers of federal grants written and received in food safety.

Year	Actual
2013	0

Output #6

Output Measure

- Number of all other grants written and funded related to Food Safety.

Year	Actual
2013	0

Output #7

Output Measure

- Number of Online Master of Agriculture (Food Safety Emphasis) students enrolled in courses.

Year	Actual
2013	0

Output #8

Output Measure

- Number of projects focused on increased understanding of the ecology of fecal indicators and pathogens

Year	Actual
2013	0

Output #9

Output Measure

- Number of projects focused on increased understanding of preharvest and postharvest processes impacts on microbial and chemical threats.

Year	Actual
2013	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

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 interventiion strategies for food borne threats along the food production continuum

Outcome #1

1. Outcome Measures

Number of participants receiving certification in Better Process Control

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #2

1. Outcome Measures

Number of participants receiving certification in ServSafe

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #3

1. Outcome Measures

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. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual

2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #4

1. Outcome Measures

Number of growers and producers receiving GAP certification or equivalent

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #5

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #6

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #7

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #8

1. Outcome Measures

Number of viable prevention, control and interventiion strategies for food borne threats along the food production continuum

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual

2013 0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Sustainable Energy

☐ Reporting on this Program

Reason for not reporting

PLEASE NOTE:
The University of Arkansas Division of Agriculture chose to align our Planned Programs to our Division of Agriculture Strategic Plan program areas. This decision will allow Arkansas to better communicate our efforts back to NIFA.

The data and information that would have been reported to Sustainable Energy is now located under the new planned program "Environment, Energy & Climate."

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Plan	8.5	0.0	25.0	0.0
Actual Paid Professional	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
Actual Volunteer	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 Matching	1890 Matching	1862 Matching	1890 Matching
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 All Other	1890 All Other	1862 All Other	1890 All Other
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

V(D). Planned Program (Activity)

1. Brief description of the Activity

Develop educational materials, curriculum, & resources
Workshops, meetings
Field Days
Demonstrations
News articles
Newsletter
Web-based Education
Continuing Education
Lab and Field Research
Deliver Services
Provide Training

2. Brief description of the target 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

3. How was eXtension used?

{No Data Entered}

V(E). Planned Program (Outputs)

1. Standard output measures

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

2. Number of Patent Applications Submitted (Standard Research Output)
Patent Applications Submitted

Year: 2013
Actual: {No Data Entered}

Patents listed
{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	2	5	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of educational programs and events held related to sustainable energy.

Year	Actual
2013	0

Output #2

Output Measure

- Number of field days related to sustainable energy

Year	Actual
2013	0

Output #3

Output Measure

- Number of educational materials & curriculum developed related to sustainable energy.

Year	Actual
2013	0

Output #4

Output Measure

- Number of locations for bioenergy crop demonstrations and research field days.

Year	Actual

2013	0

Output #5

Output Measure

- Number of refereed research articles published related to sustainable energy.

Year	Actual
2013	0

Output #6

Output Measure

- Number of research-based, non-refereed publications published related to sustainable energy.

Year	Actual
2013	0

Output #7

Output Measure

- Number of research-based scientific presentations at scientific or professional meetings related to sustainable energy.

Year	Actual
2013	0

Output #8

Output Measure

- Number of research projects on biomass crops conducted in Arkansas.

Year	Actual
2013	0

Output #9

Output Measure

- Number of research projects on biofuels performance and emissions conducted in Arkansas.

Year	Actual
2013	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Individuals adopting one practice from the recommended list of energy conserving practices.
2	Energy audits conducted.
3	Graduate students working on bioenergy projects or biofuels labs.

Outcome #1

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #2

1. Outcome Measures

Energy audits conducted.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #3

1. Outcome Measures

Graduate students working on bioenergy projects or biofuels labs.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Global Food Security and Hunger

☐ Reporting on this Program

Reason for not reporting

PLEASE NOTE:
The University of Arkansas Division of Agriculture chose to align our Planned Programs to our Division of Agriculture Strategic Plan program areas. This decision will allow Arkansas to better communicate our efforts back to NIFA.

The data and information that would have been reported to Global Food Security and Hunger is now located under either the new planned program "Agricultural Production & Processing" or the new planned program "Access to Safe & Nutritious Food."

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Plan	106.2	0.0	267.0	0.0
Actual Paid Professional	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
Actual Volunteer	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 Matching	1890 Matching	1862 Matching	1890 Matching
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 All Other	1890 All Other	1862 All Other	1890 All Other
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

V(D). Planned Program (Activity)

1. Brief description of the Activity

University of Arkansas Division of Agriculture faculty will discover new knowledge and disseminate that knowledge related to global food security and hunger to target audience groups using a broad range of direct and indirect methods will be used to provide information to both groups and individuals that make up the target audiences for this program area. Methods to be used include: conducting discovery and applied research, developing and conducting educational classes, workshops, meetings, demonstrations, tours, and field days, direct clientele contacts through office visits, on-site visits and one-on-one consultations, creating and publishing educational materials and resources, providing diagnostic services, disseminating information using the mass media outlets of print, radio and television, distribution of information through newsletters and other direct mailings, and using online electronic delivery methods (Web-based learning modules, publications, podcasts, etc.). Many of these efforts will be accomplished through collaborative efforts with other agency, organizational and industry partners.

Faculty with the Division of Agriculture's Center for Agricultural and Rural Sustainability will also be conducting focused research related to global food productivity and security in the following ways:

* Developing the DSSAT-CERES model for maize globally in order to evaluate blue versus green water demand.
* Developing water use scenarios for maize yield under a range of climate change models.
* Analyzing the impact by basin of the increase in urban demand for water resources and their impacts on agricultural blue water availability.
* Analyzing the impacts of climate change scenarios on local and global crop production strategies.
* Evaluating the impact of crop production strategies on food security by region.
* Evaluating the potential impact of alternative crop strategies (small producers) on regional food security.
* Exploring the relationship between profit, market stability, social stability, prosperity, and food security at local, regional, and global levels.

2. Brief description of the target audience

Target audiences for the various aspects of the Arkansas Global Food Security and Hunger 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)

3. How was eXtension used?

{No Data Entered}

V(E). Planned Program (Outputs)

1. Standard output measures

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2013
Actual: {No Data Entered}

Patents listed
{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	32	241	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of agronomic production education meetings related to food production

Year **Actual**

2013	0

Output #2

Output Measure

- # of demonstrations/on-farm research related to food crop production

Year	Actual
2013	0

Output #3

Output Measure

- # of farm visits related to food crop production

Year	Actual
2013	0

Output #4

Output Measure

- # of row crop field days related to food production

Year	Actual
2013	0

Output #5

Output Measure

- # 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

Year	Actual
2013	0

Output #6

Output Measure

- # 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.

Year	Actual
2013	0

Output #7

Output Measure

- # of livestock or poultry related educational programs, workshops, educational meetings and/or field days.

Year	Actual
2013	0

Output #8

Output Measure

- # of clientele attending livestock or poultry related educational programs (field days, workshops, etc.)

Year	Actual
2013	0

Output #9

Output Measure

- # of producers receiving livestock or poultry related educational materials (newsletters, fact sheets, etc.)

Year	Actual
2013	0

Output #10

Output Measure

- # of livestock or poultry related farm visits or one-on-one consultations with producers.

Year	Actual
2013	0

Output #11

Output Measure

- # of clientele trained on agricultural biosecurity.

Year	Actual
2013	0

Output #12

Output Measure

- # of requested consultations related to exotic animal disease concerns.

Year	Actual
2013	0

Output #13

Output Measure

- # of hits to the CES Website regarding avian and livestock biosecurity.

Year	Actual
2013	0

Output #14

Output Measure

- # of farm visits or one-on-one consultations with clientele related to biosecurity.

Year	Actual
2013	0

Output #15

Output Measure

- # attending food production alternative agricultural systems related education classes, workshops, demonstrations, group discussions, and other educational events.

Year	Actual
2013	0

Output #16

Output Measure

- # of food production alternative agricultural systems related demonstrations (e.g., demonstration study farm, food plots, etc.)

Year	Actual
2013	0

Output #17

Output Measure

- # of food and nutrition clientele contacts from education classes, workshops, group discussions, one-on-one interventions, demonstrations, and other educational methods.

Year	Actual
2013	0

Output #18

Output Measure

- # of food and nutrition education classes, workshops, group discussions, one-on-one interventions, demonstrations, and other educational events.

Year	Actual
2013	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	# of clientele (non-duplicated) who use the DD50 program for improved rice production.
2	# of clientele using the RICESEED program.
3	# of clientele that utilize SOYVA to assist with variety selection.
4	# of livestock producers who increased knowledge related to livestock production management practices.
5	# of livestock producers who initiated or improved their record keeping.
6	# of poultry producers who adopted new practices or technology.
7	# of livestock producers who changed an existing management practice or adopted a new practice.
8	# of growers/producers reporting knowledge gained about the need for biosecurity.
9	# of growers/producers reporting intent to adopt new biosecurity practices for animal production facilities.
10	# of diagnostic plant pest samples submitted.
11	# of diagnostic nematode samples submitted.
12	# of Asian Soybean Rust positive samples.
13	# of samples submitted for exotic animal diseases testing.
14	# of clientele who reported knowledge gained about speciality food related products.
15	# of clientele who initiated specialty food-related enterprises.
16	# of participants who indicated that they increased their knowledge related to food, nutrition and/or food resource management following completion of a nutrition education program.
17	# of participants who adopted at least one positive nutrition practice.

18	# of participants who adopted at least one food resource management practice.
19	# of participants who reported saving money on groceries following completion of a nutrition education program.
20	# of participants who reported they less often run out of food before the end of the month following completion of a nutrition education program.
21	# of plant varieties developed.

Outcome #1

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #2

1. Outcome Measures

# of clientele using the RICESEED program.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #3

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #4

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #5

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #6

1. Outcome Measures

# of poultry producers who adopted new practices or technology.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #7

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #8

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #9

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #10

1. Outcome Measures

# of diagnostic plant pest samples submitted.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #11

1. Outcome Measures

# of diagnostic nematode samples submitted.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #12

1. Outcome Measures

# of Asian Soybean Rust positive samples.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #13

1. Outcome Measures

# of samples submitted for exotic animal diseases testing.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #14

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #15

1. Outcome Measures

of clientele who initiated specialty food-related enterprises.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #16

1. Outcome Measures

# of participants who indicated that they increased their knowledge related to food, nutrition and/or food resource management following completion of a nutrition education program.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #17

1. Outcome Measures

# of participants who adopted at least one positive nutrition practice.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #18

1. Outcome Measures

# of participants who adopted at least one food resource management practice.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area

{No Data} null

Outcome #19

1. Outcome Measures

# of participants who reported saving money on groceries following completion of a nutrition education program.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #20

1. Outcome Measures

# of participants who reported they less often run out of food before the end of the month following completion of a nutrition education program.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #21

1. Outcome Measures

# of plant varieties developed.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual

2013 0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

V(H). Planned Program (External Factors)

External factors which affected 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)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Climate Change

☐ Reporting on this Program

Reason for not reporting

PLEASE NOTE:
The University of Arkansas Division of Agriculture chose to align our Planned Programs to our Division of Agriculture Strategic Plan program areas. This decision will allow Arkansas to better communicate our efforts back to NIFA.

The data and information that would have been reported to Climate Change is now located under the new planned program "Environment, Energy & Climate."

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Plan	1.8	0.0	43.0	0.0
Actual Paid Professional	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
Actual Volunteer	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 Matching	1890 Matching	1862 Matching	1890 Matching
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 All Other	1890 All Other	1862 All Other	1890 All Other
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

V(D). Planned Program (Activity)

1. Brief description of the Activity

Basic and applied research efforts will continue to be conducted in the areas of life cycle analyses for dairy(milk), cotton, and swine production; temperature stress in rice, cotton, and poultry; greenhouse gas emissions from natural and managed agroecosystems and from alternative-fuel-powered engines; assessment of soil carbon storage and sequestration in natural and managed agroecosystems; efficient water and nitrogen use in rice; efficient use of nitrogen in corn and wheat production, and on projections of economic impacts of climate-adaptive practices on crop production.

Research to expand the utiltiy of N-STaR is planned for clay soils. The adaptation of N-STaR by rice producers in Arkansaswill be quantified. The principles of N-STaR will be investigated for use in corn and wheat.

2. Brief description of the target audience

Producers of rice, cotton, poultry, swine, corn, wheat, and forestry.

3. How was eXtension used?

{No Data Entered}

V(E). Planned Program (Outputs)

1. Standard output measures

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2013

Actual: {No Data Entered}

Patents listed

{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	2	20	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Funded research amounts (in dollars)related to the Climate Change Program.

Year	Actual
2013	0

Output #2

Output Measure

- Number of current year climate relevant research programs

Year	Actual
2013	0

Output #3

Output Measure

- Number of current year climate relevant educational programs

Year	Actual
2013	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Life cycle inventory methodology and data for row crops for greenhouse gases.
2	Number of N-StaR samples processed
3	Number of new assessment and management tools developed, including models and measurements of greenhouse gas emmisions
4	Number of current year citations of climate related publications

Outcome #1

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #2

1. Outcome Measures

Number of N-StaR samples processed

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #3

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #4

1. Outcome Measures

Number of current year citations of climate related publications

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Appropriations changes
- Government Regulations
- Competing Public priorities
- Other (Global climate change)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Environment, Economics, Families and Community

☐ Reporting on this Program

Reason for not reporting

PLEASE NOTE:
The University of Arkansas Division of Agriculture chose to align our Planned Programs to our Division of Agriculture Strategic Plan program areas. This decision will allow Arkansas to better communicate our efforts back to NIFA.

The data and information that would have been reported to Environment, Economics, Families and Community is now located under one of the following new planned programs: "Environment, Energy & Climate", "Increasing Opportunities For Families & Youth", or "Economic & Community Development."

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Plan	225.0	0.0	67.0	0.0
Actual Paid Professional	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
Actual Volunteer	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 Matching	1890 Matching	1862 Matching	1890 Matching
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}
1862 All Other	1890 All Other	1862 All Other	1890 All Other
{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}	{NO DATA ENTERED}

V(D). Planned Program (Activity)

1. Brief description of the Activity

Family, youth, and community focused educational programs within the University of Arkansas Division of Agriculture include events and activities in the program areas of Agriculture, Family and Consumer Sciences, 4-H Youth Development, Community and Economic Development and Leadership Development.

Specific programs include: 4-H Afterschool; ConnectAR; LeadAR; Master Gardeners; County Extension Councils; Extension Homemaker Councils; County 4-H Teen Leader Clubs and County based Youth Leadership Programs.

Conduct research and develop technology applications, products and strategies, including economic and policy issues, enabling enhanced global competitiveness.

Develop demographic information needed to support local education and decision support efforts by County Extension Agents assisting local business and community leaders.

Develop conduct and evaluate educational programs related to alternative agriculture systems and economic enterprises.

Assist and evaluate Farmers Markets for educational opportunity and community economic development value.

Provide Pesticide Applicator Training, certifying and recertifying private and commercial/non-commercial pesticide applicators statewide each year.

Commodity based IPM programs and Pathology programs assist County Extension Agents in local efforts to improve crop production through the adoption of research based recommendations.

Train urban and commercial horticulture clientele in IPM through the Diversified IPM Program.

The Human Integrated Pest Management Program focuses on pests affecting humans. Pest targets include Africanized bees, termites, and fire ants in residential settings.

Researchers support the efforts of wildlife managers in controlling feral swine populations on both public and private land. The effort includes both management control and public policy education related to the trapping, transport and confinement of feral hogs.

Research and Extension Faculty provide cultivar screening programs for commodity crops related to disease and nematode control.

Conduct county- based educational programs and field days, workshops, demonstrations and field days related to production management systems, pest management, soil and water quality management, water use efficiency and tillage systems.

Develop and support social media applications that provide real time information as decision support for land and crop managers, including remote sensing of field to field production management circumstances, irrigation system controls and disease/insect pest diagnostics.

Maintain strong and continuing public and private media connections and associations with both farm and non-farm audiences.

Use all available resources, newsletters (both on-line and paper copy), demonstrations, workshops, on-line educational courses, field days and one-on-one consultations to extend the research based knowledge to appropriate clientele.

Division of Agriculture faculty will develop, evaluate and disseminate education programs and curricula, incorporating new research and emphasizing healthy lifestyles. Programs include but are not limited to the following:

Walk Across Arkansas
Strong Women
Be Medwise Arkansas
Healthy Homes, Healthy People
Fit in 10
Living Well with Diabetes
Right Bite Cooking School
Mediterranean Cooking School
Aging in Place
Arthritis Initiative
AgrAbility
Acknowledging Aging

Also included is an emphasis on food processing, efficiency, chemistry, and associated nutrition and human health implications.

2. Brief description of the target audience

Employers and Employees
Commodity Boards
Consumers
Farmers - regardless of agriculture enterprise or means capability or ethnicity
Health Professionals
School personnel - teachers, administrators, janitors, aides, cafeteria staff, bus drivers, students and coaches
Child Care Providers
Adults
Youth
Entrepreneurs, Hotel management, Restaurant management
Landowners - forest, crop, urban, recreational, etc.
Horticulture production and service businesses/Commercial Landscapers and Maintenance
Master Gardeners, Extension Homemakers (Councils), County Extension Councils
Military Families
Loggers
Natural Resource Professionals
Crop consultants
Homeowners
State and Federal Agency Personnel
Crop and Livestock Management Service Providers
Affiliated farm, forest, natural resource and wildlife organizations

Research and Teaching Faculty
General Public
Watershed management organizations
County and local conservation officials (Conservation District Directors)
Local Farm Organization Leaders and Boards
Extension Faculty and County Extension Agents
Project and program funding organizations
Public Health Officials
Policy Decision-makers
Regulatory Professionals
Pest Control Operators
Civic leaders and organizations
Married couples or those considering marriage
Business leaders - Industry, small, large, rural, urban, consultants and other
Voters
Parents, Grandparents, caregivers, volunteers, 4-H members

3. How was eXtension used?

{No Data Entered}

V(E). Planned Program (Outputs)

1. Standard output measures

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year:	2013
Actual:	{No Data Entered}

Patents listed
{No Data Entered}

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	{No Data Entered}	{No Data Entered}	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of non-duplicated participants in 4-H STEM, Healthy Lifestyles and Citizenship programs

Year	Actual
2013	0

Output #2

Output Measure

- Number of organized clubs and groups supported by Division of Agriculture Research and Extension resources

Year	Actual
2013	0

Output #3

Output Measure

- Number of educational products and materials developed or updated for print, electronic media, radio, podcasts or display

Year	Actual
2013	0

Output #4

Output Measure

- Number of clientele attending educational activities and events related to family and/or community economics and commerce

Year	Actual
2013	0

Output #5

Output Measure

- Number of clientele contacts resulting from education classes, workshops, group discussions, one-on-one interventions, demonstrations, and other educational methods

Year	Actual
2013	0

Output #6

Output Measure

- Number of educational classes, tours, field days, and workshops related to pest management

Year	Actual
2013	0

Output #7

Output Measure

- Number of education meetings, demonstrations, and field days related to the production of non-food agronomic, bioenergy, and horticulture crops

Year	Actual
2013	0

Output #8

Output Measure

- Number of clientele participating in educational events related to non-food agronomic, bioenergy and horticulture crop production

Year	Actual
2013	0

Output #9

Output Measure

- Number of educational materials, curricula, newsletters, web-based modules and fact sheets developed, produced and delivered

Year	Actual
2013	0

Output #10

Output Measure

- Web content utilization data tracking including hits, clicks and content utilized

Year	Actual
2013	0

Output #11

Output Measure

- Number of Food and Nutrition and Health and Aging programs delivered

Year	Actual
2013	0

Output #12

Output Measure

- Number of participants in Food and Nutrition and Health & Aging programs

Year	Actual
2013	0

Output #13

Output Measure

- Number of grants and dollars generated by grant and contract development efforts

Year	Actual
2013	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

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 of program participants who indicate a change in behavior, based on lessons learned from Division of Agriculture sponsored Research and Extension programs
5	Number of pesticide applicator training participants certified or re-certified by passing commercial pesticide certification exams
6	Number of participants (both youth and adult) indicating new knowledge gained in business management, finance, consumer economics, and taxation resulting from Division of Agriculture Research and Extension programs
7	Number of producers who gained knowledge in crop production and management
8	Number of Master Gardener participants trained, certified and re-certified
9	Number of registered crop consultants and foresters maintaining certification on an annual basis
10	Number of program participants indicating new knowledge of water quality and conservation best management practices
11	Number of participants who adopted at least one positive nutrition and/or health practice
12	Number of participants reporting a reduction of at least one risk factor for chronic disease after completing a nutrition and/or health education program
13	Number of participants reporting an increase in physical activity after completing a nutrition and/or health education program
14	Number of producers who changed or adopted new production and/or conservation management practices or technologies
15	Number of participants (both youth and adult) indicating a change in behavior in their business management, finance, consumer economics, and taxation planning and practice based on participation in Division of Agriculture Research and Extension programs
16	Number of program participants indicating the adoption or implementation of new water quality and conservation best management practices

Outcome #1

1. Outcome Measures

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. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #2

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #3

1. Outcome Measures

Total annual revenue generated by active APAC business clients

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #4

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #5

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #6

1. Outcome Measures

Number of participants (both youth and adult) indicating new knowledge gained in business management, finance, consumer economics, and taxation resulting from Division of Agriculture Research and Extension programs

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #7

1. Outcome Measures

Number of producers who gained knowledge in crop production and management

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #8

1. Outcome Measures

Number of Master Gardener participants trained, certified and re-certified

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #9

1. Outcome Measures

Number of registered crop consultants and foresters maintaining certification on an annual basis

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #10

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #11

1. Outcome Measures

Number of participants who adopted at least one positive nutrition and/or health practice

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #12

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #13

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #14

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #15

1. Outcome Measures

Number of participants (both youth and adult) indicating a change in behavior in their business management, finance, consumer economics, and taxation planning and practice based on participation in Division of Agriculture Research and Extension programs

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #16

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

V(H). Planned Program (External Factors)

External factors which affected 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)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Agricultural Production & Processing

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
101	Appraisal of Soil Resources	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%	
211	Insects, Mites, and Other Arthropods Affecting Plants	1%		1%	
212	Pathogens and Nematodes Affecting Plants	1%		1%	
213	Weeds Affecting Plants	7%		8%	
215	Biological Control of Pests Affecting Plants	10%		1%	
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%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Actual Paid Professional	124.9	0.0	251.0	0.0
Actual Volunteer	34.6	0.0	15.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
2708018	0	2554336	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
2134143	0	32352057	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
17408010	0	4603720	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Agriculture remains the largest economic sector in the state, producing one in six jobs, and generating cash receipts of more than $8 billion. Tillable land, adequate water, and favorable climate favor production agriculture and processing. Nevertheless, major challenges are increasing, such as decreasing ground water, limited soil fertility, and intensive environmental and social pressures. Globalization has increased biosecurity and financial risks, while ideological opinion dominates the information age, confusing producers and consumers with misinformation.

Animal agriculture is huge in Arkansas but suffers from high feed prices, droughts, and growing perceptions of health and food safety concerns. Plant agriculture is also large and diverse, ranking in the top ten nationally for four major crops (rice, cotton, sorghum and soybean), along with a massive forestry industry and thousands of other small farms. Gardening dominates urban agriculture settings. Challenges include misinformation, food safety concerns, GMO concerns, increasing costs, and global trade issues. Sustainability of both animal and plant agriculture, including economic sustainability, continues to grow as a Division focus area. Overall, Division scientists conduct cutting-edge research and deliver effective extension via modern technology to address these challenges.

Water is an increasing concern in the state, as Arkansas is the 4th largest irrigation state in the nation. Both water quality and quantity represent major challenges, and the Division has invested in a highly qualified working group of water scientists and educators in response.

Biosecurity, monitoring and diagnostics have become increasingly complex, given globalization, movement of goods, and misinformation on the Internet. In the age of instant news, social media, and the Internet - any biosecurity report like a "new" disease outbreak may create economic havoc in a few hours, sometimes without justification. The introduction of new pests, like the spotted-winged Drosophila,

requires extensive education and in-field monitoring to prevent substantial damage to Ag production. The Division counters these with relevant, timely, and sound science.

Competitive marketing is very complex, given modern climate, global trading, and changing social ideals like "local foods" or "non-GMO". Effective forecasting and best economic practices to support competitive marketing and help develop new markets are major focus areas, as are crop production economics and risk management.

Most people today are largely uninvolved and unaware of agriculture production and processing. Their interests do not reside in where food comes from, but assume that food will always be on the shelf, and the information age has resulted in an overload of miscellaneous opinion about Ag science. The information age has given new and powerful tools to educate stakeholders. For example, gardening is the most important pastime in the state so we released a native phone app, Hort Plants, already utilized by over 1800 stakeholders.

2. Brief description of the target audience

Target audiences for the Agricultural Production & Processing planned program include but are not limited to:

Agricultural food crop growers/producers; Livestock/poultry producers; 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; Homeowners; Government Leaders; Community leaders; Policy and decision makers; First responder emergency personnel; Research funders; Regulatory agencies; Students; Food Retailers/Distributers; Hobby Farmers; General Public.

3. How was eXtension used?

The Division participates in the Ask the Expert Program for consumer horticulture; the fire ant COP (http://www.extension.org/fire_ants); the animal welfare COP (http://www.extension.org/animal_welfare); the feral hogs COP (http://www.extension.org/feral_hogs); the National Plant Diagnostic Network (http://www.extension.org/pages/54785/national-plant-diagnostic-network#.Ux2MGj-zGMg ; and leads the Agricultural and Food Law COP (http://extension.org/ag_law);

V(E). Planned Program (Outputs)

1. Standard output measures

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	251826	319697	10425	8942

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year:	2013
Actual:	50

Patents listed

C2010-17Vaccine and Methods to Reduce Campylobacter InfectionNationalizedKR10-2013-7000471 1/8/2013
C2010-17Vaccine and Methods to Reduce Campylobacter InfectionNationalizedEP11793174.112/13/2012
C2010-25Compositions and Methods for Increasing Poultry Hatchability and Early Performance NationalizedEP11807349.32/8/2013

C2011-01Methods and Compositions Including Spore-Forming Bacteria for Increasing Health of Animals NationalizedEP11807617.32/8/2013

C2010-17Vaccine and Methods to Reduce Campylobacter InfectionNationalizedTH1201005954 11/15/2012
C2010-17Vaccine and Methods to Reduce Campylobacter InfectionNationalizedPH1-2012-502428 12/7/2012
C2010-17Vaccine and Methods to Reduce Campylobacter InfectionNationalizedVN1-2013-000631/8/2013
AG2013-06Method of In-Season Nitrogen Measurement and Fertilization of Non-leguminous Crops from Digital Image AnalysisContinuation in PartUS13/652,60510/16/2012

C2012-01DNA-Linked Nanoparticle Building Blocks for Nanostructure Assembly and Methods of Producing SameNon-ProvisionalUS13/690,30511/30/2012

AG2013-20Frozen Dessert Compositions and Methods of Preparation ThereofNon-ProvisionalUS 13/692,586812/3/2012
AG2013-12Conjugated Linoleic Acid Rich Vegetable Oil Production from Linoleic Rich Oils by Heterogeneous CatalysisNon-ProvisionalUS13/692,61912/3/2012

AG2014-03Blackberry Plant named "Camila"PlantUS13/694,7871/4/2013
C2010-17Vaccine and Methods to Reduce Campylobacter InfectionNationalizedUS13/702,82712/7/2012
C2012-04Method of Fabricating a Nonochannel System for DNA Sequencing and Nonoparticle CharacterizationNon-ProvisionalUS13/768,9602/15/2013

C2012-24Process for Reducing Water Soluble Elements Using an Amended Animal Manure Fertilizer or LitterNon-ProvisionalUS13/790,9553/8/2013

C2010-25Compositions and Methods for Increasing Poultry Hatchability and Early Performance NationalizedUS13/809,4501/10/2013

C2011-01Methods and Compositions Including Spore-forming Bacteria for Increasing the Health of AnimalsNon-ProvisionalUS13/810,5491/16/2013

C2007-13Methods of Selecting and Using Therapeutic and Prophylactic Probiotic Cultures to Reduce Bacterial Pathogen LoadsNationalizedUS13/876,7434/16/2013

AG2014-02Blackberry Plant named 'Amara'PlantUS13/986,9006/14/2013
C2010-17Vaccine and Methods to Reduce Campylobacter InfectionNationalizedCO13-003-4431/9/2013
C2010-18Vaccine Vectors and Methods of Enhancing Immune ResponsesNationalizedHK13102106.2 2/19/2013
C2010-17Vaccine and Methods to Reduce Campylobacter InfectionNationalizedCA2,800,83011/26/2012
C2010-17Vaccine and Methods to Reduce Campylobacter InfectionNationalizedAU20112647721/4/2013
C2010-17Vaccine and Methods to Reduce Campylobacter InfectionNationalizedCN201180028098.6 12/7/2012

C2010-17Vaccine Vectors and Methods of Enhancing Immune ResponsesNationalizedZA2012/09411 12/12/2012
C2010-17Vaccine and Methods to Reduce Campylobacter InfectionNationalizedUA2013002781/8/2013
C2010-17Vaccine and Methods to Reduce Campylobacter InfectionNationalizedJP2013-51437112/7/2012
C2010-17Vaccine and Methods to Reduce Campylobacter InfectionNationalizedCL3458-201212/7/2012
C2010-17Vaccine and Methods to Reduce Campylobacter InfectionNationalizedIN3912/KOLNP/2012 12/11/2012
C2012-21Novel Mucosal Adjuvants and Delivery SystemProvisionalUS61/719,71310/29/2012
AG2013-12Conjugated Linoleic Acid Rich Vegetable Oil Production from Linoleic Rich Oils by Heterogeneous CatalysisProvisionalUS61/762,6782/8/2013

C2012-22Compositions and Methods of Enhancing Immune Responses to EimeriaProvisionalUS 61/764,6812/14/2013
AG2013-24Improved Grain Yield and Quality Under High TemperatureProvisionalUS61/779,1243/13/2013
AG2013-13Nitrogen Test for Agronomic Recommendations (N-STaR)ProvisionalUS61/786,8993/15/2013
AG2013-07Compositions and Methods of Enhancing Immune Responses to Enteric PathogensProvisional US61/790,3013/15/2013

C2010-17Vaccine and Methods to Reduce Campylobacter InfectionNationalizedBRBR 11 2012 0312111 12/7/2012
C2010-25Compositions and Methods for Increasing Poultry Hatchability and Early Performance NationalizedBRBR 11 2013 000566 11/9/2013

C2011-01Methods and Compositions Including Spore-Forming Bacteria for Increasing Health of Animals NationalizedBRBR 11 2013 001107 61/16/2013

C2010-17Vaccine and Methods to Reduce Campylobacter InfectionNationalizedMXMX/a/2012/0014395 11/13/2012
C2007-03Compositions and Methods of Enhancing Immune ResponsesDivisionalMYPI 2013002516 6/24/2013
C2010-17Vaccine and Methods to Reduce Campylobacter InfectionNationalizedIDW00 2012 05287 12/20/2012
C2012-04AFM Nanochannel System for DNA Sequencing and Nanoparticle CharacterizationContinuation in PartUS13/951,6647/26/2013

C2012-30Blackberry Plant Named 'Osage'PlantUS13/987,2147/11/2013
C2012-29Grape Plant Named 'HOPE'PlantUS13/987,4947/31/2013
C2012-27Grape Plant Named 'GRATITUDE'PlantUS13/987,4967/31/2013
C2012-26Grape Plant Named 'JOY'PlantUS13/987,4977/31/2013
C2012-28Grape Plant Named 'FAITH'PlantUS13/987,5017/31/2013
AG2013-27Phophorus Sorption Media and Containment ProcessProvisionalUS61/883,6019/27/2013
SoybeanUA5612 R04-357PlantUS13/943,0217/12/2013
SoybeanUA5213C R04-357PlantUS14/017,5017/12/2013

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total

Actual	75	219	294

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # attending food production alternative agricultural systems related education classes, workshops, demonstrations, group discussions, and other educational events.

Year	Actual
2013	469

Output #2

Output Measure

- # of food production alternative agricultural systems related demonstrations (e.g., demonstration study farm, food plots, etc.)

Year	Actual
2013	37

Output #3

Output Measure

- # of livestock or poultry related educational programs, workshops, educational meetings and/or field days.

Year	Actual
2013	776

Output #4

Output Measure

- # of clientele attending livestock or poultry related educational programs (field days, workshops, etc.)

Year	Actual
2013	15600

Output #5

Output Measure

- # of producers receiving livestock or poultry related educational materials (newsletters, fact sheets, etc.)

Year	Actual

2013	22502

Output #6

Output Measure

- # of livestock or poultry related farm visits or one-on-one consultations with producers.

Year	Actual
2013	8500

Output #7

Output Measure

- # of agronomic production education meetings related to food crop production.

Year	Actual
2013	756

Output #8

Output Measure

- # of demonstrations/on-farm research related to food crop production

Year	Actual
2013	583

Output #9

Output Measure

- # of farm visits related to food crop production

Year	Actual
2013	6891

Output #10

Output Measure

- # of row crop field days related to food production

Year	Actual
2013	27

Output #11

Output Measure

- # 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.

Year	Actual
2013	2164

Output #12

Output Measure

- # 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.

Year	Actual
2013	19353

Output #13

Output Measure

- Number of education meetings, demonstrations, and field days related to the production of non-food agronomic, bio-energy, and horticulture crops

Year	Actual
2013	366

Output #14

Output Measure

- Number of clientele participating in educational events related to non-food agronomic, bio-energy and horticulture crop production

Year	Actual
2013	4131

Output #15

Output Measure

- # of clientele trained on agricultural biosecurity.

Year	Actual
2013	5015

Output #16

Output Measure

- # of requested consultations related to exotic animal disease concerns.

Year	Actual
2013	1757

Output #17

Output Measure

- # of hits to the CES Website regarding avian and livestock biosecurity.

Year	Actual
2013	28159

Output #18

Output Measure

- # of farm visits or one-on-one consultations with clientele related to biosecurity.

Year	Actual
2013	270

Output #19

Output Measure

- Number of organized clubs and groups supported by Division of Agriculture Research and Extension resources

Year	Actual
2013	65

Output #20

Output Measure

- Number of educational classes, tours, field days, and workshops related to pest management

Year	Actual
2013	340

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	# of clientele who reported knowledge gained about specialty food related products.
2	# of clientele who initiated specialty food-related enterprises.
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 changed an existing management practice or adopted a new practice.
6	# of livestock producers who changed an existing management practice or adopted a new practice.
7	# of clientele (non-duplicated) who use the DD50 program for improved rice production.
8	# of clientele using the RICESEED program.
9	# of plant varieties developed.
10	Number of producers who gained knowledge in non-food crop production and management
11	Number of producers who changed or adopted new production and/or conservation management practices or technologies.
12	# of growers/producers reporting knowledge gained about the need for biosecurity.
13	# of growers/producers reporting intent to adopt new biosecurity practices for animal production facilities.
14	# of diagnostic plant pest samples submitted.
15	# of diagnostic nematode samples submitted.
16	# of Asian Soybean Rust positive samples.
17	# of samples submitted for exotic animal diseases testing.

18	Number of Master Gardener participants trained, certified, and re-certified.
19	Number of pesticide applicator training participants certified or re-certified by passing commercial pesticide certification exams.
20	Number of program participants indicating new knowledge of water quality and conservation best management practices.
21	Number of program participants indicating the adoption or implementation of new water quality and conservation best management practices.

Outcome #1

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	768

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Today, 98% of the strawberries grown in the U.S. come from California and Florida. The two states combined keep strawberries available in the grocery stores for most of the year. Still, Americans' appetite for fresh strawberries and demand is so high that an equivalent of 15% of our annual crop is imported and demand is expected to increase 7% a year for the next three years. In contrast, Arkansas production accounts for only a small fraction of the current national acreage. Ninety percent of the strawberries grown in Arkansas are sold in local markets and production is limited to late spring season. The rapid increase in the number of Farmers' Markets in Arkansas combined with increasing demand by consumers for local produce has created lucrative opportunities for growers. With new advances protected culture technologies such as high tunnels, Arkansas growers have opportunities to extend the strawberry season to meet the year-round demand. The objective of this ongoing multidisciplinary project is to extend the strawberry production season in Arkansas while applying innovative management practices such as pest control, and nutrient management to reduce inputs and increase the environmental sustainability of strawberry production in the state.

What has been done
For this project, high tunnels were constructed at the Ark Agricultural REC in Fayetteville and at the Southwest REC in Hope. The performance of different cultivars (Albion Elyana, Radiance, and St. Festival in Fayetteville and the same cultivars with the addition of Camino Real in Hope) was tested to determine their adaptability to high tunnel environments. At both locations, strawberry fruit production began at the end of November continued through the winter months with the last harvest ending in April. Production was higher in Fayetteville than in Hope due lower pest problems in Fayetteville. There were differences in cultivar performance at the two locations. In Fayetteville, St. Festival had the best yield, best fruit quality, and less pest problems that the other cultivars and while Radiance performed best in Hope.

Results
Arkansas. Higher yields, better fruit quality, and reduced pesticide inputs obtained from this production system has encouraged several growers to adapt this technology. The adaption of high tunnel technologies in the state continues to increase giving farmers new market opportunities. In addition, this research allowed us the opportunity to receive grant funding from the North American Strawberry Growers Association and National Strawberry Sustainability Initiative to continue research to expand strawberry production in Arkansas.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
601	Economics of Agricultural Production and Farm Management

Outcome #2

1. Outcome Measures

# of clientele who initiated specialty food-related enterprises.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	39

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Pecan is a widely adapted and important tree in Arkansas. However, nut production has largely been an unorganized and individual industry for many years. Even the most basic research and education gaps have not been identified in a long time. Pecan growers and state consumers interested in local produce have expressed concern about the quality and profitability of production, as well as consistent supply.

What has been done

Two surveys were conducted to assess industry needs. In the first survey, biological and edaphic information was collected for three years from 16 pecan orchards located in various geographical areas of the state where pecans are grown. At these orchards, we distributed traps and monitored pecan nut casebearer (one of the most economically destructive pecan pest) and collected soil and leaves for analyses. The second survey was an extensive written survey sent to 80 growers (36 respondents) that asked questions pertaining to their horticultural and pest management practices, economics and marketing, and demographics. Information gained from these surveys was disseminated during educational meetings.and many growers had not conducted a soil or foliar test in the last ten years. Soil problems associated with the lack of soil testing were evident. The foliar analyses indicated deficiencies and toxicity for some of the minerals tested. These results indicate current and potential future problems with productivity, nut quality, and overall lower efficiency in Arkansas pecan orchards. Respondents indicated pecan nut casebearer (PNC) and stinkbug were the major insect problems facing the industry. To help growers better manage these problems, monitoring for PNC was established and results sent to The Belt Wide ipmPIPE project (http://pecan.ipmpipe.org/map/pnc/) to be included in the Southeast pecan IPM monitoring system. In addition, information was posted on (http://comp.uark.edu/~dtjohnso/) an interactive web page created to provide pecan producers and consultants with up-to-date temperature information to be used in pest prediction models. This study found no PNC in some areas of the state where growers were routinely spraying for this pest and found this pest in areas never reported before. With this new information and continued monitoring, growers were able to implement pest management practices that should result in better production efficiency.

Results

Survey results demonstrated the current status of the industry in Arkansas, and helped determine the educational needs of pecan growers as well as provided a baseline upon which orchard management recommendations can be made. For example, most of the pecan orchards are small, with 64% of the orchards being less than 15 acres and 19% larger than 100 acres. Forty one percent of respondents have planted new trees in the last five years and 31% plan to plant new trees in the future. The average pecan grower had 27.5 years of experience in farming with 19 years of experience in growing pecans. The survey also indicated that most growers were not following basic horticultural or pest management practices. The majority of farmers did not prune yearly (only 18% of respondents), and most growers did not thin their crop.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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

Outcome #3

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	23474

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The record-breaking drought of 2012 had a state-wide impact on Arkansas's cattle industry. From January 1, 2012 to January 1, 2013, the beef cows that calved were down 6% or 58,000 head, and all cattle and calves were down 4% or 70,000 head. Research conducted by the Division of Agriculture, University of Agriculture reported the 2012 drought cost the Arkansas beef cattle industry $128 million or $141 per bred cow.

What has been done
A comprehensive extension educational program was developed to address the immediate needs of livestock producers to recover from the 2012 drought. This program included national, regional and county presentations, videos, electronic newsletters, news releases, and TV interviews (local and RFD-TV, radio interviews, demonstrations and electronic communication via the Animal Science blog). Demonstrations were implemented to show producers how they could recover faster from the 2012 drought. These demonstrations included planting winter annuals, stockpiling cool and/or warm season grasses, containing cattle into a single pasture allowing other pastures to maintain grass residue, minimizing the number of cattle to sell, rationing out forage and hay to reduce pasture damage and developing forage management plans when conditions improved.

Results
In a winter annual demonstration in SW Arkansas, a cow/calf producer saved $30,550 or $152 per AU by planting winter annuals compared to buying hay and supplement. A stocker cattle operator saved $116 per AU by stockpiling fescue compared to buying hay and supplement. Another producer in NE Arkansas grazed 286 days during the same time period by implementing similar practices. As a result of the Extension demonstrations, one major seed distributor reported a 542% increase of sales of forage brassica seed (forage turnips) to Arkansas producers (grazing turnips was promoted through the program), which clearly indicates producers were

using the drought-management information.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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

Outcome #4

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	1593

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Cow efficiency has become a hot button issue for the beef industry. There has been little research determining the holistic impacts of mature cow size on pasture carrying capacity, pre-weaning and post-weaning growth of offspring, cow production efficiency, pasture production economics, and water and nutrient run off. Determination of the economic optimum stocking rates is essential for each environment. In the short run, it is often seen that maximum production is the most profitable, especially in highly favorable market conditions, but it is unlikely that this production level is sustainable for the long-term.

What has been done

In order to determine the economically optimum stocking rate in the Coastal Plains area of Southwestern Arkansas, eight 10 acre mixed bermudagrass/dallisgrass pastures located at the SWREC Cow Calf Unit were stocked with 56 mature beef cows. Cows were segregated into large (1250 lb average BW) and small (976 lb average BW) body weight groups and were stocked at 4, 6, 8, or 10 cows per pasture, which is equivalent to 2.5, 1.6, 1.2, and 1 acre/cow. Weight of calf weaned per cow and per acre along with cow body weight and body condition change and reproductive performance was measured.

Results

Over the entire 4-yr period predicted calf weaning weights decreased with increasing stocking rate for both large and small cows but calf body weight at weaning were decreased to a greater extent in large cows compared with small cows. There was however a 15 lb decrease in calf body weight gain with each increase in stocking rate. Weaning efficiency (lb of calf weaning weight per lb of cow body weight at weaning) was affected by a cow body weight by stocking rate interaction, where for large cows weaning efficiency decreased by 0.6 lbs for each increase in stocking rate, while for small cows weaning efficiency decreased by 0.2 lbs for each increase in stocking rate. Increasing stocking rate increased calf weaning weight per acre and total calf gain per acre. Increasing cow size increased weaning weight per acre by 0.24 lb for each lb increase in cow body weight. Hay feeding days, total hay fed per cow, and hay fed per lb metabolic body weight increased linearly with increasing stocking rate, yet cow body weight had no effect. This data indicates that increasing cow size can increase weaning weight of calves, but does not affect total production per acre and reduces weaning weight efficiency ratios. Increasing stocking rate reduces individual calf body weight gain but increases total calf gain per acre, and increased requirements of conserved forages.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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

Outcome #5

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	7015

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Drinking water quality and energy efficient lighting continue to be important focus areas for the poultry industry with over one hundred requests from state, regional, national and international major poultry organizations requesting assistance and presentations.

What has been done
We developed a simple water line swabbing method and published a fact sheet and YouTube video to demonstrate the technique and benefits. We presented the method at 40 invited conferences nationwide during 2013 to reach a broader audience in the poultry industry.

Results
Industry feedback during 2013 indicated that the method was highly useful in diagnosing and correcting on-farm water quality challenges, which resulted in significant production improvements. One poultry grower complex reported that after implementation of the water line sanitation method, along with other concepts presented, live production performance went from the bottom of the integrator's profile to the top ten percent. Positive feedback led to a 6 state extension effort and a grant proposal to SARE to develop an interactive Poultry Farm Water Quality Decision Tree Tool, a web-based program for diagnosing/correcting water related challenges in national poultry production.

4. Associated Knowledge Areas

KA Code	Knowledge Area
306	Environmental Stress in Animals
311	Animal Diseases

Outcome #6

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	4059

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Livestock producers face many challenges, but escalating costs of feed, fertilizer, and fuel caused serious problems for producers in Arkansas and throughout the country. Feeding expenses, both hay and supplements, are the biggest single cost of livestock production. Feeding during recent droughts magnified effects of high input costs for livestock producers.

What has been done
Educational programs were combined with on-farm demonstrations of eight key management practices. The management practices were 1) stockpiling fescue, 2) stockpiling Bermuda grass, 3) growing legumes, 4) growing summer annual forage, 5) growing winter annual forage, 6) improving grazing management, 7) reducing hay losses in storage, and 8) reducing hay losses during feeding. In addition, three farms and the Livestock and Forestry Research Station used the same practices to verify program recommendations and strategies. This combined approach using the same forage and livestock management practices on a production scale simultaneously across multiple environments, producer farms, and a research station is unlike any other in the country.

Results
To date, over 180 demonstrations were conducted on farms in 50 counties. Direct savings totaled over $300,000. This is a significant impact considering that 80% of Arkansas beef farms have less than 50 cows (average herd size is 38 head) and most livestock farms are less than 200 acres. Producer demonstration practices of rotational grazing, legumes, and stockpiled forages achieved grazing seasons of approximately 300 days with savings ranging from $2,200 to over $17,000 over a three to five year period. At the Livestock and Forestry Research Station, demonstration practices were verified to achieve grazing seasons over 300 days in four of five years. Savings averaged $4,100 compared to traditional feeding methods. In addition, the value-

added practice of fence line weaning added $100 per calf by using available forage with no extra inputs.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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

Outcome #7

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	600

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Successful management of rice in Arkansas depends heavily on properly timed management decisions. A powerful decision aid was introduced during the 1980s, called the DD50 or Degree Day 50 program. Based on the observation that rice develops at a predictable rate according to accumulated heat units over 50 degrees F, the program predicts critical growth stages for management decisions. Over the past several years, reported use of the DD50 has declined or become static.

What has been done
To address the decline in reporting, we increased awareness efforts of the DD50 and other best management practices in rice thru the ARPT rice information sheet, the new rice production handbook, the new Rice Quick Facts and our row crops blog. The blog notifies subscribers by cell phone of new articles. We also demonstrated use of DD50 and other BMPs on rice verification fields in 22 counties. Verification fields are whole-field management demonstrations, where the producer agrees to follow all Extension-based recommendations and compare results to his own management decisions. These fields are often the subject of field days and tours.

Results
As a result of these efforts, awareness of DD50 and more recent BMPs have increased. Growers indicate that although they do not report use of DD50 on every field, they use a base field to help manage all other similar fields on the farm. Therefore, reporting of DD50 use is below actual use. Verification fields managed using DD50 and other Division BMPs averaged 191 bu/ac yield, compared to typical yield in Arkansas of 168 bu/ac. This is largely due to more timely production practices during the growing season.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
201	Plant Genome, Genetics, and Genetic Mechanisms
205	Plant Management Systems

Outcome #8

1. Outcome Measures

# of clientele using the RICESEED program.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	425

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Rice diseases remain an important constraint to efficient production in Arkansas, costing about 10% yield and quality in any given field, if not managed. Under highly favorable conditions, however, certain rice disease epidemics can result in total field loss. A major influence on severity of specific rice diseases is density of plants. Rice is grown in uniform monoculture fields, and density influences microclimate in the canopy later in the season, which influences severity of sheath blight, the most important disease in the state most years.

What has been done
RICESEED is a simple program to assist in choosing the proper seeding rate in a particular rice production system. We worked with rice growers and consultants on seeding rate choices and methods, and conducted yield and disease experiments in plots seeded at different rates.

Results
Growers using RICESEED and BMP information form the Division, or who had hosted a Rice Verification field plant fields using lower seeding rates. These fields yield the same or higher than others using higher rates, and usually have less sheath blight pressure. In a few instances, smut diseases were higher on fields with lower seeding rates that had been over-fertilized with nitrogen early in the season to stimulate tillering. Rice consultants at the annual crop management conference in the state overwhelming endorsed lower seeding rates for rice production. Plots planted with lower rates had high yield and lower disease pressure from sheath blight and bacterial panicle blight.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
201	Plant Genome, Genetics, and Genetic Mechanisms
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems

Outcome #9

1. Outcome Measures

# of plant varieties developed.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual

2013 5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
America's domestic blackberry production is usually limited to production on second-year canes called floricanes, and produce fruit from late May to early September. This severely limits availability of this popular fruit in the US and lessens the profit potential of blackberry production overall. Between 2004 and 2009, the UA System Division of Agriculture released the first primocane fruiting blackberry varieties, a unique plant that fruits on current developed canes. To date, Prime-Ark® 45 has been the most successful, providing late summer to fall production of blackberries for established growers, however all releases have been thorned, not the most popular option for pickers.

What has been done
Prime-Ark® Freedom was released in 2013, the first thornless plant of this type ever developed. Prime-Ark® Freedom produces very large berries with good flavor, intended primarily for the home garden or local market production. It can produce until frost or later depending on climatic conditions, greatly extending the production season for blackberries.

Results
Having a thornless plant of a primocane fruiting blackberry will further impact the ability for homeowners and commercial growers to expand production as thornless plants are much easier to manage as well as much safer for pick-your-own marketing. It is expected that home gardeners as well as specialty crop growers will benefit from this new plant, providing for increased profits, meeting consumer needs and desires, and providing overall enhanced nutrition.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms

Outcome #10

1. Outcome Measures

Number of producers who gained knowledge in non-food crop production and management

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	3161

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Use of mobile devices and apps is growing exponentially. According to a recent article, there will be more mobile devices on earth than people by the end of 2013. Fifty-six percent of Americans now have a smart phone or tablet, and the average user looks at their mobile device 125 times per day. In the U.S., 40% of smartphone operating systems use Apple iOS.

What has been done
The UA System Division of Agriculture developed a large app (Hort Plants) using high resolution plant images that featured quick download and viewing. The challenge was making 1.49 gigabytes worth of high resolution images usable on a mobile device. The app developers used a special compression technique to allow for quick downloading and yet still view high resolution images as needed. Once downloaded to the mobile platform, the app no longer requires connectivity. The app is an encyclopedia covering 268 landscape plants including trees, shrubs, groundcovers, vines, annuals and perennials for the mid-South with 931 high-quality images. Included with the photographic database is comprehensive cultural and plant characteristic information.

Results
Since the app ("Hort Plants") was made available on iTunes on August 15, 2013, it has been downloaded 1,864 times. 'Hort Plants' will prove useful to a wide range of stakeholders including home gardeners as well as landscape professionals when making landscape plant decisions. The current rating on iTunes is a 4+. Two recently posted comments were: 1) "Excellent for novice or vet. This is an excellent app! I recommend it for all who enjoy working with plants in their landscape. It makes a great tool for a Master Gardener or 4-H member with a horticulture project. Great plant pictures and descriptions of each help you better decide if they will fit in your landscape." and 2) "A very well designed and organized selection with beautiful photos showing plants growing in many types of habitats and in different stages of growth."

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
112	Watershed Protection and Management
205	Plant Management Systems
216	Integrated Pest Management Systems
601	Economics of Agricultural Production and Farm Management

Outcome #11

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	536

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Herbicide-resistant Palmer amaranth (pigweed) is the greatest pest facing cotton and soybean producers in Arkansas. This species is resistant to four major herbicide types including dinitroanaline, ALS, triazine and glycine (glyphosate) groups. Herbicide and cultural practices exist to provide greater than 95% control of Palmer, but this level of control is not adequate. A single female Palmer amaranth plant can produce more than 300,000 seed each year. Obviously, if a higher percent of the population is female, the females produce more than 300,000 seed each or the herbicide program is less than 95% effective, greater numbers of escapes will be present. This is not sustainable.

What has been done
In response, the UA System Division of Agriculture developed and implemented the "ZERO TOLERANCE" program for resistant pigweed, the first program of its kind that focused on managing the weed seed bank. This educational program focuses on community management of pigweed in fields, ditches, turn rows, rights of way and equipment yards. Cleaning field and harvest equipment is also a key program point and can reduce the spread of pigweed.

Results
Visual observations and soil samples showed that the program works well if implemented and carried out properly. Hand weeding in one county was reduced from over 100 hours per field to less than 5 hours in year 2 of the program. In another county, the program reduced Palmer amaranth populations 65% in year 1 and below detectable levels after year 3. Hand weeding resistant weeds costs over $100/Acre, and an effective Zero Tolerance program eliminates 90% of hand-weeding by year 3.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
112	Watershed Protection and Management
205	Plant Management Systems
216	Integrated Pest Management Systems
601	Economics of Agricultural Production and Farm Management

Outcome #12

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	7690

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Poultry is a huge industry in the state, with Arkansas ranked 2nd in the USA in broiler production, third in turkey production, and tenth in egg production. The poultry industry has Biosecurity practices and protocols in place on each of 6000 commercial farms to protect against the introduction of diseases and to limit spread if a disease outbreak were to occur. In recent years, there has been a tremendous increase in small or "backyard" poultry flocks in the USA and Arkansas. This is of great concern from a disease standpoint since it is unknown how many small flocks there are, their overall health, or if any biosecurity practices are used.

What has been done
The Division Biosecurity education program was tested in June of 2013 when avian influenza strain H7N7 was detected on a commercial poultry farm in western Arkansas, resulting in a quarantine area. Division poultry health personnel provided informational packets: "Avian Influenza-What Is It?", "Avian Influenza-Biosecurity for Flock Owners", APHIS Fact Sheet "Avian Influenza: Responding to Concerns About Type A Viruses, Extension Fact Sheet" "Poultry Health Status Determination, USDA Animal Alert- Avian Influenza, and the DVDs "Biosecurity for Backyard Poultry" and "Biosecurity: Protecting Arkansas Poultry from Contagious Diseases." Integrators provided these to commercial growers while Division personnel distributed these

packets to small flock owners inside the quarantine zone and conducted educational meetings for all.

Results
Numerous small flock owners attended the seminars and all expressed interest in Biosecurity for their farms and planned to upgrade existing practices. The H7N7 outbreak was contained to the original commercial farm. We identified and arranged testing of 49 small flocks inside the zone and all were negative for AI. Unfortunately, despite rapid response, education and containment, the news of the H7N7 discovery resulted in several trade embargoes on Arkansas poultry and products by two states and several countries. These were lifted in a relatively short period of time however, so the economic impact could have been much worse. Continued education for small flock owners statewide is planned to lessen risk to the poultry industry in the state.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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

Outcome #13

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	3171

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
311	Animal Diseases
722	Zoonotic Diseases and Parasites Affecting Humans

Outcome #14

1. Outcome Measures

# of diagnostic plant pest samples submitted.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	2934

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Arkansas plants are subject to numerous diseases with potential to devastate Arkansas plant agriculture if improperly diagnosed. Diagnosis is a science and art, and the availability of internet information and photos appears to have increased incorrect diagnoses in our state and elsewhere. The results can mean use of the wrong disease control practice, and resulting economic losses.

What has been done
The Plant Health Clinic has modernized the facilities and increased use of the website and electronic newsletters to encourage sample submission and explain the benefits of proper diagnosis. Clinic staff educated master gardeners in many counties on this topic and provided a module for the advanced master gardener curriculum statewide. We set up the portable Clinic at the Arkansas Flower and Garden Show and estimate at least 1000 persons stopped by out of the estimated 10,000 attendees. This Clinic was conducted at four field days during the year as well.

Results
The clinic received 2934 plant samples for diagnosis during the year and issued 28 electronic

newsletters emphasizing correct diagnosis and management options. More than 99% of clientele indicated they were highly positive about results of sample diagnoses. Newsletters were cited by county agents and other clientele as a very important component of plant health management strategy and were repeatedly used. Master gardeners indicated increased knowledge of plant diagnosis at all of the training events where the Clinic was featured.

4. Associated Knowledge Areas

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants

Outcome #15

1. Outcome Measures

# of diagnostic nematode samples submitted.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	449

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Cotton is an important agronomic crop in the southern U.S. In Arkansas, about 3 percent of the cotton crop is lost to root-knot and reniform nematodes. The root-knot nematode is found statewide, and also attacks soybean, corn, and many vegetable crops. The reniform nematode is more concentrated in the southeastern quarter of the state. There are currently no highly resistant cultivars and in 2010 the most commonly-used chemical nematicide, aldicarb, was voluntarily withdrawn. Failure to manage either nematode can result in yield loss of 15-20%.

What has been done
We completed studies to define and quantify root-knot nematode-induced changes in cotton root architecture and resulting effects on plant growth and development. In other studies, we evaluated the relationship between reniform nematodes and nitrogen rates in commercial fields as well as assessed new resistant cultivars. All studies were to define additional BMPs for

nematodes of cotton in the state, in the absence of aldicarb.

Results
Nematodes significantly affected root development and these changes directly reduced crop yield. The effect on roots and yield were amplified by soil hardpans. Low nitrogen and high nematode population densities magnified yield loss further. These interactions have spawned additional research. Three breeding lines being developed by private industry for root-knot nematode resistance appeared promising. While aldicarb was a major benefit to the cotton industry for many years, this research demonstrates that nematode management using BMPs is likely without a major nematicide.

4. Associated Knowledge Areas

KA Code	Knowledge Area
212	Pathogens and Nematodes Affecting Plants

Outcome #16

1. Outcome Measures

# of Asian Soybean Rust positive samples.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	27

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Asian soybean rust entered the U.S. and Arkansas during 2004, thought to have been moved from Colombian soybean fields by Hurricane Ivan. The pathogen established on kudzu and soybean during that fall across the South, and subsequently survived on these hosts along the Gulf Coast in "frost-free" areas. Because U.S. soybean cultivars had no known resistance to this disease, there was widespread concern.

What has been done
Since 2004, Division of Agriculture plant pathologists and trained Ag personnel in the soybean production areas of the state have monitored for Asian soybean rust. Monitoring plots and sites

were maintained for several years, but discontinued in 2012. Findings were reported over time to the IPM PIPE website, originally established by USDA and land grant university personnel across the country.

Results
In the past five years, detection of Asian soybean rust in the state has been minimal, with only 27 positive findings in 2013. Over time, monitoring revealed that this pathogen was not as aggressive under U.S. climate conditions as once feared. Winter freezes destroyed it except in the far south and prevailing conditions in the spring and summer did not favor rapid northward movement or development. With the exception of two growing seasons where overwintering was higher than normal, and soybeans were planted late, Asian soybean rust has not caused measurable damage to the crop in Arkansas. We have concluded that this disease will remain highly erratic due to U.S. climate, and monitoring efforts will only need to be minor and routine for early detection and response.

4. Associated Knowledge Areas

KA Code	Knowledge Area
212	Pathogens and Nematodes Affecting Plants

Outcome #17

1. Outcome Measures

# of samples submitted for exotic animal diseases testing.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	121

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Animal agriculture in Arkansas contributed over $2.8 billion with poultry $2.25 billion of that total. Outbreaks of certain highly contagious diseases could be devastating to the Arkansas economy. Given the increase in local food interest, hobby animal farming, and global travel there is increased concern about biosecurity.

What has been done

Biosecurity knowledge, practice and monitoring. Personnel educate animal Ag producers at all levels, monitor animal health statewide, perform site visit diagnoses, and operate a diagnostic laboratory for suspected samples. Personnel also serve on the Arkansas Animal Emergency Disease Response team (AADER), Poultry Health Advisory committee (PHAC), and the Division Biosecurity committee. Current education initiatives focus on Mycoplasmosis , Laryngotracheitis, Exotic Newcastle and Avian Influenza. We visited 32 farms for on-site diagnoses, provided 250 diagnostic advisories by phone and email, and diagnosed 121 suspected samples in the laboratory. We also distributed 1000 copies of the Biosecurity DVD for Poultry at the 2013 Flower and Garden Show, University of Arkansas short courses, and 68 local animal health meetings and 41 other events.

Results

Overall, the scope of the animal health education program has resulted in less concern by industry about small animal operations and increased confidence in our biosecurity knowledge and practice in the state. This was tested when avian influenza H7N7 was detected in western Arkansas during 2013. The response was organized, immediate and comprehensive. The result was more cooperation, shorter embargoes, and less economic damage to the poultry industry than similar outbreaks have caused in the past. In the future, we hope to establish an even broader network of small animal growers, provide more systematic health monitoring, and an app for biosecurity for grower smartphones or tablets.

4. Associated Knowledge Areas

KA Code	Knowledge Area
311	Animal Diseases
722	Zoonotic Diseases and Parasites Affecting Humans

Outcome #18

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	3384

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Gardening is the number one pastime in the state, enjoyed by all ages. The UA System Division of Agriculture Master Gardener program continues to be a strong and vital program. A strong, viable program is about more than just horticulture education it is also about attracting, retaining, and certifying participants. This assures stability and impact.

What has been done

To enhance quality of education, we have advanced MG and leadership training. The state MG advisory board (County 76) assists the Division in this effort. They also help raise funds at the state MG convention for leadership. We held four advanced level MG training's in 2013 with advanced education topics including conflict management, advanced project selection, and social media in gardening. In addition, a new on-line web reporting system was implemented. MG day was hosted at Garvan Gardens near Hot Springs, the 25th MG birthday event was held in the state, and Division staff and MGs provided the technical program for the 2013 Intl Master Gardener Conference.

Results

There were 150 participants from 45 counties in for Leadership training, and surveys showed excellent ratings for the program. This effort has led to several new changes in county MG programs, projects and new MG recruits. Membership on the state advisory board has increased and become more stable. We tracked 183,990 volunteer service hours with the new online reporting system, 2nd highest volunteer hours in Arkansas among state agencies and NPOs. The MG garden blog had 577 daily followers and 44,000 views in 2013. There were 600 attendees at the state MG conference in Benton County, 400 at MG Day at Garvan Gardens, and 1000 at the MG birthday event in 2013. The technical conference at the Intl MG Conference in Washington was attended by over 1000 MGs from around the world. Overall, gardening and Master Gardeners continues to grow in Arkansas, with 65 county MG programs and 3600 volunteers, one of the largest programs in the US.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems
216	Integrated Pest Management Systems

Outcome #19

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	1878

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Pest management is a very broad area encompassing agriculture, urban situations, public health concerns, and trade. The Environmental Protection Agency (EPA) regulates the proper and safe use of pesticides. They also require that most individuals and businesses that apply pesticides receive proper and recurrent training. The pesticide safety education program (PSEP) in Arkansas is the primary way that pesticide applicators are instructed on the proper and safe use of pesticides.

What has been done
The PESP program is conducted annually, providing up-to-date education thru in-person training conferences, video training, printed and web materials, and study manuals. Division personnel also provide the technical content of the tests and testing kits. The program is the educational basis for the Arkansas State Plant Board pesticide certification system. Applicators in Arkansas muse be certified by completing the educational program and passing an exam, then recertified every 3-5 years as licenses expire.

Results
In 2013, there were 21 training conferences with 1,878 commercial and non-commercial applicators, and 4800 private applicators educated. Most attendees indicated satisfaction with the program, and appreciated the attempts to keep it interesting and diverse. This is an essential program for pesticide safety and proper use in the state, and more emphasis on these efforts at the national level are badly needed.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
205	Plant Management Systems
216	Integrated Pest Management Systems
601	Economics of Agricultural Production and Farm Management

Outcome #20

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	391

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
A regional effort to develop irrigation resources and train experts was led by the UA System Division of Agriculture in cooperation with New Mexico State University, Texas A and M University, Louisiana State University, University of Missouri, and Mississippi State University. This effort was in response to widespread concern about diminishing water resources, and the corresponding regional need for improved water conservation and irrigation efficiency. Irrigation pumps and well design have become a growing concern as energy costs rise.

What has been done
Factsheets were developed on a wide variety of topics, such as using variable frequency drives, air lines, soft starters, pump curves, dual fuel, pump efficiency, flow measurement, safety, natural gas, water horsepower, reading electrical meters, safety, general irrigation conservation suggestions, and the basics of pumping plant evaluations. Many of these are the only such factsheets on their topic publically available from land grant institutions. Additionally, they were developed specifically for application in the southern region. These factsheets were used to train participants at two regional hands-on workshops on performing pumping plant evaluations. A separate effort focused on training well drillers in the region about well development, screen and gravel pack design and development and how this related to pumping plant performance. The Irrigating Smart: Irrigation Pumping Plant Efficiency Testing developed a series of 12 factsheets and conducted two regional trainings on pump testing in New Mexico and Arkansas in 2013 and a specialized workshop for well drillers offered in Missouri.

Results
Irrigation pumping plant testing to conserve energy and reduce irrigation costs for growers. Workshop participants were NRCS engineers and staff, electricians, irrigation companies and dealers, utility staff, state agency personnel, conservation professionals, Extension agents, and

some farmers. Paper evaluations were used to measure the degree of learning and action participants would take. Ninety-four of the participants indicated that they would use the information gained to assist their clients. These clients represented about 2,739 irrigation pumps currently in service and the monetary value of the potential savings from the information learned was about $717,000. All participants indicated they would recommend pump testing to their clients and about 2/3 indicated they would be purchasing equipment to do pump testing on their own. The cost to get set up for pump testing is between $5,000 and $25,000.

Some comments about the workshops included:
"There is nothing like hearing from experts and seeing firsthand how critical proper pump sizing, pressure losses, etc. are to conserving energy and water resources."
"This training should be provided to every producer in the state."

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
112	Watershed Protection and Management
205	Plant Management Systems
216	Integrated Pest Management Systems
601	Economics of Agricultural Production and Farm Management

Outcome #21

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	94

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

During the past decade, water quality concerns from agriculture have prompted voluntary, regulatory and judiciary actions in Arkansas. Livestock agriculture faces scrutiny amid concerns of nutrient losses to water-bodies from land application of manures. Row crop agriculture in Arkansas is under increasing pressure to reduce nutrient and sediment inputs that some think contribute to hypoxia in the Gulf of Mexico. These developments are confusing to stakeholders.

What has been done

In response, the UA System Division of Agriculture developed educational programs like Arkansas Discovery Farm program (9 farms), nutrient management training, soil and water conservation, watershed stewardship and urban storm-water management. Education and information is delivered via public meetings, our water quality website, fact sheets and other materials. The Division also developed the Arkansas Watershed Steward program to equip concerned citizens with watershed management skills that promote voluntary and locally led watershed protection efforts from nonpoint source pollution. The Arkansas Watershed Steward Handbook, a 159 page color publication was written and posted to http://www.arnatural.org/.

Results

The nine Arkansas Discovery Farms collected third year edge-of-field water sampling data. Early data shows surprisingly limited water quality impacts from fields but these are long-term monitoring efforts over 7 years. A wide range of stakeholders have shown interest in this program, helping Arkansas become the leader in the 13 state MRBI program of NRCS in terms of projects and funding. This program helped farmers receive over $5 million in federal conservation awards. During the first three years, we have conducted 15 Discovery Farm tours and made oral presentations to over 3000 people, including NRCS Chief Jason Weller.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
112	Watershed Protection and Management
205	Plant Management Systems
216	Integrated Pest Management Systems
601	Economics of Agricultural Production and Farm Management

V(H). Planned Program (External Factors)

External factors which affected 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.)

Brief Explanation

The Division continues to do more with less, given the economy, appropriations, competing public priorities and government regulations. Decreasing capacity over time has led to longer times to complete goals, however private grants from growers thru checkoff have helped in row crop agriculture. Climate was a major challenge from 2010-2012, with a major drought over much of the state. In 2013, the after-effects of the drought were encountered as livestock producers attempted to rebuild herds and pastures, creating the need for a drought recovery program and extra staff time. Increasing government regulations, or the threat of same, has led to increasing effort and time in water quality as well as rice grain quality.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

In 2013, the Division helped restart the pecan industry. Surveys showed 64% of orchards were small with about 1/3 planting new trees. Most were not following recommendations and certain pests were overestimated. Survey respondents indicated renewed interest in pecan management.

GMO foods are controversial and Division economists developed a new survey on consumer attitude toward Non-GMO soybeans and other grains. Surveyed farmers expressed concern about creating false impressions of Non-GMO benefits but were interested in premiums.

In 2013, entomologists conducted workshops and monitoring of the spotted wing drosophila, a new fruit pest in the state. The pest was confirmed from 16 counties but early detection and rapid response prevented damage. Surveyed growers (29%) thought the pest was a huge potential threat and 16 growers reported late losses. All respondents indicated satisfaction with program efforts.

Arkansas is the 4th largest irrigation state but ground water is declining. Irrigation efficiency is paramount and of 150 participants in a regional pumping plant efficiency workshop surveyed, 94 indicated they would use the new knowledge on 2,729 irrigation pumps for an estimated savings of $700,000. All respondents indicated satisfaction with comments like "This training should be provided to every producer in the state".

Arkansas experienced a record-setting drought during 2012, crippling the livestock industry and costing $128 million. A major drought recovery program in 2013 resulted in increased website hits to almost 2 million, over 20,000 e-newsletter openings, and 13,099 blog views. Demonstrations on winter annuals saved over $30,000 on one farm and a major seed supplier saw a 542% increase in forage brassica seed sales. A fall plantain control demonstration saved about $300 in forage costs. Of 42 participants in a drought recovery workshop, 85% planned to implement weed control in pasture renovation.

During 2013, the Master Gardener program focused on training 150 new leaders who implemented social media in local programs and increased membership on the statewide advisory board. Overall, the program documented 183,990 volunteer service hours statewide, the blog increased to 577 regular followers and had 44,000 views.

Row Crops are huge in Arkansas and herbicide-resistant weeds are a major threat. A new program, Zero Tolerance, was implemented 2011- 2013 to reduce resistant palmer

amaranth. Hand weeding of esca8pes declined from 100 hours per field to less than 5 hours in year 2, with no detections of escapes in year 3. Savings to growers was more than $100 per acre.

Arkansas ranks 10th in U.S. soybean production, but consistently high yields are difficult. In 2013, county extension focused on high yields, increasing participation in annual yield contests to over 130 fields. Three enrolled grower fields broke the 100 bushel yield barrier for the first time, and several fields exceeded 90 bushels.

During 2013, the Arkansas Row Crops Blog site was visited over 108,000 times with 209,000 page views. The e-newsletter had 1140 active subscribers, with 35% opened the same day and 29% hosted clicks.

Key Items of Evaluation

Modernizing the dormant pecan industry in Arkansas is underway.
Understanding consumer attitudes toward Non-GMO foods.
The battle begins against a new pest of small fruit in Arkansas.
Irrigation in Arkansas in the face of declining ground water.
Recovering from a record drought in Arkansas' livestock production region.
Creating Master Gardeners and Community Leaders in Arkansas.
Zero tolerance of herbicide-resistant weeds in Arkansas.
Yes, 100 bushel per acre soybean yields are possible.
New technology makes Extension information more competitive in "big" agriculture.

V(A). Planned Program (Summary)

Program # 8

1. Name of the Planned Program

Access to Safe and Nutritious Food

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
403	Waste Disposal, Recycling, and Reuse	5%		0%	
501	New and Improved Food Processing Technologies	10%		20%	
502	New and Improved Food Products	10%		20%	
503	Quality Maintenance in Storing and Marketing Food Products	5%		10%	
504	Home and Commercial Food Service	5%		0%	
701	Nutrient Composition of Food	5%		10%	
702	Requirements and Function of Nutrients and Other Food Components	10%		10%	
703	Nutrition Education and Behavior	10%		0%	
704	Nutrition and Hunger in the Population	10%		0%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	10%		30%	
724	Healthy Lifestyle	10%		0%	
806	Youth Development	10%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Actual Paid Professional	96.5	0.0	55.6	0.0
Actual Volunteer	38.4	0.0	1.5	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
1511404	0	206849	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1191112	0	6143204	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
9715790	0	1213655	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The University of Arkansas Division of Agriculture Extension & Research offers a comprehensive approach to address food safety from industry to individual consumers. Taught in many Arkansas counties the ServSafe® Food Safety Program for Managers course provides the necessary tools for industry managers to effectively teach food service employees best practices in food safety. SNAP-Ed and EFNEP and 4-H Positive Youth Development programs teach basic principles of food safety to consumers both adults and youth. Extensive research in being conducted on food safety issues ranging from poultry to produce food safety.

To address food security the University of Arkansas Division of Agriculture Extension & Research's Supplemental Nutrition Assistance Program - Education (SNAP-Ed) and Expanded Food and Nutrition Education Program (EFNEP) are delivered in all Arkansas counties. These programs have goals of helping individuals make healthy food choices on a limited budget, choose physically active lifestyles consistent with the Dietary Guidelines for Americans and food resource management. The University of Arkansas Division of Agriculture addresses childhood obesity through both of these programs and 4H and youth development programs.

In 2011, 59.9% of women (age 18 and over) in the state of Arkansas were classified as either overweight or obese. In 2013, Arkansas was the only state in the US to show an increase in obesity rates, which now makes Arkansas the third most obese state in the United States.

The Extension Food and Nutrition programs focus on: adoption and maintenance of healthy lifestyles for chronic disease prevention including regular physical activity and healthy eating. The food and nutrition program identifies and promotes evidence-based policies and practices that will reduce the incidence of chronic disease. In addition, professors at the University of Arkansas are conducting research in the areas of obesity and diabetes prevention in order to help reduce the incidence of these disease within the state and nationally.

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. These processing companies are working synergistically with the University of Arkansas Food Science Department in areas of research and extension.

In 2013, the Food Science pilot plant became of commercial food processing plant that can be used

by entrepreneurs to launch new food products. The pilot plant changed its name to the Arkansas Food Innovation. In the first year, over 15 entrepreneurs, school systems and non-profit organizations used the facility.

2. Brief description of the target audience

4H Youth
SNAP-Ed Youth and Adults
EFNEP Youth
Teachers
Child Care providers

The target audience for SNAP-Ed is individuals who receive SNAP benefits and individuals who are eligible for SNAP benefits. The target audience for EFNEP is adults, youth and children who earn less than 185% of the 2013 federal poverty guidelines. The EFNEP eligible individuals are additionally healthy or at risk for or are managing any number of chronic disease conditions. Specifically the audience includes adults who have primary responsibility for obtaining and preparing food for their children, low-income pregnant women and teens, and low-income adolescent youth, pre-adolescent youth, and children aged 5-18 years.

Youth
School personnel
Parents
Adults
Grandparents
Child Care Providers
County, Federal and State Agency Employees
University Researchers
Industry Researchers
Food manufacturers
Farmers Markets
Entrepreneurs and restaurants
School districts
Non-profit Food Organizations

3. How was eXtension used?

eXtension was not used in this program.

V(E). Planned Program (Outputs)

1. Standard output measures

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	159485	40194	300241	40049

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year:	2013
Actual:	2

Patents listed

A. Proctor and U. Shah. 2013 Conjugated linoleic acid rich vegetable oil production from linoleic acid rich oils by heterogeneous catalysis. Utility patent application 13/692,619.

Hettiarachchy NS. 2013. Bioactive Pentapeptides from Rice Bran and Use Thereof. Patent# US 8,575,310B2, Published:11.05.2013.

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	0	41	41

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of food and nutrition clientele contacts from education classes, workshops, group discussions, one-on-one interventions, demonstrations, and other educational methods.

Year	Actual
2013	29882

Output #2

Output Measure

- # of food and nutrition education classes, workshops, group discussions, one-one interventions, demonstrations, and other educational events.

Year	Actual
2013	16943

Output #3

Output Measure

- Number of food and Nutrition and Health and Aging programs delivered.

Year	Actual
2013	37887

Output #4

Output Measure

- Number of participants in Food and Nutrition and Health & Aging programs.

Year	Actual
2013	201379

Output #5

Output Measure

- Number of participants in educational programs leading to certification for food handlers (ServSafe and Better Process Control School.)

Year	Actual
2013	699

Output #6

Output Measure

- Number of ServSafe classes offered.

Year	Actual
2013	30

Output #7

Output Measure

- Number of Food Safety education classes, workshops, group discussions, one-on-one interventions, demonstrations, and other educational events.

Year	Actual
2013	6757

Output #8

Output Measure

- Number of federal grants written and received in food safety.

Year	Actual
2013	2

Output #9

Output Measure

- Number of all other grants written and funded related to Food Safety.

Year	Actual

2013	8

Output #10

Output Measure

- Number of Online Master of Agriculture (Food Safety Emphasis) students enrolled in courses.

Year	Actual
2013	24

Output #11

Output Measure

- Number of participants in quarterly HACCP round tables.

Year	Actual
2013	32

Output #12

Output Measure

- Number of projects focuses on increased understanding of the ecology of fecal indicators and pathogens.

Year	Actual
2013	2

Output #13

Output Measure

- Number of projects focused on increased understanding of pre-harvest and post-harvest processes impacts on microbial and chemical threats.

Year	Actual
2013	5

Output #14

Output Measure

- # grants/contracts funded in support of childhood obesity issues.

Year	Actual
2013	8

Output #15

Output Measure

- # of 4-H/Youth Food, Nutrition and Physical activity programs delivered related to eating healthy

and being active.

Year	Actual
2013	20944

Output #16

Output Measure

- # of youth contacts in 4-H/Youth Food, Nutrition, and Physical Activity programs related to eating healthy and being active.

Year	Actual
2013	163442

Output #17

Output Measure

- # of funded Federal grants and/or contracts.

Year	Actual
2013	4

Output #18

Output Measure

- # of active research projects on the development or adoption of healthy eating guidelines and childhood obesity.

Year	Actual
2013	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of participants receiving certification in ServSafe.
2	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.
3	Number of growers and producers receiving GAP certification or equivalent.
4	Number of youth demonstrating improved knowledge of food safety or hand washing.
5	Number of Online Master of Agriculture (Food Safety Emphasis) graduates employed in the food industry.
6	# of participants who indicated that they increased their knowledge related to food, nutrition and/or food resource management following completion of a nutrition education program.
7	# of participants who adopted at least one positive nutrition practice.
8	Number of participants reporting a reduction of at least one risk factor for chronic disease after completing a nutrition and/or health education program.
9	Number of participants who adopted at least one positive nutrition and/or health practice.
10	Number of participants reporting an increase in physical activity after completing a nutrition and/or health education program.
11	Number of participants receiving certification in Better Process Control.
12	Number of viable technologies developed or modified for the detection and characterization of food-borne pathogens.
13	Number of viable prevention, control and intervention strategies for food-borne threats along the food production continuum.
14	# of participants who adopted at least one food resource management practice.
15	# of participants who reported saving money on groceries following completion of a nutrition education program.
16	# of participants who reported they less often run out of food before the end of the month following completion of a nutrition education program.
17	# of children and youth who increased consumption of foods recommended by the U.S. Dietary Guidelines for Americans.

18	# of families/caregivers who increased consumption of foods recommended by the U.S. Dietary Guidelines for Americans.
19	# of Children/Youth who intend to adopt healthy eating patterns.
20	# of families/caregivers who intend to adopt healthy eating patterns.
21	# of Children/Youth who gained knowledge about healthy eating patterns (foods to increase and/or decrease.)
22	# of families/caregivers who gained knowledge about healthy eating patterns (foods to increase and/or decrease.)
23	# of Children/Youth who increased their physical activity and/or reduced sedentary time.
24	# of families/caregivers that reported spending time together in physical activity.
25	# of Children/Youth who increased physical activity to 60 minutes or more daily.
26	# of Children/Youth who understand the importance of balancing food intake and physical activity.
27	# of new delivery systems/access points offering healthy foods (farmers markets, produce at corner stores, and school food programs.)
28	# of families with children that report an intention to access/produce/preserve healthy foods.
29	# of children who increased consumption of fruits and vegetables.
30	# of children who decreased consumption of sugar sweetened beverages.
31	Number of new food businesses launched as a result of assistance provided by Arkansas Food Innovation
32	Improved stability of chokeberry juice anthocyanins by beta cyclodextrin addition and refrigeration can improve health benefits
33	The treatment of highly virulent MRSA with bacteriophage and essential oils can be an alternative to antibiotics.
34	Peptides derived from Arkansas-grown rice and soybean co-products show potential anti-cancer and other chronic disease bioactivities
35	Grain sorghum has anti-diabetic effects
36	Measuring the energy required to dry rice in on-farm driers will lead to farmer's bottom line
37	Unraveling milled rice appearance and quality traits of importance to key export markets will lead to improved US rice marketability

38	Food Retail Environment affects Childhood Obesity
39	High protein breakfast increases energy metabolism, decreases food intake and glycemic response in children.

Outcome #1

1. Outcome Measures

Number of participants receiving certification in ServSafe.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	506

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Consumer food safety is a concern. The Centers for Disease Control and Prevention estimates that each year approximately 48 million people gets sick, 128,000 are hospitalized and 3,000 die of foodborne diseases. The 2011 estimates provide the most accurate picture yet of which foodborne microbes are causing the most illnesses in the United States. They include Salmonella, norovirus, Clostridium perfingens, and Campylobacter. A significant portion of foodborne illness arises from food consumed at food service establishments. Moreover, Arkansas has over double the desired CDC target rate for salmonellosis per 100,000 individuals and foodborne botulism still persists in the United States.

What has been done
In a partnership with the Arkansas Hospitality Association, ServSafe® Manager two-day workshops focus on essential food safety practices to create a culture of food safety among restaurant managers and staff. ServSafe® has been the industry national standard for over 20 years, training managers and employees how to receive, store, prepare, and serve food safely. At the end of the ServSafe® Manager workshops participants take a proctored comprehensive exam. If a minimum competency score is met a certification is awarded which must be renewed every five years.

Results
As a result of food safety education, with an 87% pass rate (506 certifications of 583 participants) ServSafe® students gained knowledge that may produce fewer foodborne illness outbreaks

related to unsafe food service practices. A ServSafe Manager participant in Newton County, Arkansas relayed "knowing the correct way to handle food makes my job easier and safer." Improvements in restaurant and food service food safety have the potential to save Arkansas money and time by way of reducing cases of foodborne illnesses.

4. Associated Knowledge Areas

KA Code	Knowledge Area
504	Home and Commercial Food Service
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #2

1. Outcome Measures

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. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	76

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #3

1. Outcome Measures

Number of growers and producers receiving GAP certification or equivalent.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	35

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Over the past few decades, there has been an increase in the concern of foodborne illness resulting from the consumption of fresh produce. On average 37% of foodborne illnesses result from the consumption of produce such as melons, tomatoes, greens, and berries that do not receive a heat treatment prior to consumption. In January 2013, the FDA published proposed regulations on Good Agriculture Practices as part of the Food Safety Modernization Act that require certain field operations that would prevent the fecal contamination of fresh produce. The comment period was originally scheduled to end May 15 but has been delayed several times (Sept 15 and Nov 15).

What has been done
The Institute of Food Science & Engineering at the University of Arkansas has been in the process of developing training programs for smaller growers who want to voluntarily improve the food safety for farmers markets produce as well as larger ones who must comply with the provisions of the Food Safety Modernization Act. Additional current work involves a GAP website as well as working with the Produce Safety Alliance (PSA) for training of county agents.

Results
The proposed regulations of the GAP portion of the Food Safety Modernization Act has been temporarily delayed and will be introduced early next summer After the comment period, the regulations will be written. The PSA is going forward with the training modules and will be training in Arkansas probably in early spring 2015. The voluntary inspection program is currently being used by several school districts and workshops are being given across Arkansas.

4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #4

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	4198

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Consumer food safety is a concern especially among at risk populations. At risk populations include immunocompromised, preschool aged children and older adults. The Centers for Disease Control and Prevention estimates that each year approximately 48 million people gets sick, 128,000 are hospitalized and 3,000 die of foodborne diseases. A significant portion of foodborne illness arises from food consumed at home. One of the best ways to prevent foodborne illness is by the simple act of hand-washing yet a large body of literature suggests that a minority of the population washes their hands after using the restroom as an example.

What has been done
Food safety education has been coupled to or is the focus of all youth nutrition/health education programs sponsored by the University of Arkansas Division Of Agriculture Research & Extension. Youth nutrition education programming includes SNAP-Ed, EFNEP and 4-H Positive Development priority programs focused on healthy living and food security. Curricula includes key elements of consumer food safety including clean, separate, cook, and chill with a special focus on the importance of hand-washing and personal hygiene.

Results
50% (435 of 875) of reporting children and youth participating in EFNEP use safe food handling practices more often or gain knowledge.
2,751 of youth participating in SNAP-Ed who reported or demonstrated they more often practice desirable personal hygiene such as hand-washing.
1,012 of youth participating in 4-H who reported or demonstrated they more often practice desirable personal hygiene such as hand-washing

4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #5

1. Outcome Measures

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

Not Reporting on this Outcome Measure

Outcome #6

1. Outcome Measures

# of participants who indicated that they increased their knowledge related to food, nutrition and/or food resource management following completion of a nutrition education program.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	4858

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The Arkansas Department of Health data shows that 66% of Baxter County adults are overweight or obese. 82.8% of Baxter County residents do not eat the recommended amount of fruits and vegetables and 33.2% have not exercised in the past 30 days. The Baxter County Extension Council identified nutrition and health as primary focus areas for the 2013 program year.

What has been done
The Baxter County Extension office has worked to provide educational programs focusing on improving nutrition and health. Six groups meet twice weekly in Strong Women strength-training and exercise classes. Six multi-session nutrition/cooking skills workshops and two fruit and vegetable preservation workshops were conducted. These workshops reached 116 different individuals. Six single-session nutrition seminars were provided. Monthly health and nutrition

displays with corresponding newsletters were set up in two locations in the county. In addition, two nutrition interviews were done with local radio stations.

Results
There are 84 individuals who participate in the Baxter County Strong Women program. Of those completing evaluations, 100% report that their physical health has improved and 86% have become more physically active. Nutrition/cooking workshop participants reported that they have learned helpful skills such as portion control and making healthy meals for their families. Of those surveyed, 97% plan to eat more fruits and vegetables and 88% plan to start eating the recommended amount of whole grains.

"The most helpful skills I've learned are healthy ways to eat and fast, easy, good meals for my family."
- Nutrition workshop participant, Baxter Co.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population

Outcome #7

1. Outcome Measures

# of participants who adopted at least one positive nutrition practice.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	3074

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Teaching healthy lifestyles to prevent type 2 diabetes can save the health care system $172,000-305,000 per person diagnosed. Research shows obesity a risk factor for diabetes. An obesity rate of 37.8% (above the state average of 30.9%), contributes to 12.3% of Miller County adults having diabetes, 5th highest ranking in the state, according to the CDC.

What has been done
The University of Arkansas Cooperative Extension Service in Miller County focused on chronic disease prevention in FY13. Multi-sessions lessons focusing on health and wellness were offered to Miller County residents. Educational programs included, cooking demonstrations, educational sessions, educational exhibits, & weekly foods articles.
Participants learned how to prepare foods with reduced fat, sodium and sugar, while also increasing fiber, learned how to modify recipes for diabetes, count carbohydrates, plan healthy diabetic meals, and reduce the overall risk of chronic disease.

Results
Participants surveyed indicated that:
- 89 % initiated increasing fiber in their diet by eating more fruits and vegetables.
- 69 % modified recipes to lower the amount of salt in recipes.
- 83 % modified recipes to lower the amount of fat in recipes.
- 79 % carried out preparing healthy meals for themselves or someone with a chronic disease.

"This class has helped both me and my wife. I am on a very limited sodium diet, and my wife is diabetic so the information that has been offered is benefiting both of us and the recipes that we are trying are benefiting both of us."
"Anyone with diabetes or who wants to eat better should take these diabetic classes." Living Well with Diabetes participant, Miller Co.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population

Outcome #8

1. Outcome Measures

Number of participants reporting a reduction of at least one risk factor for chronic disease after completing a nutrition and/or health education program.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual

2013 105

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Obesity is a major health problem in Ashley County with 36% of adults being obese. Thirty-three percent of youth in the Crossett and Hamburg school districts are either at risk for overweight or overweight, which may lead to diabetes, high blood pressure, heart disease and many other problems. The goal is to decrease incidence of overweight and obesity.

What has been done
Multiple educational approaches were used to respond to issues related to chronic illness and obesity. Multi-session lessons focusing on health and wellness were offered to Ashley County youth and adult residents. Educational programs included "ReNew You" Weight Loss Boot Camps, Walk Across Arkansas- Fall and Spring programs, Strong Women & Men, Nutrition Education Seminars, Healthy Cooking Classes and Supplemental Nutrition Assistance Programs. Through these efforts 315 educational sessions were conducted that reached 2,183 individuals.

Results
Participants in the "ReNew You" Weight Loss Boot Camps lost 189.5 pounds, walked 2,516 miles: 75% decreased blood pressure, blood glucose levels and 25% decreased cholesterol. The 516 participants in Walk Across Arkansas recorded exercising 973,441 minutes which potentially saved $97,343 in health care costs; the 47 participants lost 277 pounds. Results from the Strong Women & Men program indicate a cost savings of $140,123.00 from fall reductions, Medicare savings, & hospitalization from hip fracture prevention. The 872 participants in the nutrition education programs reported an increase in knowledge and skills with 85% indicating an intent to make a positive dietary change.

"I thought I knew how to eat right but have learned to really count my calories, fat grams, sugar grams, and milligrams
of sodium. In doing so, I have lowered my blood pressure, blood glucose, weight, and Body Mass Index. I have also gone down a size in clothing, have more energy, and have encouraged my husband to eat better and make better choices in his food." -- "ReNew You" Weight Loss Boot Camp participant, Ashley Co.

4. Associated Knowledge Areas

KA Code	Knowledge Area
701	Nutrient Composition of Food
724	Healthy Lifestyle
806	Youth Development

Outcome #9

1. Outcome Measures

Number of participants who adopted at least one positive nutrition and/or health practice.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	4400

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
According to the National Center for Health Statistics, 37% of Lafayette County's population is obese and 34% lack physical activity. Obesity and inactivity are risk factors for diabetes, heart disease, and hypertension. Lafayette County is also classified as a "Food Desert" with a lack of access to fresh fruits and vegetables.

What has been done
A wide variety of programming was used to help promote health and wellness in the community. Programs such as Small Steps to Health and Wealth, series of nutrition programs, Supplemental Nutrition Education Program, Cooking Schools, and exercise programs. Contacts were reached through exhibits, newsletters, programs.

Results
Nutrition and Cooking School participants:
- 78% increased the amounts of fruits they eat
- 80% prepare more meals from scratch instead of eating out
- 80% are staying within recommended portion sizes
- 75% have increased amount of vegetables

"The family has made changes in the way they prepare foods. It has made such a difference. My daughter had serious
health issues developing and she has lost 10 lbs and her blood pressure is going down. This program has been such a blessing to our family." -Mediterranean Cooking School participant, Lafayette Co.

4. Associated Knowledge Areas

KA Code	Knowledge Area
701	Nutrient Composition of Food
724	Healthy Lifestyle
806	Youth Development

Outcome #10

1. Outcome Measures

Number of participants reporting an increase in physical activity after completing a nutrition and/or health education program.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	1326

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Phillips County is the poorest county in the State of Arkansas, ranking 75th out of 75 counties in overall health, according to the 2010 ADH Report. Phillips County has high incidences of health related diseases, including high cholesterol, hypertension, and diabetes.

What has been done
Phillips County delivered the "Eating Smart, Being Active" curriculum through EFNEP. We offered a series of 8 Nutrition Education lessons to 100 adults over an average of 8 months.

Results
Of the 100 adults enrolled, more than 90% reported favorable behavior changes, including the adoption of healthier eating habits and increasing physical activity, as well as saving money. At subsequent EFNEP events, former participants frequently shared their gratitude for the program. Some participants indicated that the change of behaviors had affected their children and others in the household as well.

"As a result of the EFNEP program 'Eating Smart, Being Active', I lost 32 pounds in the past 3 months! I am proud to say I have cut down on the number of sweets and fried food I eat and exercise daily. I was overweight & wanted a better quality of life for myself. I wanted to be healthier and be there for my children." EFNEP participant, Phillips Co.

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
806	Youth Development

Outcome #11

1. Outcome Measures

Number of participants receiving certification in Better Process Control.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	119

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The food industry of Arkansas needs continuous training to remain globally competitive. Workshops and training sessions offered and conducted will allow them to remain prosperous and competitive.

What has been done
The Institute of Food Science & Engineering at the University of Arkansas has been offering the Better Process Control School (BPCS) since 1973 which is one of the oldest in the nation and required for FDA controlled canning industries. Twenty-eight BPCS are offered each year, and historically Arkansas is the only contiguous state except for Texas offering the program.In addition, over the past several years, the Better Process Control School program has been taken into several different food processing plants and taught customized to the needs of the company requesting training or taught in other times and locations other than the traditional November date in Fayetteville, AR. This past year, Better Process Control School has been taught by UA representatives at the University of Missouri in Columbia, MO, Oklahoma State University in Stillwater OK, in Fort Smith AR in August for PepperSource and Gerber and the traditional program in November in Fayetteville.

Results
Since starting the Better Process Control School at the University of Arkansas in 1973, over 3,000 people have been certified mostly from major canning companies in the region. This allows for

these Arkansas-based companies to train a large number of their employees at a reduced cost since travel costs are reduced. For the University of Arkansas, the Better Process Control School has served as a springboard to other food-related workshops for industry to include food safety, food defense, food labeling, microbiology, sensory evaluation and other courses under development.

4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #12

1. Outcome Measures

Number of viable technologies developed or modified for the detection and characterization of food-borne pathogens.

Not Reporting on this Outcome Measure

Outcome #13

1. Outcome Measures

Number of viable prevention, control and intervention strategies for food-borne threats along the food production continuum.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Cross-contamination of food contact surfaces with microbial pathogens is considered one of the most important vehicles for transmission of foodborne diseases. Research has also shown that many foodborne illnesses result from employee food handler error, which may be minimized when employees are properly motivated, trained and transfer their training to their jobs.

What has been done
Commercially available blended cellulose/cotton cloth, microfiber, scouring cloth, nonwoven fabric and traditional terry cloth towels were examined for ability to remove inoculated Listeria monocytogenes from deli food contact surfaces of stainless steel and Formica laminate. Bacteria remaining on the food-contact surfaces and bacteria trapped in each cloth were enumerated.

Results
Among all cloths, blended cellulose/cotton cloths showed the highest removal efficiency on both types of typical food contact surfaces. Bacteria captured by each cloth did not show significant differences. In a confirmation assay, ATP bioluminescence assay results were significantly reduced by all cleaning cloths although the relative luminescence unit value was higher on stainless steel than on Formica. These results indicate that the performance of cleaning cloths vary for the removal of bacteria and food debris depending on the fabric material and microfiber cloths should be considered as a better choice for the food service industry than traditional terry cloth towels.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #14

1. Outcome Measures

# of participants who adopted at least one food resource management practice.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	1396

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population

Outcome #15

1. Outcome Measures

# of participants who reported saving money on groceries following completion of a nutrition education program.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	321

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population

Outcome #16

1. Outcome Measures

of participants who reported they less often run out of food before the end of the month following completion of a nutrition education program.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	1144

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
With a population of 2,949,131 in 2013 Arkansas is ranked 2nd in the nation for household food insecurity at 19.7% and has high childhood food insecurity rates at 28.4%. That means that one-fifth of households and over one-quarter of Arkansas children are not sure where their next meal is coming from. Associated with adverse health outcomes, including behavioral problems in children and obesity and type 2 diabetes in specific sub-populations of adults, food insecurity has the potential to negatively impact a wide range of individuals and activities.

What has been done
The University of Arkansas Division of Agriculture Cooperative Extension Service's Supplemental Nutrition Assistance Program Education (SNAP-Ed) and Expanded Food and Nutrition Education Program (EFNEP) were delivered in every Arkansas county in FY2013. They provided Arkansas' most vulnerable families and youth with hands-on opportunities to address food security challenges. With goals to teach food resource management and address food security issues SNAP-Ed and EFNEP aimed to increase knowledge and influence behaviors such that food security is improved among participants. With a focus on practical food preparation, cooking, tasting, and shopping everyone wins!

Results
- 65% (1181 of 1826) of EFNEP adult graduates more often planned meals in advance.
- 55% (1013 of 1849) of EFNEP adult graduates more often compared prices when shopping.
- 1144 of EFNEP and SNAP-Ed adult participants less often ran out of food before the end of the month.
- 62% (1099 of 1775) of EFNEP adult graduates more often used a list for grocery shopping.
- 321 SNAP-Ed adult participants reported saving money on groceries following completion of a nutrition education program.
- 1316 EFNEP adult graduates reported an average grocery bill cost savings of $10.20

amounting to a total of $13,378 money saved for participants.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population

Outcome #17

1. Outcome Measures

# of children and youth who increased consumption of foods recommended by the U.S. Dietary Guidelines for Americans.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	4675

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
In Arkansas, approximately 23% of the total population receives SNAP benefits. Thirty-eight percent of school-aged children and adolescents, and 67% of adults are overweight or obese. Research shows that a healthy diet can lead to weight loss and lower the risk for heart disease, diabetes and certain cancers.

What has been done
SNAP-Ed programs were conducted at 563 locations throughout Arkansas including schools, Head Starts, senior centers, food banks and pantries, shelters, DHS offices, WIC offices and grocery stores. Lessons focused on: making healthy choices within a limited budget, learning how to read food labels, cook, grocery shop and increase physical activity. Parents in seventeen counties whose children participated in school-based nutrition projects were surveyed to determine if the SNAP-Ed program was reaching parents through children.

Results
As a result of SNAP-Ed in schools in FY13, Arkansas families reported the following:
- 82% reported their child talked to them about healthy foods and snacks.
- 78% reported their child asked for more or different fruits, vegetables, milk, or yogurt.

- 58% made changes in their family's eating and/or were more physically active.
"The program has been great for my child because she wants to try new things I could never get her to eat before. Thanks for the help!" SNAP-Ed parent, Independence Co.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle
806	Youth Development

Outcome #18

1. Outcome Measures

# of families/caregivers who increased consumption of foods recommended by the U.S. Dietary Guidelines for Americans.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	857

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population
724	Healthy Lifestyle

Outcome #19

1. Outcome Measures

# of Children/Youth who intend to adopt healthy eating patterns.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	5543

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle
806	Youth Development

Outcome #20

1. Outcome Measures

# of families/caregivers who intend to adopt healthy eating patterns.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	1186

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population
724	Healthy Lifestyle

Outcome #21

1. Outcome Measures

# of Children/Youth who gained knowledge about healthy eating patterns (foods to increase and/or decrease.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	5746

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
According to the most recent BMI data (2012-2013) for Magazine Public Schools, approximately 33.7% of school aged children are considered overweight and 54% obese. Furthermore, around 70% receive free and reduced price lunches. Providing a healthy, hands-on cooking school is fundamental in helping students develop life-long healthy eating habits.

What has been done
The University of Arkansas Cooperative Extension's SNAP-Ed program in Logan County partnered with JD Leftwich High School in FY13 to teach a healthy cooking school to students in their health class. Lessons focused on preparing healthy meals, cooking techniques, and food safety. Students prepared recipes and were given the opportunity to sample a tasting portion of what they had made.

Results
As a result of the Cook Smart, Eat Smart Cooking School:
- 100% of the students sampled new, healthy foods throughout the cooking school.
- 75% of the students reported an increase in making healthier choices.
- 62% of students reported trying recipes at home after the class.

School personnel observed the students that participated in the cooking school sharing their experiences with other students, often encouraging their peers to try healthy foods.
"I didn't know that I liked most of the 'healthy' foods that we made." Cook Smart Eat Smart participant, Logan Co.

"Students were excited about the cooking school and talk about the program even after it was over. It was a great experience to introduce them to cooking healthy foods." Teacher, Logan Co.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population
724	Healthy Lifestyle

Outcome #22

1. Outcome Measures

of families/caregivers who gained knowledge about healthy eating patterns (foods to increase and/or decrease.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	1433

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
In Benton County, agencies report an increase in the number of SNAP eligible clients they serve with over 22% of those receiving benefits including children age 0-6. The prevalence rate of food insecurity is above average with 17% of adults reporting limited access to healthy foods. The adult obesity rate is 28%.

What has been done
In FY13, Extension partnered with agencies to deliver SNAP-Ed programs focusing on preparing healthy meals to include a variety of fruits, vegetables and whole grains, low-fat or fat-free dairy and lean protein and to be physically active. Twenty-four Cooking and Shopping Matters lessons were conducted at the Office of Human Concern reaching
seventy-one clients. Participants were presented nutrition topics, prepared healthy recipes to practice cooking skills and learned to read food labels and stretch food dollars through store tours. In addition, SNAP eligible individuals were reached with nutrition lessons, exhibits and newsletters.

Results
- 71 individuals were reached through Cooking and Shopping Matters programs. Of those, 55 currently receive SNAP benefits.
- 99% reported adopting healthy eating patterns and over 80% increased fruit and vegetable consumption.
- 49 participants reported adopting one or more food resource management practices and 24 use nutrition labels to make food choices.
"This program has changed my life by helping me cook healthier meals for my family." SNAP-Ed participant, Benton Co.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle
806	Youth Development

Outcome #23

1. Outcome Measures

# of Children/Youth who increased their physical activity and/or reduced sedentary time.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	4889

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
32% of school-age youth in Garland County live in poverty, 38% live in single-parent households, and 12% have limited access to healthy foods. In addition, all seven school districts within Garland County have SNAP-Ed eligible campuses. Health disparities stemming from an inadequate or improper diet are growing at a rapid rate in our youth which is evident by the 36% overweight/obesity rate.

What has been done
More than 100 programs focusing on MyPlate, the five food groups, and increasing physical activity were implemented in SNAP-Ed eligible schools and reached over 2,600 school-age youth. Lessons utilized hands-on activities, visual aids and computer-based applications to demonstrate creative ways to increase fruit and vegetable intake, the difference between refined grains and whole grains, and how to maintain a healthy weight or lose weight through physical activity and by managing calories in versus calories out.

Results
Youth surveyed reported the following:
- 62% reported increasing their consumption of fruit
- 40% reported increasing their consumption of vegetables
- 44% reported increasing their consumption of whole grains
- 89% reported increasing their overall level of physical activity
- 83% reported increasing their daily physical activity to 60 minutes or more

"I exercise more and eat better food. I feel less tired while I am at school." SNAP-Ed participant, Garland Co.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle
806	Youth Development

Outcome #24

1. Outcome Measures

# of families/caregivers that reported spending time together in physical activity.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	329

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle

Outcome #25

1. Outcome Measures

# of Children/Youth who increased physical activity to 60 minutes or more daily.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	2673

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population
724	Healthy Lifestyle
806	Youth Development

Outcome #26

1. Outcome Measures

# of Children/Youth who understand the importance of balancing food intake and physical activity.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	2518

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle
806	Youth Development

Outcome #27

1. Outcome Measures

of new delivery systems/access points offering healthy foods (farmers markets, produce at corner stores, and school food programs.)

Not Reporting on this Outcome Measure

Outcome #28

1. Outcome Measures

of families with children that report an intention to access/produce/preserve healthy foods.

Not Reporting on this Outcome Measure

Outcome #29

1. Outcome Measures

of children who increased consumption of fruits and vegetables.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	4504

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
According to County Health Rankings, 27.4% of the adults and 40% of the children in Crittenden County are living in households at poverty level and thirty-eight percent of the adults are obese compared to 32% in Arkansas. More than 50% of the students in all of the eighteen schools in the county participate in the free or reduced-price lunch program. The most recent SNAP data shows that Crittenden County had 7,822 unduplicated SNAP cases serving 18,937 persons with a total coupon value of $22, 447,917.

What has been done
The University of Arkansas Cooperative Extension's SNAP-Ed program partnered with the Earle, Marion and West Memphis School Districts, to teach nutrition education along with physical activity, using the train-the-trainer approach. Youth participated in multi-sessions on lesson topics such as: Building a healthy plate, increasing fruits and
vegetables, importance of whole grain, low-fat dairy or fat-free, healthy protein choices, and the importance of water and physical activity. Each lesson was accompanied by a parent newsletter. Two hundred seventy-four lessons were conducted, reaching 966 youth.

Results
As a result of the SNAP- Ed program, participants have made the following changes:
- 64% have increased fruit consumption
- 53% have increased vegetable consumption
- 46% changed to low-fat or fat free dairy products.
- 38% increased whole grain
- 54% consume less fat and less sugary foods
- 64% drink more water
- 66% increased their physical activity
- 70% of the participants are more willing to try new foods.

"This program has taught my children to see fruits and vegetables as a fun food."
-SNAP-Ed parent, Crittenden County

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle
806	Youth Development

Outcome #30

1. Outcome Measures

# of children who decreased consumption of sugar sweetened beverages.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	1187

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle
806	Youth Development

Outcome #31

1. Outcome Measures

Number of new food businesses launched as a result of assistance provided by Arkansas Food Innovation

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The vast majority of jobs in the United States and in Arkansas are created by small, privately held companies. It is therefore vital to create an environment and conditions to assist small businesses to develop and hire more people. Assisting small food companies and entrepreneurs in technical and business issues of the food processing industry can improve the Arkansas job situation and provide additional tax revenue to Arkansas.

What has been done
The Institute of Food Science & Engineering (IFSE) in the Department of Food Science at the University of Arkansas assist small food processing companies and entrepreneurs by providing necessary programs such as measuring pH, Aw, providing nutritional labels, developing labels and other forms of technical and business assistance. This year, Arkansas Food Innovation was launched for entrepreneurs to use in manufacturing their products for sale. Along with the use of the pilot plant facility came assistance with labels, specification writing and manufacturing.

Results
The result of the IFSE assistance program generally assists 15-25 entrepreneurs each year but only about 4-8 of these entrepreneurs ever develop into actual businesses. Over the past year, several entrepreneurs have taken their products to market with varying degrees of success. Products included pesto, tomato sauce, apple sauce, salsa, dried Shiitake mushrooms, and flavored syrups.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
502	New and Improved Food Products
503	Quality Maintenance in Storing and Marketing Food Products
701	Nutrient Composition of Food

Outcome #32

1. Outcome Measures

Improved stability of chokeberry juice anthocyanins by beta cyclodextrin addition and refrigeration can improve health benefits

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Chokeberries contain abundant levels of anthocyanin pigments which have received much attention due to their important role in health promotion. Due to their stringent taste, chokeberries are commonly processed into various shelf-stable forms including juices. Unfortunately, anthocyanins are susceptible to degradation during processing and storage of berry products at ambient temperature. Methods are needed to retain higher levels of anthocyanins in processed berries. Encapsulation of anthocyanins with cyclodextrins is a potential treatment that could ameliorate anthocyanin losses. Anthocyanins can form inclusion complexes with cyclodextrin molecules, which may protect anthocyanins from hydration and polymerization reactions.

What has been done
This study evaluated the effects of three pH levels (2.8, 3.2, and 3.6) and four beta cyclodextrin (BCD) concentrations (0, 0.5, 1, and 3%) alone and in combination on the stability of chokeberry juice anthocyanins before and after pasteurization, and over eight months of storage at 4 and 25oC. Juices were analyzed for anthocyanins by HPLC and percent polymeric color using a spectrophotometric assay. Lowering the pH from 3.6 to 2.8 in the presence of BCD provided marginal protection against anthocyanin losses during processing and storage. Addition of 3% BCD at the natural chokeberry pH of 3.6 resulted in excellent protection of anthocyanins, with 81 and 95% retentions after eight months of storage at 25 and 4oC, respectively. The protective effect of BCD was lessened with concentrations < 3% and reduction in pH, indicating changes in anthocyanin structure play an important role in BCD stabilization of anthocyanins.

Results
The combination of 3% BCD treatment at the natural pH (3.6) of chokeberries can be used to prevent anthocyanin losses during juice processing and storage. The protective effect of BCD is most pronounced when used in conjunction with refrigerated storage. Our results demonstrate that berry juices should be refrigerated to retain higher levels of health-promoting anthocyanins.

Additional research is needed to identify a more efficient and cost-effective encapsulation agent.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
502	New and Improved Food Products
503	Quality Maintenance in Storing and Marketing Food Products
701	Nutrient Composition of Food

Outcome #33

1. Outcome Measures

The treatment of highly virulent MRSA with bacteriophage and essential oils can be an alternative to antibiotics.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

S. aureus causes a wide variety of human infections. In the pre-antibiotic era, the mortality associated with systemic S. aureus infections was 80%. Fortunately, aggressive antibiotic therapy proved highly successful in controlling S. aureus infections. However, antibiotic resistance developed rapidly in S. aureus, and MRSA strains resistant to all beta-lactam antibiotics as well as other classes of antibiotics are now isolated worldwide. Historically, outbreaks have been confined to hospitals; an environment particularly conducive to the acquisition and spread of drug-resistant pathogens. Now concerns have intensified as MRSA appears in a range of unexpected community settings: children in day-care centers, army recruits, athletes in contact sports, prison populations, and intra-venous drug users. Until recently vancomycin was the sole remaining therapeutic agent for such strains; however, clinical isolates of high-level VRSA have been documented in the U.S. The public health impact of both widespread VRSA and MRSA could be quite significant. In short it is essential to find alternative, natural antimicrobials against staphylococcal infections now.

What has been done

In Arkansas, we are focusing on forestry byproducts sources for potential antimicrobials (i.e. plant essential oils [EOs]) to inactivate highly virulent MRSA. Crude EOs isolated from a variety of pine byproducts, including both needles and bark, have been reported to be effective against S. aureus. Despite the success of EO inhibition of MRSA, these compounds are still somewhat of a blunt instrument as they can also inhibit non-Staph bacteria including organisms considered to be beneficial to the host. Therefore, we are using EOs as a "sensitization" agent in combination with a very specific S. aureus killing agent "bacteriophages" that will not harm the surrounding skin microbiome. Therefore, we are identifying EO fractions from forestry byproducts found in Arkansas that exhibit the best anti-MRSA activity, assessing the effectiveness of these EO fractions in combination with MRSA-specific phage, and developing a potential commercial skin topical antimicrobial that can serve as an alternative for antibiotics currently used to treat highly virulent MRSA.

Results

Developing a combined phage EO antimicrobial could be a highly lucrative commercial enterprise for the Arkansas forestry industry as the timber industry represents over $1.5 billion in wages alone to the Arkansas economy (UA Division Agric. Economic Impact statistics). Success of our project would generate value-added marketable products from part of the biomass that is currently either left to rot or simply underutilized. The market potential for these byproducts could be substantial. Moreover, this combined antimicrobial would be another tool to utilize for the treatment of cutaneous MRSA infections.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies

Outcome #34

1. Outcome Measures

Peptides derived from Arkansas-grown rice and soybean co-products show potential anti-cancer and other chronic disease bioactivities

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

In the US, cancer is the second most leading cause of death. Obesity and age-related diseases such as Alzheimer's disease (AD) have also become a threat and medical burden for the nation. Traditional therapies for above diseases are life-long with high cost and have side effects. As an alternative treatment, safe and cost effective food derived bioactives are in demand for the prevention of cancer and related chronic diseases.

What has been done

Pentapeptide and peptides prepared from rice bran were evaluated for their bioactivities including anti-cancer, anti-obesity, and anti-AD. In addition, activities of peptides derived from soybean meal against human cancer in multi-sites were also evaluated. The cell proliferation inhibition of bioactive peptides (rice bran pentapeptide and soybean peptides) on human colon, liver, breast, and lung cancer cell lines were determined by phenazine methosulfate 3-(4,5-dimethyl thiazole-2-yl)]-2,5-diphenyl tetrazolium bromide (MTS) assay. The anti-obesity and anti-AD activities were evaluated by adipocyte differentiation assay and MTS assay, respectively. The apoptotic properties of pentapeptide-induced cell death on cancerous breast cells were evaluated by morphological changes, DNA fragmentation, and caspases activities. The mechanic pathways were determined by levels of biomarkers (p53, COX-2, TNF-alpha;, Fas, Bax, Bcl-2, and ErbB-2) using enzyme-linked immunosorbent assay. Since a consumer prefers bioactives in food products rather than consumed as a drug, pentapeptide was incorporated in apple juice using nanoparticle technology to evaluate its stability and self-life.

Results

Rice bran derived pentapeptide (N. Hettiarachchy. Bioactive pentapeptides from rice bran and use thereof. Patent # 8575310, 11/5/2013) and bioactive soybean peptides showed significant inhibition of human cancer cell lines including colon, liver, lung, blood and breast. Pentapeptide also showed promising anti-obesity and anti-AD activities by increasing adipocyte viability and reducing cytotoxicity on amyloid-induced neuronal cells, respectively. The follow-up mechanistic study of pentapeptide-induced apoptosis on breast cancer cells suggests activation of a caspase-dependent biochemical pathway suggesting that the genes involved in this pathway can be controlled by the bioactive pentapeptide. The impact of this study provides information on bioactivities of peptides derived from food source co-products and their potential drug-like property and nutrigenomics effect on cancer, obesity, and AD. The information could open avenues for the use of the bioactive peptides for future novel nutraceutical diet development and promising alternative strategy to current expensive drugs.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies

Outcome #35

1. Outcome Measures

Grain sorghum has anti-diabetic effects

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Maintenance of blood glucose and insulin is important for the health of both normal and diabetic individuals. Diabetes mellitus has been steadily increasing in the U.S. The last two decades of which 26 million people or 8% of the population has been diagnosed with diabetes mellitus. Diet is crucial for maintaining a healthy weight and preventing chronic illness such as diabetes.

What has been done
Grain sorghum is the fifth most produced cereal crop and is gown predominately in the U.S., India, Nigeria, Argentina, and Mexico. Grain sorghum has been known to be a slowly digestible cereal; however, research is limited on its health effects in humans. A human study was conducted to determine the contents of functional starch fractions
and to investigate its effects on postprandial plasma glucose and insulin responses in pre-diabetic individuals.

Results
Grain sorghum product contained high levels of functional starch fractions, slowly-digestible starch (SDS; 18+0.3%) and resistant starch (RS;4+0.3%), compared with the control (SDS 11+0.1% and RS 0.5+0.1%). With the grain sorghum product, the incremental blood glucose response was lower at 45, 60, and 75 minutes intervals. Mean incremental area under the curve (iAUC) responses of glucose and insulin were reduced about 20% and 14%, respectively.
The findings of the study brings forth evidence that grain sorghum high in functional starch fractions can help maintain normal range of blood glucose and insulin levels. In addition, it could increase market of grain sorghum as a functional ingredient and benefit to state's economy.

4. Associated Knowledge Areas

KA Code	Knowledge Area
502	New and Improved Food Products
701	Nutrient Composition of Food

Outcome #36

1. Outcome Measures

Measuring the energy required to dry rice in on-farm driers will lead to farmer's bottom line

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
As the price of petroleum-based fuels increases, the costs of drying rice increases proportionately. A recent study showed that drying accounts for 55% of the total energy consumed for production and processing of rice, followed by harvesting (15%), cultivation (10%), seeding (10%), transportation (6%), and milling (4%). The Economic Research Service recently reported that for the rice farms in Arkansas in which rice is dried, drying accounts for ~ 38% of the cost of on-farm production and processing operations, including drying, fertilizers, chemical application and harvest. However, little data exists showing how energy efficiency and use of rice driers, both on-farm and commercial, are affected by ambient conditions and drier operation.

What has been done
Energy use and efficiency of an on-farm, cross-flow dryer were measured by performing five tests during the harvest season of 2011 and three tests during the harvest season of 2012. Thermal energy requirements were expressed in terms of energy per unit mass water removed, by dividing the energy requirements of the burner by the total mass of water removed for each drying run. Energy efficiency was calculated as the ratio of theoretical energy requirements to the measured energy requirements.

Results
The thermal energy used to dry rice in the on-farm, cross-flow dryer ranged from 2,840 to 5,840 kJ/kg water removed for the eight tests conducted during the 2011 and 2012 harvest seasons. Thermal energy efficiency ranged from 44 to 90%, indicating that in some instances, drying efficiency was quite good, but in others, improvement was needed. The cost to dry rice from the initial moisture contents, ranging from 16.6 to 21.7% to ~ 13% ranged from 7.7 to 12.0¢/kg water removed. Based on the data collected from these tests, equations were developed to predict thermal energy use, based on ambient air temperature and the amount of water removed from the rice. These equations can be used to improve the logistical operation of driers to maximize

energy efficiency.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies

Outcome #37

1. Outcome Measures

Unraveling milled rice appearance and quality traits of importance to key export markets will lead to improved US rice marketability

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The U.S. rice industry owns the reputation as the world's quality standard for long-grain rice. In recent years, however, the industry has been beset with unfavorable quality issues raised by both domestic and international customers, which has consequently weakened the U.S. market share. Some government reports have disclosed that many U.S. customers are turning to other countries in South America and Asia as alternative sources of high quality long-grain rice. There have been complaints about inferior grain appearance (chalkiness, opacity, luster, and color), non-uniformity of grain size and shape (length, width, and thickness), and inconsistent cooking characteristics of domestically grown rice. The reasons for the U.S. rice quality issues are presumed to be related to genetics, factors during crop production (e.g. high nighttime air temperatures), and post-harvest processing (e.g. drying and milling technologies). It is necessary that the underlying causes of diminishing quality are properly identified; otherwise the U.S. rice industry may eventually lose its export market share to other countries.

What has been done
The goals of this project are to identify pertinent rice components that impact the marketability of rice and to identify Arkansas premium cultivars (pureline and hybrid) that can satisfy both domestic and export market demands. Researchers at the University of Arkansas Division of Agriculture have collected a total of 24 milled, long-grain rice samples from Asia (India, Taiwan, Thailand, and Vietnam), South America (Brazil, Costa Rica, and Peru) and United States

(Arkansas and California) and analyzed for their physical quality attributes.

Results
Kernel chalkiness is noticeably greater for the United States samples. Chalkiness values (area percentage) determined by a Winseedle image analyzer are 0.0-3.0%, 0.1-0.4%, and 0.0-7.0% for the Asia, South America, and United States samples, respectively. Rice samples from South America have the narrowest range in color whiteness and yellowness values and kernel length. All rice samples have a similar range of width and thickness regardless of the geographical source. Based on the FGIS criteria for milled rice grain type (kernel length/width ratio), eight of the ten Asia samples were classified as long-grain; four of the five South America samples were long-grain; and six of the nine United States samples were long-grain.
This project is expected to develop benchmark information on the key factors that impact the quality traits of rice for key export markets. Such information will be useful to farmers in choosing specific cultivars to plant; to rice breeders in knowing the traits/markers to include in varietal improvement efforts; and to processors in making proper adjustments of existing processing operations so as to consistently produce high-quality milled rice.

4. Associated Knowledge Areas

KA Code	Knowledge Area
502	New and Improved Food Products

Outcome #38

1. Outcome Measures

Food Retail Environment affects Childhood Obesity

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Childhood obesity is a major public health issue and is presently receiving great deal of attention due to its broader economic consequences and long term effects on children?s overall health, academic accomplishments, quality of life and productivity as they become adults. Arkansas schoolchildren are especially at risk for obesity. Arkansas is among the poorest least healthy

states and the childhood obesity rate has doubled over the last couple of decades and is now one of the highest in the country (Arkansas Center for Health Improvement, 2009).

What has been done

Division of Agriculture faculty?s work in this area received an important infusion of resources in 2011 when it was awarded a large USDA-NIFA-AFRI grant. They are leading this project but it involves a diverse team of scholars representing expertise in early childhood education, child nutrition, child development, and the behavioral sciences. The project is unique in that all participants are from Arkansas-based institutions. Participants include the UA Division of Agriculture, UA Fayetteville, University of Arkansas for Medical Sciences (UAMS), and Arkansas Children's Hospital Research Institute. The project also involves important stakeholder groups including childcare providers, educators, policy makers, and farmers. Professors Nayga and Thomsen are examining the link between childhood obesity outcomes and features of the food and social environment. This work is being done to ensure that interventions are targeted to those children most at-risk for obesity. They are working closely with the UAMS Arkansas Center for Health Improvement (ACHI) to access a unique individual-level dataset on obesity outcomes. Access to these data allows research to be conducted at a level of detail and accuracy that is not possible with national-level datasets.

Results

This research is able to assess causal linkages using quasi-experimental analytical methods and data-intensive identification strategies. Findings, published in the American Journal of Agricultural Economics, Economics and Human Biology, and Applied Economic Perspective and Policy, are providing a better understanding of the effect of supermarket access, the proximity of fast foods around schools and residences, and the role of peers on childhood obesity outcomes.

4. Associated Knowledge Areas

KA Code	Knowledge Area
504	Home and Commercial Food Service
704	Nutrition and Hunger in the Population
724	Healthy Lifestyle

Outcome #39

1. Outcome Measures

High protein breakfast increases energy metabolism, decreases food intake and glycemic response in children.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Breakfast is a key component of a healthy diet and can positively impact children?s health and well-being. However, it is estimated that, in the US, 8% of children and 20-30% of adolescents skip breakfast. Children who eat breakfast on a consistent basis tend to have better nutritional status, are less likely to be overweight, and perform better
in school compared to their breakfast-skipping peers. Currently, one in every three children ages 2-19 are categorized as overweight or obese. Obesity is positively correlated with increased risk of cardiovascular disease (CVD) and 70% of obese children 5-17 years have at least one additional risk factor for CVD (CDC). Direct costs of childhood obesity are estimated to be $14.3 billion dollars per year and increase
exponentially as they grow into obese adults. Roughly half of obese school-age children remain obese into adulthood and the estimated cost of treating obesity-related illnesses in adults is $147 billion per year. Though obesity is a preventable condition, the most effective means for curbing the rise must be a multifaceted approach.

What has been done
We hypothesize that consumption of an egg (protein)-based breakfast (22% protein,48% carbohydrate, 30% fat) will improve energy metabolism and glycemic response immediately and 120 minutes postprandial, increase satiety, and reduce energy intake over 24 hours in school-aged children compared to an isocaloric carbohydrate-based breakfast (5% protein, 65% carbohydrate, 30% fat). The objectives of this study are to
determine if consumption of an egg breakfast by normal and overweight school-aged children: improves energy metabolism through increasing thermic effect of food,reduces energy intake at lunch, reduces hunger, and improves postprandial glycemic response. We anticipate the egg-based breakfast will result in a blunted blood glucose response when compared to the carbohydrate breakfast.

Results
Eggs are a convenient, affordable, and nutritious source of key macro and micronutrients. Eggs are an integral and established part of breakfast in many cultures.Compared to ready-to-eat breakfast cereal or white bread, eggs are more satiating. In addition, research indicates that eating breakfast has nutritional benefits including improved overall nutritional status, reduced hunger, and decreased calorie consumption throughout the day. We have found that a protein-based breakfast significantly reduces hunger after breakfast compared to the carbohydrate-based breakfast. In addition,consumption of a protein-based breakfast results in lower caloric intake at lunch (~100
kcal) compared to the carbohydrate-based breakfast. Relative to body weight, NW burn more calories per min compared to OW. Finally, consumption of a protein-based breakfast increased energy expenditure by 10% compared to a carbohydrate-based breakfast in overweight/obese children. Additional research is needed regarding the long-term effect of higher protein breakfast on energy metabolism in overweight and obese children.

4. Associated Knowledge Areas

KA Code	Knowledge Area
502	New and Improved Food Products
701	Nutrient Composition of Food
702	Requirements and Function of Nutrients and Other Food Components

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

Recent food safety "outbreaks" have heightened concern among the public about the safety of not only processed and restuarant food, but also fresh foods in the store or from local growers. This has led to increased government regulations such as the Food Modernization and Safety Act, which has created a confusing litany of potential on-farm rules, certification standards and so forth. We have responded with improved certification and on the farm safety information for producers, but lack of capacity has hampered our efforts. This is further complicated by changes in farm worker populations, where many immigrant workers in the state have to be engaged in their first language. Increasing public priorities in local foods, community food systems, and farmer markets - and the resulting programmatic and economic factors associated with these movements will continue to create additional demand on our limited resources. We plan to continue our food service safety programs, and hope that public policy changes will help in this arena over time.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Of 84 persons surveyed in the Baxter County Strong Women program, 97% indicated they would eat more fruits and vegetables and 88% more whole grains. Success in these nutrition and wellness programs increase the need for access to safe and nutritious food.

The food safety education program ServSafe® showed an an 87% pass rate (506 certifications of 583 participants) with knowledge of foodborne illness outbreaks related to unsafe food service practices a major emphasis area. A ServSafe Manager in Newton County, Arkansas noted "knowing the correct way to handle food makes my job easier and safer." These results show the potential for this and related programs to save businesses, individuals and the state money by reducing health costs and time lost due to foodborne illness.

Eating more nutritious food seems simple, but it is not for most people. An

educational program in Miller County, AR showed that participants indicated:

- 89 % initiated increasing fiber in their diet by eating more fruits and vegetables.
- 69 % modified recipes to lower the amount of salt in recipes.
- 83 % modified recipes to lower the amount of fat in recipes.
- 79 % carried out preparing healthy meals for themselves or someone with a chronic disease.

"This class has helped both me and my wife. I am on a very limited sodium diet, and my wife is diabetic so the information that has been offered is benefiting both of us and the recipes that we are trying are benefiting both of us."

"Anyone with diabetes or who wants to eat better should take these diabetic classes." Living Well with Diabetes participant, Miller Co.

Participants in the "ReNew You" Weight Loss Boot Camps lost 189.5 pounds, walked 2,516 miles: 75% decreased blood pressure, blood glucose levels and 25% decreased cholesterol. And, the 872 participants in the nutrition education programs reported an increase in knowledge and skills with 85% indicating an intent to make a positive dietary change.

"I thought I knew how to eat right but have learned to really count my calories, fat grams, sugar grams, and milligrams of sodium. In doing so, I have lowered my blood pressure, blood glucose, weight, and Body Mass Index. I have also gone down a size in clothing, have more energy, and have encouraged my husband to eat better and make better choices in his food." -- "ReNew You" Weight Loss Boot Camp participant, Ashley Co.

In Lafayette County, AR nutrition and Cooking School participants surveyed indicated that:

- 78% increased the amounts of fruits they eat
- 80% prepare more meals from scratch instead of eating out
- 80% are staying within recommended portion sizes
- 75% have increased amount of vegetables

"The family has made changes in the way they prepare foods. It has made such a difference. My daughter had serious health issues developing and she has lost 10 lbs and her blood pressure is going down. This program has been such a blessing to our family." -Mediterranean Cooking School participant, Lafayette Co.

Of the 100 adults enrolled in Phillips County EFNEP, more than 90% reported favorable behavior changes, including the adoption of healthier eating habits and increasing physical activity, as well as saving money.

"As a result of the EFNEP program 'Eating Smart, Being Active', I lost 32 pounds in the past 3 months! I am proud to say I have cut down on the number of sweets and fried food I eat and exercise daily. I was overweight & wanted a better quality of life for myself. I wanted to be healthier and be there for my children." EFNEP participant, Phillips Co.

SNAP-Ed in schools during 2013 showed that of surveyed families:

- 82% reported their child talked to them about healthy foods and snacks.
- 78% reported their child asked for more or different fruits, vegetables, milk, or yogurt.

- 58% made changes in their family's eating and/or were more physically active.

"The program has been great for my child because she wants to try new things I could never get her to eat before. Thanks for the help!" SNAP-Ed parent, Independence Co.

Key Items of Evaluation

As educated as we are in the United States, the concept of access to safe and nutritious food - whether we buy it, produce it, prepare it or consume it - still is amazingly complex and difficult to impart. Our nutrition and wellness programs compliment health and wellness education because "you are what you eat" or perhaps "you live what you eat" as shown in results where participants indicate they will eat more recommended safe and affordable foods like fruits and vegetables. Of course, these foods have to come from farms and gardens where safe practices are employed, then be stored and prepared in a safe manner. We have the knowledge, but transferring it to a majority of citizens remains problematic. And competing information on the Internet and TV, promoting non-research based food safety and nutrition information, is a growing problem not reflected in these results but faced by our educators every day. All other things being equal, teaching kids about safe and nutritious food likely will have the most long-term impact. For example, in the Cook Smart, Eat Smart Cooking School at a local school in Logan County, AR 100% of the students sampled new, healthy foods throughout the cooking school; 75% reported an increase in making healthier choices, and 62% reported trying recipes at home after the class. School personnel observed the students that participated in the cooking school sharing their experiences with other students, often encouraging their peers to try healthy foods. "I didn't know that I liked most of the 'healthy' foods that we made." one student said. "Students were excited about the cooking school and talk about the program even after it was over. It was a great experience to introduce them to cooking healthy foods." noted one of the teachers at the school. Hope remains.

V(A). Planned Program (Summary)

Program # 9

1. Name of the Planned Program

Economic & Community Development

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
601	Economics of Agricultural Production and Farm Management	5%		0%	
602	Business Management, Finance, and Taxation	25%		10%	
603	Market Economics	5%		0%	
604	Marketing and Distribution Practices	5%		0%	
605	Natural Resource and Environmental Economics	10%		0%	
606	International Trade and Development	5%		0%	
608	Community Resource Planning and Development	10%		0%	
610	Domestic Policy Analysis	10%		75%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	15%		15%	
805	Community Institutions, Health, and Social Services	5%		0%	
806	Youth Development	5%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Actual Paid Professional	21.3	0.0	26.5	0.0
Actual Volunteer	13.6	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
514798	0	214473	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
405704	0	2639593	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
3309289	0	1481001	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The U of A Division of Agriculture conducts educational programs to address the following priorities identified in our current strategic plan:

- Improve the Economic Viability and Sustainability of our communities and regions
- Address emerging issues related to Rural Infrastructure
- Foster increased Leadership and Community Involvement
- Improve Quality of Life for Arkansans
- Increase understanding of Population Composition and Change

Highlights for 2013 include:

- County, state and sector-specific analyses of economic and social trends to help communities and regions examine their situation and address challenges and opportunities that may potentially impact their future.
- Facilitation to help communities and organizations address complex issues.
- Strategic planning programs including Breakthrough Solutions, a planning and action process that is asset based, technology enabled, community driven and results oriented; and Stronger Economies Together (SET), part of a nationwide initiative to assist regions in creating and implementing an economic development blueprint strategically building on current and emerging economic strengths of the region.
- Programs and technical assistance for business owners and potential entrepreneurs, including the Arkansas Procurement Assistance Center (APAC), which provides educational classes and technical assistance for companies interested in doing business with government entities; resources to help immigrant entrepreneurs overcome business development barriers; Entre-WHAT? Business Basics for Arkansas Youth, curricula to introduce youth to concepts of business and entrepreneurship; agritourism programs, such as a collaborative workshop with Mississippi State University; and income tax schools to provide IRS-approved continuing education for tax preparation professionals.
- Local government research and outreach concerning fiscal stress and options for providing needed infrastructure and services.
- Policy education through the National Agricultural Law Center, the nation's leading source of non-partisan objective agricultural and food law research and information (offering www.nationalaglawcenter.org, a comprehensive online clearinghouse of agricultural and food law resources spanning more than 50 separate subject areas); and the Public Policy Center, which provides research-based information and education about emerging public issues including state and local ballot initiatives, water quality issues, renewable energy developments, and newly enacted legislation of widespread interest to Extension clientele.

• Leadership programs including Lead Arkansas (LeadAR), a two-year statewide program; support in development of locally-based leadership programs; and training on topics such as parliamentary procedure, motivation, nonprofit management, and personality traits.

Delivery methods used include single and multi-session classes, presentations, demonstrations, one-on-one consultation, newsletters, publications, social media, web-based instruction, technology-based media, traditional media outlets, tours, camps, staffed displays, strategic partnerships and research studies.

2. Brief description of the target audience

- Producers - small, large, limited resource, retirement, and other
- Non-Farm private landowners
- Businesses/Industry - small, large, rural, urban, consultants, and other
- Potential business owners (youth and adult)
- Elected officials - city, county, state, and federal
- Unelected community and business leaders
- Emerging leaders
- Organizations - civic, community, producer, consumer, nonprofit, environmental and other
- Organizational boards
- Government personnel - public agencies, administrators and other personnel
- Voters
- Research, extension and teaching professionals
- Educators
- General public
- Youth

3. How was eXtension used?

The eXtension web portal was utilized as a resource for finding information. Faculty and staff also participated in webinars directly linked to or affiliated with eXtension.

V(E). Planned Program (Outputs)

1. Standard output measures

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	52089	35632	5273	2611

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year:	2013
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	105	0	105

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of organized clubs and groups supported by Division of Agriculture Research and Extension resources.
  Not reporting on this Output for this Annual Report

Output #2

Output Measure

- Number of educational products and materials developed or updated for print, electronic media, radio, podcasts or display

Year	Actual
2013	896

Output #3

Output Measure

- Number of clientele attending educational activities and events related to family and/or community economics and commerce.
  Not reporting on this Output for this Annual Report

Output #4

Output Measure

- Number of clientele contacts resulting from education classes, workshops, group discussions, one-on-one interventions, demonstrations, and other educational methods.

Year	Actual
2013	61082

Output #5

Output Measure

- Number of educational materials, curricula, newsletters, web-based modules and fact sheets developed, produced and delivered.

Year	Actual
2013	9665

Output #6

Output Measure

- Number of web hits on business and communities web pages.

Year	Actual
2013	628848

Output #7

Output Measure

- Number of grants and dollars generated by grant and contract development efforts.

Year	Actual
2013	1827396

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

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	Total annual revenue generated by active APAC business clients.
3	Number of participants (both youth and adult) indicating new knowledge gained in business management, finance, consumer economics, and taxation resulting from Division of Agriculture Research and Extension programs.
4	Number of participants (both youth and adult) indicating a change in behavior in their business management, finance, consumer economics, and taxation planning and practice based on participation in Division of Agriculture Research and Extension programs.
5	Number of organizational, community or regional plans adopted or implemented in conjunction with our Division of Agriculture Research and Extension community and regional development programs
6	Dollar value of grants and resources leveraged or generated by organizations, communities or regions as a result of Division of Agriculture Research and Extension community and regional development programs

Outcome #1

1. Outcome Measures

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. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	863

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
To help resolve the social and economic problems in Arkansas communities, citizens must show initiative, responsibility, and exercise decision-making. Throughout our state there are some, but not enough, visionary yet pragmatic leaders: leaders bound by public needs and not political favors; leaders who serve their neighbors by serving their locality, state, and region. The goal of Lead Arkansas (LeadAR) is to increase the knowledge and understanding among emerging leaders of economic and social changes affecting our state through the practical application of leadership skills and development of expertise to address critical problems facing their communities.

What has been done
LeadAR consists of eleven three day seminars about issues that affect Arkansas, a ten day National Study Tour to another state and Washington, D.C., and an eleven day International Study Tour to another country. Issues addressed in the seminars and tours focus on agriculture, trade, and economic policies and current issues facing our state and nation in education, health, water, economic development, and criminal justice. Leadership skills training is a part of every seminar agenda. Each participant also identifies a community service goal or project that they will take the leadership to accomplish during the two years of the program.

Results
Seven of twenty three LeadAR Class 15 members completed the following community service goals during their participation in 2013: raising funds to purchase three computers and a printer for an Entrepreneurial Training Center; expansion of a Young Nonprofit Professionals Network; preparation of a cookbook to be distributed to people who are dependent on food pantries for their food; securing funds for a Parental Education Project; establishment of a franchise for

ambulance service; establishing a steering committee to promote racial healing in a divided city; and raising funds to help complete a 4-H Community Center.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
603	Market Economics
605	Natural Resource and Environmental Economics
606	International Trade and Development
608	Community Resource Planning and Development
610	Domestic Policy Analysis
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services
806	Youth Development

Outcome #2

1. Outcome Measures

Total annual revenue generated by active APAC business clients.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	31785952

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
With the historically dominant industries of manufacturing and agriculture in rural areas in decline, the structure and economic base of Arkansas have changed over the last several years. The Arkansas Procurement Assistance Center (APAC) is operated under a Cooperative Agreement with the Department of Defense (DOD) through a program administered by the Defense Logistics Agency (DLA). The purpose of the program is to generate employment and improve the general economy of a locality by assisting business firms in obtaining and performing under federal, state and local government contracts.

What has been done
This year, APAC has made a concerted effort to communicate with inactive clients with the goal of getting them re-activated. We offered a variety of training courses including Introduction to Government Contracting, System for Award Management (SAM), Government Service Contracting, Ethics and Sense of Urgency, Construction Contracting, Contract Cost and Pricing, and Subcontracting Procedures. We increased our collaboration efforts with other agencies and organizations to expand our reach. In 2013, we provided one-on-one technical assistance and counseling to 377 companies (unduplicated) and reached 976 participants through 36 different educational events.

Results
In 2013, APAC clients reported receiving 523 awards valued at over $31.7 million in government contracts. Feedback from program participants suggests we are making a positive fiscal impact on businesses' bottom lines. One client wrote: "APAC has been a valuable resource for my small business and over the year my company has received over $385,664 in actual sales on our current contract." We have also helped save businesses money. According to one APAC client: "APAC identified an oversight of approximately $40K per year on a multiple year contract I made and saved my company from receiving a contract that would have bankrupted my business. I will continue to attend the federal contracting and procurement training they provide."

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation
604	Marketing and Distribution Practices
608	Community Resource Planning and Development

Outcome #3

1. Outcome Measures

Number of participants (both youth and adult) indicating new knowledge gained in business management, finance, consumer economics, and taxation resulting from Division of Agriculture Research and Extension programs.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual

2013	352

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation
604	Marketing and Distribution Practices
605	Natural Resource and Environmental Economics
606	International Trade and Development
608	Community Resource Planning and Development
610	Domestic Policy Analysis
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
806	Youth Development

Outcome #4

1. Outcome Measures

Number of participants (both youth and adult) indicating a change in behavior in their business management, finance, consumer economics, and taxation planning and practice based on participation in Division of Agriculture Research and Extension programs.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	264

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation
604	Marketing and Distribution Practices
605	Natural Resource and Environmental Economics
606	International Trade and Development
608	Community Resource Planning and Development
610	Domestic Policy Analysis
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
806	Youth Development

Outcome #5

1. Outcome Measures

Number of organizational, community or regional plans adopted or implemented in conjunction with our Division of Agriculture Research and Extension community and regional development programs

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	13

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Faced with continuing population decline as well as a devastating tornado a few years ago, Dumas and Desha County are seeking to revitalize their county and economy. Their strong and visionary leadership included developing a Delta Technology Education Center (DTEC), which serves as a continuing education center, computer lab, and location to provide public access to the internet. DTEC offers educational courses from four institutions of higher education serving the area. However, challenges in the area remain, with population decreasing and the downtown struggling to grow.

What has been done
At the request of Dr. John Ahlen, President of the Arkansas Science Technology Authority (ASTA), Breakthrough Solutions was invited to consider how DTEC could become sustainable and more fully developed as a catalyst for community and economic development in Desha County. Breakthrough Solutions is an award-winning, next-generation strategic planning and development program of the University of Arkansas Cooperative Extension Service with partners in the public, private and non-profit sectors.

Results
A DTEC in Action Blueprint for the 21st Century has been developed and adopted. As part of its effort to pipe in resources from throughout the state and nation to address critical issues and opportunities, DTEC hosted a webinar on downtown revitalization in collaboration with the Dumas Chamber of Commerce and Mainstreet Dumas. DTEC has cultivated two new partnerships, including one with Delta Memorial Hospital on a health improvement project and one with Alt Consulting, which now provides small business consulting services in the DTEC facilities. Instead of just offering whatever courses colleges are willing to offer, DTEC has secured funding to conduct a survey to identify the education and training needs of entrepreneurs and small businesses. DTEC has become more aggressive in marketing through a new website design and new logo and tagline. DTEC has begun developing a robust set of indicators for tracking success and showing accountability to current and potential future funders.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services

Outcome #6

1. Outcome Measures

Dollar value of grants and resources leveraged or generated by organizations, communities or regions as a result of Division of Agriculture Research and Extension community and regional development programs

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	2471378

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Many rural areas of Arkansas lost businesses and population even before the Great Recession beginning in 2007. The Great Recession amplified the loss of jobs and population in many rural areas. Many of these jobs will not return to these rural areas due to the changing global economy. Rural communities and regions must identify new economic strategies in which they have a competitive advantage if they want to remain viable.

What has been done
We conducted the Stronger Economies Together (SET) program for leaders in the eight-county region in Southwest Arkansas (SADA). This program brought leaders from this eight-county region together to identify viable economic development strategies that would provide additional employment and income opportunities for residents of the region. The SET program consisted of a series of 11 workshops over a two-year period covering topics from understanding your local competitive advantages to developing a strategic plan for the region.

Results
The local leaders completed the SET program and identified their goals and objectives for the region. Members participating in the SET program used these goals and objectives to obtain a $150,000 EDA grant for the Southwest Arkansas Planning and Development District. The grant will assist the region support entrepreneurs and create economic development opportunities.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services

V(H). Planned Program (External Factors)

External factors which affected 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 (Interstate Policy Issues)

Brief Explanation

While external factors in some instances delayed outcomes, all were met.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

We use multipled methods to evaluate programs including the use of advisory groups, participant questionnaires, pre-and post-tests, interviews with program participants, and informal feedback.

Key Items of Evaluation

* Jobs created, contract dollars received, and customer satisfaction (related to government contracting)
* Individual goals achieved by LeadAR participants
* Change in knowledge of entrepreneur camp participants measured by pre- and post-tests

V(A). Planned Program (Summary)

Program # 10

1. Name of the Planned Program

Increasing Opportunities For Families & Youth

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
607	Consumer Economics	15%		0%	
723	Hazards to Human Health and Safety	15%		0%	
724	Healthy Lifestyle	15%		100%	
802	Human Development and Family Well-Being	15%		0%	
806	Youth Development	40%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Actual Paid Professional	119.7	0.0	1.8	0.0
Actual Volunteer	102.8	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
1850250	0	17880	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1458151	0	198710	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
11894001	0	70011	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The Division of Agriculture Extension educational programs and activities address family relationships, health and wellness, aging, family economics, safety and 4-H youth development in close collaboration with county, state and federal agencies and policy makers.

Within the Family and Consumer Sciences discipline, science-based research programs focused on content area addressing the following:

Health & Aging:

The Division conducts research on how aging, caregiving, and use of health care services affect individuals and families. The population of older adults in the USA continues to increase. With 15% of Arkansas residents age 65+ (ranked 10th nationally up12% since 2010) the health issues that accompany growing older--chronic disease, disability, and dependence--are of particular importance because they bring diminished quality of life and increase costs to the public. Arkansas continues to rank 48th or 49th in the nation in overall health outcomes. Programs like Aging in Place, Acknowledging Aging, AgriAbility project, and Arthritis education help older Arkansans extend productivity and independence into later life, which saves the state millions of dollars each year. Programs like Extension Get Fit, which incudes Strong Women and Men, Walk Across Arkansas , and Fit in 10, help young and old Arkansans increase physcial activity, improve health, and improve quality of life. Low levels of heath literacy contributes to poor health outcomes. Be Medwise, a medication literacy program helps Arkansans better manage their own health and health care.

Strengthening Families:

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

Parenting 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 need for quality care for Arkansas's children is greater than ever. To provide the best care possible, Arkansas's child care professionals are required to get a minimum of 10 hours per year of verified training to maintain their licensure. The Division of Agriculture's Best Care, Best Care Connected, and Guiding Children Successfully programs provide Arkansas's child care professionals with the verified training they need. These programs are delivered through Extension's statewide network so they are readily available to Arkansans in all 75 counties.

Family Economics

Research indicates that many Arkansas consumers are financially vulnerable. Twenty percent reported that their household spent more than their income. Sixty-seven percent were unable to answer more than three of five financial literacy questions correctly. More than half lack adequate emergency savings. To address these issues, Consumer Protection Forums were conducted in 8 counties, personal finance programs conducted throughout the state and Farm Family Estate Planning sessions were conducted.

Empowering Youth:

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. As one of the largest and oldest youth serving organizations in Arkansas, 4--H has a significant statewide impact; reaching youth ages 5-19. The 4-H program uses an experiential learning model to reach 134,000 youth. The Arkansas 4-H youth development program is research-driven and focuses on three statewide initiative areas: Healthy Lifestyles, 4-H Science and Citizenship/Leadership. The 4-H experience is pivotal in building a foundation of leadership and skill attainments that potentially yields success in accomplishing goals and career aspirations.

2. Brief description of the target audience

Adolescents and adults
Adolescents and adults who expect to become parents
Parents
Grandparents
Adult caregivers
4-H members
4-H youth participants
4-H volunteers
4-H parents
Adults
School teachers
Married couples or couples considering marriage
Child care providers
Afterschool Care providers
Military families
Local, state, and community leaders
Extension Homemaklers Council members
Elected officials
Consumers
Organizations

3. How was eXtension used?

- eXtension is used as a reference source during the creation of child care professional training modules. Extension educators are also encouraged to utilize eXtension resources within their programs to expand their outreach efforts.
- Arkansas CES provides only-in person debtor education. Bankruptcy filers seeking online debtor education are referreed to the approved online course provided through eXtension.

V(E). Planned Program (Outputs)

1. Standard output measures

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	129904	125113	185764	1177

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year:	2013
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	33	10	43

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of non-duplicated participants in 4-H STEM, Healthy Lifestyles and Citizenship programs.

Year	Actual
2013	49693

Output #2

Output Measure

- Number of organized clubs and groups supported by Division of Agriculture Research and Extension resources.

Year	Actual
2013	822

Output #3

Output Measure

- Number of educational products and materials developed or updated for print, electronic media, radio, podcasts or display.

Not reporting on this Output for this Annual Report

Output #4

Output Measure

- Number of clientele attending educational activities and events related to family and/or community economics and commerce.

Year	Actual
2013	14601

Output #5

Output Measure

- Number of clientele contacts resulting from education classes, workshops, group discussions, on-on-one interventions, demonstrations, and other educational methods.

Year	Actual
2013	131300

Output #6

Output Measure

- Number of educational materials, curricula, newsletters, web-based modules and fact sheets developed, produced and delivered.
  Not reporting on this Output for this Annual Report

Output #7

Output Measure

- Web content utilization data tracking including hits, clicks and content utilized.

Year	Actual
2013	710604

Output #8

Output Measure

- Number of Food and Nutrition and Health and Aging programs delivered.

Year	Actual
2013	5580

Output #9

Output Measure

- Number of participants in Food and Nutrition and Health & Aging programs.

Year	Actual

2013	65544

Output #10

Output Measure

- Number of grants and dollars generated by grant and contract development efforts.

Year	Actual
2013	2118859

Output #11

Output Measure

- Number of child care professionals trained.

Year	Actual
2013	5972

Output #12

Output Measure

- Number of participants trained in family life programs (personal well-being, couples, parenting.)

Year	Actual
2013	2703

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

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	Number of participants who adopted at least one positive nutrition and/or health practice.
3	Number of participants reporting a reduction of at least one risk factor for chronic disease after completing a nutrition and/or health education program.
4	Number of participants reporting an increase in physical activity after completing a nutrition and/or health education program.
5	Number of participants (both youth and adult) indicating new knowledge gained in business management, finance, consumer economics, and taxation resulting from Division of Agriculture Research and Extension programs.
6	Number of participants (both youth and adult) indicating a change in behavior in their business management, finance, consumer economics, and taxation planning and practice based on participation in Division of Agriculture Research and Extension programs.
7	Number of child care professionals who increased their knowledge as a result of our child care professional programs.
8	Number of child care professionals who changed at least one child care behavior or practice as a result of our child care professional programs.
9	Number of participants who increased their knowledge as a result of participating in family life programs.
10	Number of participants who intended to change at least one well-being, couple, or parenting practice as a result of participating in family life programs.
11	Number of participants who actually changed at least one personal well-being, couple, or parenting practice as a result of participating in family life programs.
12	Number of participants improving functional fitness after participating in Extension Exercise Program

Outcome #1

1. Outcome Measures

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. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	412485

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Making a Difference and Community Engagement are just two skills that youth learn through 4-H membership. General apathy toward community involvement has led to a decrease in youth and adults serving as volunteers in their local communities.

What has been done
Many Arkansas 4-H members are involved in community service projects through out the year. In 2013, the second annual One-Day 4-H was held to encourage Arkansas 4-H members, parents, volunteers, and community leaders to step into their communities and make a difference in one day! 4-H clubs from across the state were encouraged to select a project to give back to the community. Youth participated in trash pick-ups, food collections for local food pantry, cleaning public lots and property, nursing home visits, etc were examples of how members gave back.

Results
Approximately 30 counties gave back to their local communities by conducting community service projects on October 5, 2013. Forty-six projects were completed which involved 733 4-H members and 145 non-4-H youth were engaged in the projects conducted by 4-H members. This activity resulted in 2,855 hours contributed by participants. The 46 projects resulted in a $63,201.00 donation to Arkansas communities with 33,000 people being impacted.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #2

1. Outcome Measures

Number of participants who adopted at least one positive nutrition and/or health practice.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	3392

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

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

Outcome #3

1. Outcome Measures

Number of participants reporting a reduction of at least one risk factor for chronic disease after completing a nutrition and/or health education program.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	781

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Arkansas tops the list of least healthy states. More than 66% of residents are overweight or obese. High chronic disease rates, including diabetes, heart disease, and hypertension burden the state and strain health care resources. Rural residents lack opportunities to be physically active and have limited access to programs addressing lifestyle behaviors.

What has been done
Extension faculty dedicated nearly 17,000 hours to improving Arkansans' health in 2013. Extension exercise programs reached more than 48,917 Arkansans with sessions to increase fitness. This program is supported by a strong base of over 800 volunteers who conducted more than 2,500 sessions. More than 700 people learned the health impact of environmental risks, such as mold and carbon monoxide through the Healthy Homes program. The Be Medwise program reached over 500 people with sessions to increase health and medication literacy.

Results
Participation in Extension health programs helped thousands of Arkansas residents reduce chronic disease risk factors and improve well-being. Of participants surveyed, 72% increased knowledge of healthier practices; 84% reported improved physical health. Functional fitness was improved by 71% of strength training participants evaluated, with resulting annual estimated healthcare cost savings topping $l6 million. Volunteers contributed nearly 19,000 hours in support of health programs, with time valued at $ 402,641.

4. Associated Knowledge Areas

KA Code	Knowledge Area
723	Hazards to Human Health and Safety
724	Healthy Lifestyle

802	Human Development and Family Well-Being
806	Youth Development

Outcome #4

1. Outcome Measures

Number of participants reporting an increase in physical activity after completing a nutrition and/or health education program.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	2645

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

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

Outcome #5

1. Outcome Measures

Number of participants (both youth and adult) indicating new knowledge gained in business management, finance, consumer economics, and taxation resulting from Division of Agriculture Research and Extension programs.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	5715

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Research indicates that many Arkansas consumers are financially vulnerable. 20% reported that their household spent more than their income. 67% of Arkansans were unable to answer more than three of five financial literacy questions correctly. More than half lack adequate emergency savings. (2012 Financial Capability Survey)

What has been done
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. Our county agents are trained in both subject matter and in educational methods that meet the specific needs of different groups of learners. Our research-based information has practical application and immediate impact to help Arkansans increase financial security and build wealth.

Results
Cooperative Extension Service programs give Arkansans the knowledge and skills they need. More than 20,000 individuals participated in personal finance programs with $73,928 reported saved and debt reduced. In addition, of the 3,400 early childhood educators who participated in training; 1,968 indicated that they changed at least one practice based on what they learned. Consumer Protection forums in eight counties drew more than 300 people: 72% increased knowledge and 86% will use the information to improve financial security. Estate Planning seminars improved financial literacy about farm transfer, taxes, and wills to secure family farms for the next generation.

4. Associated Knowledge Areas

KA Code	Knowledge Area
607	Consumer Economics
806	Youth Development

Outcome #6

1. Outcome Measures

Number of participants (both youth and adult) indicating a change in behavior in their business management, finance, consumer economics, and taxation planning and practice based on participation in Division of Agriculture Research and Extension programs.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	3707

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Research indicates that many Arkansas consumers are financially vulnerable. 20% reported that their household spent more than their income. 67% of Arkansans were unable to answer more than three of five financial literacy questions correctly. More than half lack adequate emergency savings. (2012 Financial Capability Survey)

What has been done
Estate Planning seminars were conducted to improve financial literacy about farm transfer, taxes, and wills to secure family farms for the next generation.

Youth Development programs such as "Get Real Here's the Deal", Shifting Financial Attitude programs, High School Financial Planning Programs, in-school programs, Entrepreneur Camp, day-camps, summer programs, consumer judging competitive events and club programming are strategies for engaging and informing youth about financial education and consumer economics.

Small Steps to Health and Wealth cluster focus groups were conducted to assist in developing best practices for implementing the program. Trainings were conducted for agents throughout the state, lessons and marketing materials were developed and distributed.

Results
Cooperative Extension Service programs give Arkansans the knowledge and skills they need. More than 20,000 individuals participated in personal finance programs with $73,928 reported dollars saved and debt reduced. In addition, of the 3,400 early childhood educators who participated in training; 1,968 indicated that they changed at least one practice based on what they learned. Consumer Protection forums in eight counties drew more than 300 people: 72% increased knowledge and 86% will use the information to improve financial security.

4. Associated Knowledge Areas

KA Code	Knowledge Area
607	Consumer Economics
806	Youth Development

Outcome #7

1. Outcome Measures

Number of child care professionals who increased their knowledge as a result of our child care professional programs.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	5853

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The need for quality care for Arkansas's children is greater than ever. To provide the best care possible, Arkansas's child care professionals are required to get a minimum of 10 hours per year of verified training to maintain their licensure and 15 hours per year to participate in Better Beginnings--Arkansas's quality approved rating system.

What has been done
In 2013, with a budget of $47,000 in external funding, 5,972 child care professionals successfully completed 36,760 hours of training. The Best Care program trained (face-to-face) 2,147 professionals who completed 13,683 hours training. Best Care Connected program trained (online) 2,304 professionals who completed 11,520 hours of training. The Guiding Children Successfully program (self-guided)trained 1,521 professionals who completed 13,557 hours of training.

Results
Research indicates that for every dollar spent on early childhood intervention programs, there is a $2.50-$4.00 ROI. That means the ROI within the state of AR for child care professional training programs is between $1.19 and $1.90 million dollars.

Participants had statistically significant increase in their levels of understanding of all lesson topics after participating in training.

98% of participants increased their knowledge of effective child care practices.

96% of participants did something new to be a better child care professional.

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

Outcome #8

1. Outcome Measures

Number of child care professionals who changed at least one child care behavior or practice as a result of our child care professional programs.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	5733

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

Outcome #9

1. Outcome Measures

Number of participants who increased their knowledge as a result of participating in family life programs.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	2595

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

Outcome #10

1. Outcome Measures

Number of participants who intended to change at least one well-being, couple, or parenting practice as a result of participating in family life programs.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	2356

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Life and relationships can be difficult. Too many Arkansans struggle with depression and anxiety, couple conflict and strained parent-child relationships. It's important to learn how to be an emotionally healthy individual, a good partner, and an effective parent. Doing so will lead to greater happiness and productivity in life.

What has been done
In 2013, Extension agents reported 8,495 direct client contacts with family life programs (e.g., personal well-being, couple relationships and parenting). Evaluation data was collected from 2,703 Arkansans. The Family Life webpage received 288,983 hits, 87,442 page views, and 55,449 unique visitors. In addition, there were 2,150 subscribers for our weekly Navigating Life's Journey (NLH) email services.

Results
In a survey of 212 Navigating Life Journey subscribers, 100% of them said the weekly emails were valuable to them and 94% of them said their lives and relationships are better as a result of Navigating Life Journey messages.

Of the 2,703 Arkansans who were trained in person, 96% of them increased their knowledge and 87% of them committed to change their behavior.

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

Outcome #11

1. Outcome Measures

Number of participants who actually changed at least one personal well-being, couple, or parenting practice as a result of participating in family life programs.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	1482

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

Outcome #12

1. Outcome Measures

Number of participants improving functional fitness after participating in Extension Exercise Program

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	431

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Arkansas is the most sedentary state in the nation. According to state data, more than 31% of adults report no physical activity or exercise. Regular physical activity is one of the most important elements of a healthy lifestyle. Sedentary lifestyles increase risk of developing cardiovascular disease, diabetes, hypertension, and obesity.

What has been done

More than 1,900 adults participated in 2,596 Extension exercise sessions offered through multi-session programs in counties across the state. Programs included the Strong Women & Men strength training program and Arkansas' Fit in 10 program. Nearly 900 volunteer leaders contributed 18,178 hours to help Arkansans increase physical activity levels through these programs.

Results

Results from the Senior Fitness Test and participant evaluations showed that Extension Exercise programs increased strength and flexibility, improved balance, and improved mental and physical health. Specifically, 71% of participants increased strength, 68% increased flexibility, 65% improved agility and balance, 84% reported improved physical health, and 51% reported improved mental health. Based on Senior Fitness Test results, it is estimated the program resulted in the following medical and treatment cost savings (estimates for one year:

$2.3 million in hospitalization cost savings from reduced fall risk
$1.5 million in hospitalization cost savings from hip fracture prevention.
$3.4 million in treatment cost savings from hip fraction prevention.
$8.9 million in nursing home cost savings.

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
802	Human Development and Family Well-Being

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

Clientele availability is a constant factor affecting programs in the Increasing Opportunities for Families and Youth area. We are competing against other priorities for our target audience's time, which has led the Marriage, Parenting and Family Life area to shift the direction of its educational programming. Yet, the economy has actually positively

affected our Family Economics area in that more families are finding it important to learn how to budget, save, etc.

4-H youth have numerous out-of-school options and 4-H is one of many. Because of sports and other activities it is sometimes challenging to attract and retain a diverse group of youth, as well as volunteer leaders. Utimately, this impacts program delivery and participation.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Navigating Life's Journey

Weekly e-mails with great quotes and invitations to apply them to their lives have been sent to over 2,150 subscribers over the past year. In addition, we have 153 people subscribed to the blog, 512 Facebook followers, and 386 Twitter followers.

A random sample of email subscribers were chosen to provide feedback. Of those who responded, 98% say that the emails are valuable and 90% say that their lives and relationships are better as a result of the messages. Using NLJ, we made 56,269 contacts on personal well-being, 54,938 contacts on couple relationships, and 52,692 contacts on parenting.

Family Economics

Estate Planning for Farm Families - two groups of agents determined that farm families in their respective counties were interested in obtaining information about estate planning. Planning meetings were held with a multi-county group (Howard, Polk Sevier) and Randolph County. Both Agriculture and FCS agents were involved in planning, organizing, and conducting the events. Seminars were held in Polk and Randolph Counties. Both sites had two sessions each. More than 70 individuals participated with the majority indicating that the topics were important and the seminars increased their knowledge. Participants indicated that the most important topics were wills (72%), farm transfer (66%) and taxes (65%). Follow-up evaluation results will be collected in 2014.

Extension Exercise Outcomes

- 2,853 presentations were delivered on physical activity or exercise
- 1900 adults were enrolled in extension exercise program; there were 1,841 unduplicated program participants.
- 18,178 volunteer hours contributed by 848 volunteers ($402,461 value @ $22.14/hr)
- 17,105 hours contributed to Strong Women & Men program ($378,704 value @ $22.14/hr)

Of the 604 adults who completed fitness assessments (33% of unduplicated participants):

- 69% increased lower body strength
- 71% increased upper body strength
- 57% increased aerobic endurance
- 68% increased lower body flexibility

- 64% increased upper body flexibility
- 65% increased agility and dynamic balance
- 18% lost weight

Of the 888 participants surveyed:

- 72% reported increased knowledge
- 84% reported improved physical health
- 51% reported improved mental health
- 32% reported decreased pain
- 9% reported decreasing medication
- 14% reported weight loss

Housing for Health & Aging Outcomes

Of 199 participants surveyed:

- 92% increased knowledge
- 81% intend to change behavior
- 2% reported not having to move from their present residence due to program

Other Healthy Living Programs

Development of the Healthy Living: Yoga for Kids curriculum was a major project for FY13. A 200-page curriculum will be provided to agents through in-services planned for January 2014. An instructional DVD appropriate for both personal and classroom use is in the editing stage and should be ready for replication in January 2014. Yoga for Kids was promoted at the Southern Region PLN meeting; several states expressed interest in adopting the program. In addition to the poster and factsheet, which were developed in late 2012 and provided to agents in January 2013, two more posters are under development to guide agents and teachers as they lead students in yoga. For early adopters, two informal trainings were held in advance of the January 2014 in-services - one in the Delta district, the other in Ozark. A special training was conducted for agents involved in a $65,000 grant from Wal-Mart through the National 4-H Council. Specifically, this grant has supported implementation of nutrition and yoga programs in Craighead, Clay, Prairie, Miller, Ashley, Garland, and Logan counties.

Survey of 5,693 participants showed that, as a result general healthy living programs:

- 100% learned something new
- 26% changed their beliefs
- 30% practiced what they learned
- 38% shared what they learned with their families

Healthy Lifestyle Choices

The Healthy Lifestyle Choices (HLC) curriculum was purchased for each county through a gift from AEHC in honor of the organization's 100th Anniversary in 2012. One-on-one training was provided to new agents following the statewide in-service in August 2012. For FY13, AIMS allowed reporting efforts specific to this curriculum, in addition to overall Healthy Living program efforts.

- 7,510 Arkansas youth were reached with the Healthy Lifestyle Choices program

- 158 lessons were conducted by 87 trained volunteers
- 199 volunteers were trained
- Survey of 3,040 participants showed that, as a result of the program:
  - 97% learned something new
  - 42% changed their beliefs
  - 45% practiced what they learned
  - 52% shared what they learned with their families
  - 27% were able to recognize good communication concepts
  - 56% understood the concept of energy balance and its relationship to healthy body weight

Key Items of Evaluation

Child Care Provider Education programs are delivered through Extension's statewide network so they are readily available to Arkansans in all 75 counties. Our programs are available in multiple formats (e.g., face-to-face, online, & self-guided) to accommodate different learning styles and work schedules. The RAND Institute, in a review of the benefits and savings of early childhood intervention programs, calculated that for every dollar invested in such programs, there is an estimated return of $2.50 to $4.00. That means the return on investment within the state of Arkansas for our child care professional training programs is between $1.19 and $1.90 million dollars.

- In 2013, with a budget of $475,000 in external funding, 5,972 child care professionals successfully completed 38,760 hours of training.
- Participants had statistically significant increases ($p < .001$) in their levels of understanding of all lesson topics after participating in the training.
- As a result of the training, 98% of participants indicated their knowledge of effective child care practices increased and 96% of participants did something new to be a better child care professional.

V(A). Planned Program (Summary)

Program # 11

1. Name of the Planned Program

Environment, Energy & Climate

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
101	Appraisal of Soil Resources	10%		12%	
102	Soil, Plant, Water, Nutrient Relationships	10%		10%	
111	Conservation and Efficient Use of Water	10%		7%	
112	Watershed Protection and Management	5%		8%	
123	Management and Sustainability of Forest Resources	5%		6%	
131	Alternative Uses of Land	5%		2%	
133	Pollution Prevention and Mitigation	5%		3%	
136	Conservation of Biological Diversity	0%		2%	
141	Air Resource Protection and Management	0%		7%	
201	Plant Genome, Genetics, and Genetic Mechanisms	5%		8%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	5%		5%	
204	Plant Product Quality and Utility (Preharvest)	5%		2%	
205	Plant Management Systems	5%		2%	
211	Insects, Mites, and Other Arthropods Affecting Plants	5%		4%	
306	Environmental Stress in Animals	5%		5%	
402	Engineering Systems and Equipment	0%		3%	
405	Drainage and Irrigation Systems and Facilities	5%		2%	
511	New and Improved Non-Food Products and Processes	5%		2%	
605	Natural Resource and Environmental Economics	5%		6%	
610	Domestic Policy Analysis	5%		4%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Actual Paid Professional	11.9	0.0	129.5	0.0
Actual Volunteer	0.9	0.0	1.8	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
288672	0	917827	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
227497	0	14497478	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
1855676	0	3346968	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The Arkansas Discovery Farm Program monitors water quantity and quality on real, working farms. Edge-of-field nutrient and sediment losses are quantified and long-term sustainability methods are implemented on nine Discovery Farms, representing livestock and row crop enterprises. Discovery Farms outreach efforts including: 1) presentations made to more than 3,000 people at various events in Arkansas, 2) Conducted 15 field tours during the last three years for the Joint House/Senate Agriculture Committee, Arkansas Congressional staffers, Wal-Mart Sustainability Coordinators from eleven nations, Arkansas Farm Bureau, Natural Resources Conservation Service (NRCS), United Soybean Board Sustainability Workgroup, and a 7-state Discovery Farm Tour. The USDA MRBI program includes financial incentives for farmers to conduct edge-of-field monitoring of installed conservation practices. Conservation partnersincluding the University of Arkansas Division of Agriculture, Arkansas State University, University of Arkansas at Pine Bluff and conservation districts have formed the Arkansas Edge-of-Field Monitoring Network, leveraging a national Conservation Innovation Grant from NRCS for over $900,000, to support MRBI.

Division scientists conducted statewide training of nutrient management plan writers and manure management plan writers in collaboration with NRCS, Arkansas Natural Resources Commission (ANRC) and the Arkansas Association of Conservation Districts. The state's NRCS Nutrient Management Standard 590 was revised as requested by NRCS. We are also working with these partners to revise nutrient management planning under State Title 22, Rules Governing the Arkansas Soil Nutrient and Poultry Litter Application and Management Program, including revisions to the Arkansas P-Index for Pastures and revising the training program to reflect these changes. The Division provides training for both nutrient planner and nutrient applicator certification required under State Titles 20 and 21.

The Division promotes the use of conservation practices that can be cost-shared through USDA-NRCS programs such as Environmental Quality Incentives Program (EQIP), Wetlands Enhancement

Program (WEP), Conservation Reserve Program (CRP) and other programs under the Conservation Title of the Farm Bill. The newest federal financial incentive program in Arkansas is the Mississippi Healthy River Basin Initiative (MRBI) which is funded separately from the Farm Bill and brings $320 million to agricultural producers in thirteen states to cost-share the installation of conservation practices. Division specialists launched an e-mail newsletter, 'Conservation Corner', delivered to landowners electronically across the state.

A new training program, funded by an EPA 319h grant via ANRC, is aimed at educating local citizens on voluntarily protection of water resources within their local watersheds, introducing citizens to scientific principles on nonpoint source pollution, source water protection and watershed principles. Curriculum and training agendas are being finalized.

Two full time storm water educators provide storm water education to meet federal regulations. To support these local educational efforts, the Water Quality Specialist has developed fact sheets and field demonstrations (Rain gardens), worked with the Master Gardeners on methods of remediating storm water with plants where the local hydrology has been altered in urban settings.

State Nonpoint Source Plan, administered by ANRC as required by EPA under the Clean Water Act, must be updated every five years and an annual report must be submitted to EPA Region 6. To facilitate the input of stakeholders in the planning and reporting process, the Division's Public Policy Center coordinates this statewide effort to include the Annual State Nonpoint Source Meeting as well as preparation of the report and the five-year plan update.

A research program addressing declining water quantity and quality seeks new methods of conserving water and preserving water quality; research on conservation of power and improving pumping efficiency; demonstration of new technology to save water, monitor pumps and wells, and cut costs; and on-farm plus workshop education and demonstration of Phaucet, multiple inlet rice irrigation (MIRI) system and other labor and water-saving irrigation systems.

Division scientists work with industry and regulatory agencies to provide technical advice, research data, and information on best management practices related to pesticides, including efficacy data; local environmental impact; application data and information; symptomology; and technical support for emergency or special local need registrations.

Research and Extension specialists from four Southern states-Arkansas, Louisiana, Mississippi and Tennessee-have formed a regional workgroup to develop collaborative research and extension programs to address the regional water quality issue of hypoxia in the Gulf of Mexico resulting from excess nutrient delivery via the Mississippi river drainage basin and declining levels of regional groundwater aquifers underlying these four states.

The Center for Agricultural and rural Sustainability administered a $3 million research project "National Sustainable Strawberry Initiative" (NSSI) funded by the WalMart Foundation. 3 projects were focused on alternatives to methyl bromide and 9 projects contained energy reduction components. The NSSI webiste had 17,946 views.

The principles N-ST*R, a novel method of determing the soil-N levels, storage and predict rice crop N use and profitability have been expanded to added soil types and corn. N-ST*R can help farmers increase N-use efficiency and may reduce N applications on many fields.

A number of research projects are underway, including: 1) Evaluation of 10% water-in-diesel emulsion to determine effect on emissions, 2) Effects of monoculture switchgrass and cottonwood as bio-energy feedstocks on soil respiration, 3) Crop Breeding programs aimed at developing novel genotypes which allow crops to mitigate or avoid the effects of climate change, 4) Effects of microbial community in

soil N cycling and C sequestration, 5) Crop/weed competiton studies, 6) Rice quality parmeters, 7) Surface wetting by low pressure, overhead sprinkler system on chicken cooling, indoor thermal climate and water use in broiler houses, 8) Alternative septic systems absorption filed products, 9) Effects of broiler litter rate on surface runoff and leaching, 10) Effects of disinfection on antibiotic resistance in bacteria in wastewater, 11) BMPs for pasture mgmt for water quality.

2. Brief description of the target audience

Agricultural producers, agricultural consultants, county agents, agribusiness sales people, scientists/researchers,high school and college students, seed growers, seed dealers, rice millers, rice processors, ecologists, Arkansas Forestry Commission, Arkansas Forestry Association, AR Game and Fish Commission, AR Association of Consrvation Districts, AR Congressional delegation, familay forest owners, foresters, youth of all ages, women landowners, Certiied Crop Advisors, Municipal leaders and their staff, Certiied Pesticide Applicators. writers of nutrient management plans, wildlife enthusiasts, county extension agents, and the general public, poultry producers, poultry industry personnel, AR health Department, AR Department of Environmental Quality.

3. How was eXtension used?

As a member of a feral hog Community of Practice with eXtension.org, an Extension faculty member helped develop and market materials regarding the threat of feral hogs to the environment and effective control strategies for feral hogs. A Facebook page about feral hogs was developed to promote the new eXtension website.

eXtension website was used for augmenting feral hog control and mamnagment program and responding to public requests for information regarding nuisance wildlife. eXtension funded travel for palnning and coordinating multi-state feral hog education which benefits the Arkansas nuisance wildlife program.

V(E). Planned Program (Outputs)

1. Standard output measures

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	16658	17465	1743	1305

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year:	2013
Actual:	1

Patents listed

Process for reducing water soluble elements using an amended animal manure fertilizer or litter US 13/790,955

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	14	68	70

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of educational products and materials developed or updated for print, electronic media, radio, podcasts or display.

Year	Actual
2013	93

Output #2

Output Measure

- Number of clientele contacts resulting from education classes, workshops, group discussions, one-on-one interventions, demonstrations, and other educational methods.

Year	Actual
2013	18147

Output #3

Output Measure

- Number of education meetings, demonstrations, and field days related to the production of non-food agronomic, bioenergy, and horticulture crops.

Year	Actual
2013	54

Output #4

Output Measure

- Number of clientele participating in educational events related to non-food agronomic, bioenergy and horticulture crop production.

Year	Actual
2013	9012

Output #5

Output Measure

- Number of educational materials, curricula, newsletters, web-based modules and fact sheets developed, produced and delivered.

Year	Actual
2013	77

Output #6

Output Measure

- Web content utilization data tracking including hits, clicks, and content utilized.

Year	Actual
2013	172541

Output #7

Output Measure

- Number of grants and dollars generated by grant and contract development efforts.

Year	Actual
2013	3853626

Output #8

Output Measure

- Number of educational programs and events held related to sustainable energy.

Year	Actual
2013	29

Output #9

Output Measure

- Number of field days related to sustainable energy.
  Not reporting on this Output for this Annual Report

Output #10

Output Measure

- Number of educational materials & curriculum developed related to sustainable energy.

Year	Actual
2013	6

Output #11

Output Measure

- Number of locations for bioenergy crop demonstrations and research field days.

Year	Actual
2013	2

Output #12

Output Measure

- Number of refereed research articles published related to sustainable energy.

Year	Actual
2013	2

Output #13

Output Measure

- Number of research-based, non-refereed publications published related to sustainable energy. Not reporting on this Output for this Annual Report

Output #14

Output Measure

- Number of research-based scientific presentations at scientific or professional meetings related to sustainable energy.

Year	Actual
2013	4

Output #15

Output Measure

- Number of research projects on biomass crops conducted in Arkansas.

Year	Actual
2013	2

Output #16

Output Measure

- Number of research projects on biofuels performance and emissions conducted in Arkansas.

Year	Actual
2013	2

Output #17

Output Measure

- Funded research amounts (in dollars) related to the Climate Change Program.

Year	Actual
2013	20000

Output #18

Output Measure

- Number of current year climate relevant research programs.

Year	Actual
2013	10

Output #19

Output Measure

- Number of current year climate relevant educational programs.

Year	Actual
2013	9

Output #20

Output Measure

- Formal regional research collaborations, research projects, information exchange groups

Year	Actual
2013	5

Output #21

Output Measure

- Formal regional research collaborations, research projects, information exchange groups

Year	Actual
2013	5

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Graduate students working on bioenergy projects or biofuels labs.
2	Individuals adopting one or more conservation BMPs from the Discovery Farm program
3	Energy audits conducted.
4	Number of producers who gained knowledge in non-food crop production and management.
5	Number of registered crop consultants and foresters maintaining certification on an annual basis.
6	Life cycle inventory methodology and data for row crops for greenhouse gases.
7	Number of new assessment and management tools developed, including models and measurements of greenhouse gas emissions.
8	Number of programs participants indicating new knowledge of water quality and conservation best management practices.
9	Number of program participants indicating the adoption or implementation of new water quality and conservation best management practices.
10	Number of producers who changed or adopted new production and/or conservation management practices or technologies.
11	Number of current year citations of climate related publications.
12	Number of N-StaR samples processed.
13	Number of municipal leaders who learned about converting solar energy to AC
14	Number of individuals who increased knowledge of wildlife, wildlife management and habitat
15	Number who increase knowledge of policies and programs pertaining to wildlife
16	Number who adopt or change wildlife management practice as self reported
17	Number who prepare a wildlife management plan as self reported

18	Number of acres of impacted wildlife habitat as self reported
19	$ amount saved in wildlife management plan and/or GPS application as self reported
20	Number of individuals with increased knowledge of backyard wildlife habitat practices
21	Number of Research projects on treated wastewater by dissolved ozone
22	Number of economic evaluations of conservation BMPs
23	Individuals adopting one practice from the recommended list of energy conserving practices.

Outcome #1

1. Outcome Measures

Graduate students working on bioenergy projects or biofuels labs.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	6

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources

205	Plant Management Systems
402	Engineering Systems and Equipment

Outcome #2

1. Outcome Measures

Individuals adopting one or more conservation BMPs from the Discovery Farm program

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	8

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Agriculture in Arkansas is under pressure to manage nutrients and sediment in an environmentally sustainable manner. In many sectors of the farming community, this has created constraints to remaining viable and competitive in today's global market place. Increasing national attention is being focused on reducing nutrients to the Gulf of Mexico, which will further increase the need of agricultural producers to increase nutrient efficiency while declining groundwater levels in crop producing areas of eastern Arkansas will increase the need for greater water efficiency.

What has been done
Division's Discovery Farm program monitors runoff quality from seven farms at six locations as we are quantifying sediment and nutrient losses from all major row crop and livestock commodities including rice, soybean, corn, cotton, poultry and cattle. We are currently monitoring the quality of runoff from 19 fields using automated water quality samplers that are now equipped with modems that contact us via cell phone when sampling is initiated. On our row crop fields, we have increased our efforts to monitor irrigation water use and needs. All fields are equipped with irrigation flow meters to automatically records flow data. Over $1.5 million dollars from 15 different funding sources via grants and contracts support the program. The Arkansas Discovery Farm program has also helped leverage nearly $1 million from a Conservation Innovation Grant from NRCS. We have also effectively developed, engaged and transferred ownership to a functioning Stakeholder Advisory Committee.

Results

The Arkansas Discovery Farm program continues to collect data, hoping to provide timely information on both economic and natural resource sustainability on behalf of Arkansas Agriculture to regulators, lawmakers and other decision makers. While we have generated much information on how to produce livestock and crops, we have less scientifically-valid data on how we can ensure that we are sustainable. We also hope utilize the information to promote more efficient use of our soil and water resources through outreach and education.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
131	Alternative Uses of Land
133	Pollution Prevention and Mitigation
405	Drainage and Irrigation Systems and Facilities

Outcome #3

1. Outcome Measures

Energy audits conducted.

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Number of producers who gained knowledge in non-food crop production and management.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	1600

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
123	Management and Sustainability of Forest Resources
131	Alternative Uses of Land

Outcome #5

1. Outcome Measures

Number of registered crop consultants and foresters maintaining certification on an annual basis.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	204

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
131	Alternative Uses of Land
133	Pollution Prevention and Mitigation
136	Conservation of Biological Diversity
605	Natural Resource and Environmental Economics

Outcome #6

1. Outcome Measures

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

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Methane (CH4) is a potent greenhouse gas with a global warming potential approximately 23 times greater than carbon dioxide (CO2). Rice (Oryza sativa L.) production is unique among agricultural crops in its susceptibility to CH4 emissions. As a semi-aquatic plant, rice is produced under flooded conditions for the majority of the time it is actively growing. Flooding results in soil

chemical changes, including the rapid depletion of oxygen in the soil and the sequential reduction of molecules utilized as terminal electron acceptors. Methane emissions in soils occur when the soil is highly anaerobic and highly reduced. Data concerning directly measured methane fluxes from Arkansas, the largest rice-producing state, are lacking.

What has been done
A study was conducted in 2012 to investigate CH4 emissions from Arkansas rice production practices. Research was conducted at the Rice Research and Extension Center near Stuttgart on a DeWitt silt loam to evaluate the effects of previous crop (i.e., rice and soybean) and variety (i.e., conventional and hybrid rice) on season-long methane emissions. Similarly, research was conducted at the Northeast Research and Extension Center in Keiser on a Sharkey clay to evaluate season-long methane emissions from a conventional rice variety. A chamber-based gas sampling procedure was used to directly quantify methane fluxes over the growing season from flooding to after harvest.

Results
Preliminary results indicate that methane emissions are greater from rice following rice than from rice following soybean, presumably due to substantial differences in carbon returned to the soil between rice and soybean, and that methane emissions may be lower from hybrid rice than from conventional varieties. Furthermore, it appears that methane emissions in general are significantly lower from clay than from silt-loam soils. Overall, it is clear that soil texture, rice variety, and previous crop are key factors controlling methane emissions from rice.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
131	Alternative Uses of Land
133	Pollution Prevention and Mitigation
141	Air Resource Protection and Management

Outcome #8

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	80

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
111	Conservation and Efficient Use of Water
133	Pollution Prevention and Mitigation
405	Drainage and Irrigation Systems and Facilities

Outcome #9

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	770

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation
405	Drainage and Irrigation Systems and Facilities

Outcome #10

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	80

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water

112	Watershed Protection and Management
133	Pollution Prevention and Mitigation

Outcome #11

1. Outcome Measures

Number of current year citations of climate related publications.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	311

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management

Outcome #12

1. Outcome Measures

Number of N-StaR samples processed.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	4000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Arkansas is the primary rice producing state in the US and harvests roughly 1.3 million acres per year. Until recently, N fertilizer recommendations for rice in Arkansas were based solely on cultivar, previous crop, and soil texture which does not account for potentially mineralizable soil-N. Recommendations made using the current system do not take into account the amount of N that is being supplied by the soil and thus, can result in over or under application of N fertilizer. Reduced grain yields, increased disease susceptibility, lodging and off-location transport of N can result under these general recommendations. The development and release of the N-STaR program allows producers to apply field-specific N fertilizer rates in order to maximize rice yields.

What has been done
Field-scale strip trials were established over the past three years designed to compare the producer's standard N rate application against the N-STaR N rate recommendation. These strips trials gave soil scientists confidence in the ability of N-STaR to predict yield maximizing N rates on a large-scale and also demonstrate the technology to producers, consultants and county agents. N-STaR was introduced as recommendation tool on both silt loam and clay soils. N-STaR technology was implemented across different soil types, rice cultivars and production settings.

Results
In an effort to summarize the effect of the N-STaR program in Arkansas, samples submitted to the University of Arkansas N-STaR Soil Testing Lab during 2013 were categorized by county and soil texture. Samples were received from 27 Arkansas counties, with Arkansas county and Mississippi county evaluating the largest number of fields, with 57 and 51 fields respectively. The samples received were from 171 silt loam fields and 137 clay fields. In total the lab analyzed roughly 4,000 soil samples during the 2013 growing season. The N-STaR N rate recommendations for these samples were then compared to the producer's estimated N rate or the standard Arkansas N rate recommendation of 150 lb N/acre for silt loam soils and 180 lb N/acre for clay soils and divided into three categories: those with a decrease in recommendation, no change in recommended N rate, or an increase in the N rate recommendation. Samples classified as silt loams indicated a reduced N rate for 60% of the fields analyzed and the average N rate reduction was 25 lb N/acre. Whereas clay soils resulted in reduced N rates for 70% of the fields tested with an average reduction in the N rate of 39 lb N/acre. These results from the 2013 season indicate the potential to reduce N rates for rice produced on both clay and silt loam soils while still maintaining yield and producer profitability. One of the greatest testaments to the N-STaR program came in 2013, when the N-STaR N rate recommendations were used in all of the

Rice Research and Verification Program Fields. In the southern portion of Arkansas 8 of the 11 RRVP fields had significantly lower N rates using the N-STaR program than the producer would have traditionally applied based on soil texture, variety and previous crop. For those fields that indicated a reduced N rate the average reduction was 35 lb N/acre, but yields were drastically higher than the state average coming in at 196 bushels/acre. The inclusion of N-STaR in the RRVP is the first field-scale "real world" test for the program and based on 2013's yield results- it passed with flying colors.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation

Outcome #13

1. Outcome Measures

Number of municipal leaders who learned about converting solar energy to AC

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	8

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
In Arkansas, one of the most influential factors thwarting development and adoption in renewable energy systems is the lack of local state policies to incentivize renewable energy investments. Policy makers and city leaders are inconsistently educated in renewable energy technologies, and therefore may not be fully capable of making holistic decisions regarding renewable energy adoption within their own communities.

What has been done
As a component of the University of Arkansas Applied Sustainability Center's Summer Energy Academy, eight groups of city leaders from across Arkansas attended a workshop and tour at the

Abernathy Laboratory, where they engaged in both lecture-based and lab-based renewable energy sessions. City leaders learned about the process of converting sunlight into AC energy, the different types of photovoltaic system components and the strengths of each, and the decision-making factors that must be considered when determining whether renewable energy systems are a wise investment for a city. They also visited the Department of Agricultural Education, Communications, and Technology Solar Energy Analysis Station, where they observed the various components of both on-grid and off-grid photovoltaic arrays, and saw their different potential uses in various residential, commercial, and agricultural settings.

Results

Eight city mayors and their groups of city leaders attended the session. Cities varied in size, as can be shown by two participants, Little Rock and Gould. Quantitative data collected indicated that individuals experiencing the photovoltaic array tour first and lecture portion second significantly increased their knowledge of solar energy systems compared to those that attended the lecture first and then experienced the tour. These findings provide support for the experiential learning cycle, which is a foundational component of agricultural education teaching methodology. Further, city leaders offered informal conversation that indicated the knowledge they learned would be carried back to their constituents and could potentially influence their decisions regarding renewable energy policy and adoption in the future. Several mayors and leaders discussed ideas for renewable energy adoption in their cities, which aligned with examples shown during the event. One participant shared with the presenter that the session was the most helpful the group had attended during their two-day academy. Another participant from Fayetteville Public Schools requested information regarding future educational opportunities for students to visit the Solar Energy Analysis Station. As the Solar Energy Analysis Station's inaugural event, this positive feedback confirms that it can be a valuable vehicle for service and education related to renewable energy adoption throughout the state.

4. Associated Knowledge Areas

KA Code	Knowledge Area
402	Engineering Systems and Equipment
605	Natural Resource and Environmental Economics

Outcome #14

1. Outcome Measures

Number of individuals who increased knowledge of wildlife, wildlife management and habitat

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	158

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
136	Conservation of Biological Diversity
205	Plant Management Systems

Outcome #15

1. Outcome Measures

Number who increase knowledge of policies and programs pertaining to wildlife

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	123

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
136	Conservation of Biological Diversity
610	Domestic Policy Analysis

Outcome #16

1. Outcome Measures

Number who adopt or change wildlife management practice as self reported

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	106

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
136	Conservation of Biological Diversity

Outcome #17

1. Outcome Measures

Number who prepare a wildlife management plan as self reported

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	107

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources

Outcome #18

1. Outcome Measures

Number of acres of impacted wildlife habitat as self reported

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	7743951

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources

Outcome #19

1. Outcome Measures

$ amount saved in wildlife management plan and/or GPS application as self reported

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	5000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources

Outcome #20

1. Outcome Measures

Number of individuals with increased knowledge of backyard wildlife habitat practices

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	16

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
131	Alternative Uses of Land
205	Plant Management Systems

Outcome #21

1. Outcome Measures

Number of Research projects on treated wastewater by dissolved ozone

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
While wastewater treatment plants (WWTP) employ disinfection protocols which greatly reduce microbial numbers, WWTPs are not designed or required to completely remove diffuse organic pollutants such as genetic elements. Some of the genes that pass through WWTPs and enter receiving streams carry traits such as antibiotic resistance which can affect health and ecology from humans to agriculture to the functioning of ecosystems.

What has been done
We investigated the efficacy of dissolved ozone as a primary means for the destruction of broad-host-range (BHR) plasmids, which can spread among unrelated organisms, and chromosomal DNA. We evaluated dissolved ozone at concentrations of 2 and 8 mg L-1 in the laboratory under controlled conditions and in pilot-scale tests using an experimental unit in a municipal WWTP. We compared results with ultraviolet (UV) irradiation and chlorination methodologies. We used culture based and molecular methods to assess destruction of bacteria and specific genes. In laboratory experiments, dissolved ozone at 8 mg L-1 significantly destroyed greater than 93% of all DNA, but substantial amounts of DNA measured as total, E. coli, and BHR plasmid DNA remained after treatment. In the pilot scale tests, there was discrepancy in E. coli counts between the culture based and molecular methods where culture based methods suggested greater destruction by ozone than molecular methods

Results
None of the disinfection methods completely destroyed BHR plasmids or chromosomal DNA, indicating that high concentrations of dissolved ozone or other disinfection strategies may be necessary to ensure complete destruction of BHR plasmid DNA in WWTP effluent. Mobile genetic elements such as BHR plasmids can be considered emerging contaminants. The lack of congruency between methodological approaches highlights the need to calibrate molecular methods with more traditional culture-based methods for quantification of fecal indicator bacteria and genetic elements such as BHR plasmids. The risks and threats of BHR plasmid discharge from WWTPs still need to be determined to evaluate the level of reduction of BHR plasmids needed in WWTPs to ensure downstream environmental health and safety.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water

112	Watershed Protection and Management
133	Pollution Prevention and Mitigation

Outcome #22

1. Outcome Measures

Number of economic evaluations of conservation BMPs

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Reducing the global warming potential of rice production, management of animal waste and methane emissions from Arkansas rice have become crucial issues for crop and livestock producers and the general public. Several studies show the effectiveness of best management practices (BMPs) in reducing the impact of agriculture on water quality and GHG emissions. However, economic evaluation of implementing BMPs is scarce. The objective of our research was to evaluate a range of management alternatives under uncertain production conditions using economic tools.

What has been done
59 different BMPs in terms of net returns risk reduction for hay producers in the Lincoln Lake watershed were compared. Emphasis was devoted to identifying cost-effective practices to reduce total phosphorous (TP) runoff while maintaining profitability of agriculture in the watershed. To assess the value of BMPs to reduce TP runoff, SDRF was employed to analyze scenarios. This analysis requires a systems approach combining a number of different models covering hydrologic, economic and risk analysis components of a hay production farming system. The hydrologic model was run to generate TP loading and bermudagrass yield data for each scenario for each subbasin in the watershed. Bermudagrass yield data sets were inputs to the economic model. Yield data were utilized to calculate net returns for each scenario analyzed. Outcomes from the hydrologic and economic models were input to the risk model. This last model was employed to evaluate the impact of decision-makers' risk attitudes on BMP scenario preferences under both net returns and TP runoff reductions

Results

This simulation provided evidence that TP runoff in the Lincoln Lake watershed could be reduced without affecting producers' expected net returns when environmentally efficient and economically acceptable BMPs are implemented. Results showed that decision makers will be reluctant to adopt BMPs that reduce drastically their net returns regardless of their water quality benefits. Consequently, decision makers should compare net returns risks and environmental benefits of implementing BMPs to reduce TP runoff, so that producers will be able to select BMPs with the lowest negative economic impact in their hay production operations.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems
605	Natural Resource and Environmental Economics

Outcome #23

1. Outcome Measures

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

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Public Policy changes
- Competing Public priorities

Brief Explanation

The economic climate and outlook for forestry and forest products does not provide incentive for many forest landowners to make investments in short term improvements of forest land.

In Arkansas, where very little infrastructure related to biofuels has evolved, there is little incentive for producers of biofuels feedstocks to invest in alternative biofuels crops and related equipment. Interest in growing alternative biofuel crops in the state today is low, where tradtional row crops enjoy reasonable-to-good profitability.

The emergence of a viable and dynamic Carbon Market could have a big impact among Arkansas forestland and cropland managers.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The Division of Agriculture has been approached and engaged by private and public

entities to conduct multisdisciplinary research and extension programs benefitting farmers, regulators, decison makers, and the general public.

The Discovery Farm program has manged to expand in scope and across commodities since its inception. Among the most revealing aspects of the impact of the program is that the Discovery Farms program has now recived financial funds from 13 different sources, including public directed dollars, competitivie federal funds, commodity board funds, Farm Bureau, NRCS, and others.

The N-STaR program has been quickly adopted by many farmers as a method of managing Nitrogen on rice for both maximum economic returns and reduction of potential GHG emissions.

Key Items of Evaluation

The Center for Agricultural and Rural Sustainability (CARS) launched the $3 million National Sustainable Stawberry Initiative, funded by the Wal Mart Foundation, in 2013. CARS faculty will monitor the prgress of 20 research and extension projects aimed at reducing the environmental impact on US strawberry production while increasing opportunities for stawberry production outside the traditional production areas.

The Discovery Farm Program is addressing the Best Practices for sustainable agricultural production
on nine farms in Arkansas. Discovery Farm uses edge-of-field monitoring of both the quantity and quality of inflow and runoff from fields on real, working farms. Data collected quantifies nutrient and sediment losses to determine off-farm environmental impacts and addresses long-term sustainability and profitability. The nine Discovery Farms strategically placed across the State to represent the predominant livestock and row crop enterprises. Discovery Farms showcase stewardship through website, field days, tours and through oral presentations throughout the State at various events.

Discovery Farms generate opportunities for education and outreach efforts including: 1) Presentations made to more than 3,000 people at various events in Arkansas, 2) Conducted 15 field tours during the last three years for the Joint House/Senate Agriculture Committee, Arkansas Congressional staffers, Wal-Mart Sustainability Coordinators from eleven nations, Arkansas Farm Bureau, Natural Resources Conservation Service (NRCS), United Soybean Board Sustainability Workgroup, and a Multi-State (Seven States) Discovery Farm Tour.

The N-STaR samples submitted to the University of Arkansas N-STaR Soil Testing Lab during 2013 were categorized by county and soil texture. Samples were received from 27 Arkansas counties. The samples received were from 171 silt loam fields and 137 clay fields. In total the lab analyzed roughly 4,000 soil samples during the 2013 growing season. The N-STaR N rate recommendations for these samples were then compared to the producer's estimated N rate or the standard Arkansas N rate recommendation of 150 lb N/acre for silt loam soils and 180 lb N/acre for clay soils and divided into three categories--those with a decrease in recommendation, no change in recommended N rate, or an increase in the N rate recommendation. Samples classified as silt loams indicated a reduced N rate for 60% of the fields analyzed and the average N rate reduction was 25 lb N/acre, whereas clay soils resulted in reduced N rates for 70% of the fields tested with an average reduction in the N

rate of 39 lb N/acre. These results from the 2013 season indicate the potential to reduce N rates for rice produced on both clay and silt loam soils while still maintaining yield and producer profitability.

One of the greatest testaments to the N-STaR program came in 2013, when the N-STaR N rate recommendations were used in all of the Rice Research and Verification Program Fields. In the southern portion of Arkansas 8 of the 11 RRVP fields had significantly lower N rates using the N-STaR program than the producer would have traditionally applied based on soil texture, variety and previous crop. For those fields that indicated a reduced N rate the average reduction was 35 lb N/acre, but yields were drastically higher than the state average coming in at 196 bushels/acre. The inclusion of N-STaR in the RRVP is the first field-scale "real world" test for the program and based on 2013's yield results, it passed with flying colors.