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LASTING IMPACT

University of Arkansas System Division of Agriculture

Annual Report 2012

UofA **DIVISION OF AGRICULTURE**
RESEARCH & EXTENSION
University of Arkansas System



IMPACT:

- Enabling growers to set new yield records.
- Developing probiotic products and technologies that resulted in a new biotech company in Arkansas with an estimated earnings of \$5 million in 2012.
- Saving taxpayers thousands of dollars in health care costs through programs that encourage people to exercise.
- Creating a web site that provided crucial, real-time answers to more than 12,000 Arkansans who were hit hard by the 2012 drought.



Each of these is a true story. Each shows the impact of the University of Arkansas System Division of Agriculture. Touching an individual life may seem beyond the scope of an institution this size, but the Division is a statewide campus created to change lives: to make a positive impact on each of us and our families, communities and businesses. It was conceived more than 150 years ago to make higher education possible for everyone.

The Division has many dedicated people working to make that impact in two ways: through research to discover answers to current and future problems that affect us; and through extension of these answers to us so we can use them to make life better. With offices in every county, the Division of Agriculture is the only part of the University of Arkansas System with a truly statewide presence. In addition to the 75 county extension offices, we have five research and extension centers, seven research stations and three specialty units.

Whether your link to us is through your home garden, parenting advice, 4-H or taking part in a research project, the employees of the University of Arkansas System Division of Agriculture are working to make life better for you, your family and communities.

U of A System Division of Agriculture *Annual Report 2012*

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2012 was a year of milestones

for America's land grant universities, including the University of Arkansas. We celebrated the 150th anniversary of the Morrill Act, a law that established land grant universities, opening higher education to rural America, and ensuring safe, affordable food for all. The University of Arkansas would become the host for a key research institution, the Arkansas Agricultural Experiment Station, founded through the Hatch Act passed 125 years ago; and for its transforming arm, the Cooperative Extension Service, formed in 1914 by the Smith-Lever Act. The final milestone for 2012 was the passage, 50 years earlier, of the McIntire-Stennis Act that provided support for forestry education and research.



Mark J. Cochran
Vice President for Agriculture

These laws are not simply landmarks in our history. They are the essence of what we do every day. Our mission is not only to support agriculture, our state's largest industry, but also the families who work the farms and those who benefit from their labors. The efforts of the experiment station and Cooperative Extension Service enable us to bring new technologies and research to all Arkansans.

"Impacting Arkansas," our 2012 Annual Report provides examples of our focus on specific projects and programs in the Division's five areas of emphasis:

- Agricultural production and processing
- Environment, energy and climate
- Access to safe and nutritious food
- Increasing opportunities for families and youth
- Economic and community development

We believe all of this hard work is having a lasting impact on Arkansas and its residents.

Sincerely,

A handwritten signature in black ink that reads "Mark J. Cochran". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

Mark J. Cochran
Vice President for Agriculture



\$16 BILLION:

Agriculture accounts for nearly one quarter of the state's economic activity (\$16 billion annually) and provides

one in six jobs.



ECONOMIC CONTRIBUTION OF ARKANSAS AGRICULTURE

Arkansas agriculture is measured by more than just acres, bushels or calves. It's an industry gauged by jobs and dollars and the impact both have on the community and related businesses.

In the Natural State, crops, livestock and forestry sectors account for more than 256,244 jobs, which is more than one of every six jobs in Arkansas. Agricultural products account for a higher percentage of the state's Gross Domestic Product (GDP) than any other southeastern state, and almost twice the national average.

Agricultural workers in Arkansas received \$9.8 billion in wages and salaries. At more than 16 percent of the state's total labor income, it represents a huge part of Arkansas' economy. Agriculture accounted for \$16 billion of the total Arkansas economy in 2010, making us one of the most important agriculturally-based states in the nation.

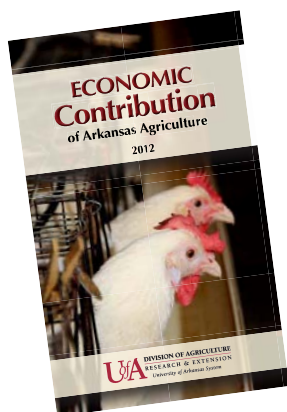
Arkansas is in the top 25 states in the production of 24 agricultural commodities

(2011 Production Year)¹

- No. 1 in Rice
- No. 2 in Broilers
- No. 3 in Catfish (food-size)
- No. 3 in Cotton (upland)
- No. 3 in Turkeys
- No. 4 in Cottonseed
- No. 5 in Sweet Potatoes
- No. 6 in Grain Sorghum
- No. 9 in Soybeans
- No. 10 in Chicken Eggs
- No. 10 in Pecans
- No. 11 in Beef Cows²
- No. 12 in Tomatoes
- No. 13 in Blueberries
- No. 13 in Grapes
- No. 14 in Watermelons
- No. 16 in Sod Production Acreage³
- No. 20 in Wheat
- No. 21 in Cattle and Calves
- No. 21 in Corn for Grain
- No. 21 in Honey
- No. 21 in Oats
- No. 21 in Peaches
- No. 24 in Hogs and Pigs

Source: National Agricultural Statistics Service, data for 2011.

¹ Data for some states are unavailable due to nondisclosure, especially for livestock and livestock products commodities. As a result, these states are not included in the rankings, which may affect Arkansas' actual rank.² Beef cows is a Jan. 1, 2011, inventory comprised of "beef cows that have calved" and "beef cow replacement heifers 500 pounds and over."³ Source: Census of Agriculture, data for 2007; Haydu, J.J., A.W. Hodges, and C.R. Hall, 2006.



For more information about the economic contributions of Arkansas agriculture, visit http://division.uaex.edu/news_publications/economic_Contribution_2012.pdf to download the Economic Contribution of Arkansas Agriculture.

The total economic impact of the agricultural sector includes three areas of wealth and job generation.

- **Direct Impacts** are generated by farm production and processing of crops, poultry, livestock and forest products.
- **Indirect Impacts** result when agricultural firms purchase materials and services from other Arkansas businesses — a very important part of the economy in many communities.
- **Induced Impacts** result when employees of agricultural firms and their suppliers spend a portion of their income within Arkansas.

These impacts are reported in terms of Employment, Labor Income and Value Added.

- **Employment** includes all wage and salary employees, as well as self-employed workers in a given sector.
- **Labor Income** consists of two parts. First is proprietary income, which includes all income received by self-employed individuals. Second is wages, which includes all payments to workers, including benefits.
- **Value Added** includes labor income plus indirect taxes and other property-type income such as payments for rents, royalties and dividends. Value Added and Gross Domestic Product (GDP) are equivalent measures in theory but are estimated using different methods and data sources.

With 48,300 farms on 13.5 million acres in 2011, Arkansas ranks 14th nationally in total farm receipts. It ranks 4th in timber production, with about 18.8 million acres of forest land

representing approximately 56 percent of the total land base. Arkansas is the largest producer of rice in the nation and ranks in the top 25 states or higher for the production of 24 different commodities.

Arkansas agriculture contributes a larger share to the Gross State Product than does agriculture in neighboring states and the U.S. economy. Agricultural production, processing and retail account for 10.8 percent of the Gross Domestic Product by state. This compares to about 7 percent for the southeast U.S. and 5.6 percent nationwide.

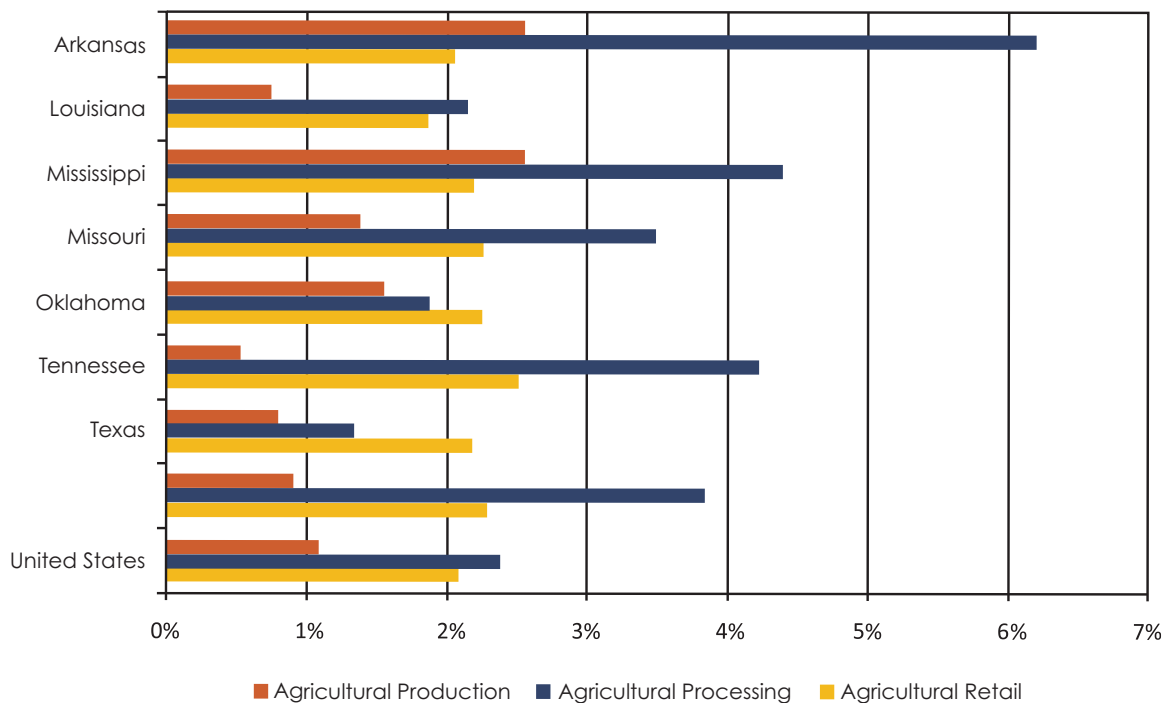
Aggregate of Value Added by Agriculture

Impact Area	Billions (\$)	% Total Impact	% State Total
Direct			
Production	2.27	14.2	2.4
Processing	5.64	35.2	5.8
Ag-related	0.33	2.1	0.3
Total Direct	8.24	51.5	8.5
Indirect	4.53	28.3	4.7
Induced	3.23	20.2	3.3
TOTAL	16.00	100.0	16.6

Source: Impact of the Agricultural Sector on the Arkansas Economy in 2010

Agricultural Production, Processing and Retail as a percentage of Gross State Product by State, 2010

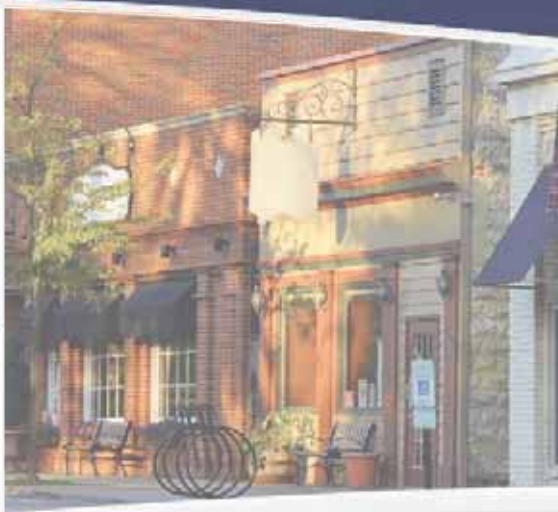
Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Accounts Data, 2012.





*"I know my county agent's
recommendations are research-based."*

— Corey Patterson, Prairie County producer



AGRICULTURAL PRODUCTION & PROCESSING

Agriculture is an inseparable quality of Arkansas' character. The state's economy was built on farming, and today one in six jobs is based on some facet of agriculture, whether forestry, animals, poultry or plant crop-related. The core mission of the University of Arkansas System Division of Agriculture is to provide positive impact for that key industry through research and extension from the Division of Agriculture.

Corn verification fields hit record-breaking yields

The 13-year-old Arkansas Corn Verification Program hit new highs in 2012. Average yields for fields hit an unprecedented 238 bushels per acre, obliterating the old record of 205 bushels set in 2008. As of October, the statewide average yield for corn was pegged at 177 bushels per acre. USDA was to make final state averages available in January 2013. "I don't know that I'll ever see another year like this," said Kevin Lawson, extension area agronomist for corn and sorghum. Lawson and Jason Kelley, specialist for corn and wheat, said the warm March and well-timed rain made for perfect conditions for this year's crop. An early start allowed corn to mature enough not to be hurt by the killing summer drought. Lawson said the verification farmers who closely followed university recommendations — especially when to irrigate — saw the highest yields.

Flag the Technology goes statewide

A new extension program, "Flag the Technology," was initiated statewide in 2012 using a grant from the Arkansas Soybean Promotion Board. The simple premise is to educate growers on where to purchase color-coded bicycle flags and use them to mark fields with specific herbicide resistance technology, for example, "Liberty Link soybeans," resistant to Liberty herbicide. The grant was used by counties to purchase and distribute 25,000 demonstration flags installed in thousands of fields, representing an estimated 1.3 million acres. Surveys during the summer have indicated widespread support for the concept



THE FLAG IS UP — Flag the Technology uses highly visible, standardized color-coded flags to mark crops according to their herbicide resistance technology. This helps applicators avoid drift and mistakes.

and belief that it has made pesticide applicators more careful, reducing application mistakes and herbicide drift problems. CES faculty have also initiated the development of a web site to allow fields to be marked with the color codes using GPS satellite images, to be made available to applicators in the future.

Alien invaders: web site about forest invasives launched

Invasive pests cost the U.S. an estimated \$130 billion in damage and preventative measures every year, and information is the best defense. The Arkansas Forest Resources Center has just launched a web site, www.arinvasives.org, meant to provide critical information to help manage destructive pests of our forests. Jon Barry, an extension forester for the Division of Agriculture, said the site has two goals: one, to raise awareness of problems caused by invasive pests, and two, to recruit and train qualified people as field spotters who can serve as early warning systems for these insects.

Cutting-edge science to develop better poultry

Several important model genetic lines of chickens have been developed and maintained for study by Division scientists in the Poultry Center of Excellence. These lines are currently being investigated using cutting-edge molecular genetic techniques to understand basic differences in modern poultry breeds, and identify genes that will chickens for farms of the future. Another benefit of this basic research will be a better understanding of why certain genes are associated with diseases and how these genes actually work. These findings could have value in understanding genetic diseases of people as well. For commercial production in the near future, these studies should help develop poultry that are more resistant to ascites, a complex disease syndrome resulting in “congestive heart failure” in broilers that results in up to 5 percent loss under Arkansas growing conditions.

Peanuts making a comeback in Arkansas

Cooperative Extension Service faculty, working with industry representatives, growers and other agencies, have helped re-establish peanuts as a growing crop in Arkansas. Efforts began in 2011, including hosting the first organizational and educational meetings. Since then the group has been researching local production constraints and has been assisting growers in field establishment and equipment choices. Travis Faske, extension plant pathologist for the Division of Agriculture, said that Arkansas’ peanut acreage is estimated at 18,000 acres, well up from the approximately 7,500 acres grown in 2011. Most of the peanut acreage is in Lawrence and Randolph counties, with other total acres spread among Clay, Lee, Poinsett, Phillips, Mississippi and White

“As first time peanut growers, we faced many new problems, but the Extension Service helped us make a great crop.”

— Adam Henry, Lawrence County producer



counties. Two peanut buyers, the Clint Williams and Birdsong peanut companies, built buying point warehouses near Pocahontas and Walnut Ridge. Peanuts are an old crop in Arkansas, with 6,000 acres harvested in 1909. Over time, acreage diminished until in recent years very few acres were produced in the state. In 2012, Arkansas growers proved that peanuts could be a profitable crop once again, and hopes are that the industry is here to stay.

Herbicide resistance in barnyardgrass — a growing threat

Barnyardgrass is the most important grass weed of crops in the Midsouth, and one of the most difficult to control over time. In recent years, this major weed has become resistant to many herbicides and slowing down or stopping the development of resistance is a major goal of Division weed scientists. Scientists have developed a computer model that helps them understand how different herbicide and non-herbicide management approaches impact long term control of this weed and its ability to develop resistance under different growing conditions. Results from model simulations are being validated under actual field conditions and growers are being advised as to how to best manage barnyardgrass in the long term to avoid creating “monster weed” problems that cannot be effectively managed.

Using mustard to beat nematodes in tomatoes

Arkansas tomato growers with root knot nematodes face a difficult situation. In order to purchase federal insurance for their crops, they must fumigate for nematode control. Fumigation using methyl bromide is not only pricey at \$400 an acre but also is scheduled to be banned from use in the United States because it is considered a greenhouse gas. A producer whose field tested high for nematodes contacted Bradley County Extension

Agent John Gavin. Gavin talked to Extension Vegetable Specialist Craig Andersen and Plant Pathologist Craig Rothrock for alternatives. Rothrock had been researching the use of the Indian mustard ‘Fumus’ as a biofumigant in cotton. Rothrock provided some seed and Gavin planted 10 acres. The mustard was allowed to grow between September 2010 and February 2011, when it was tilled in to decompose prior to tomato planting. Tests showed that the one planting reduced nematodes to acceptable levels in both the 2011 and 2012 growing seasons. Gavin said the biofumigant likely saved the producer an estimated \$400 per acre per year, with a total savings of \$8,000 on his 10 acres of tomatoes during the past two years. More research is needed to confirm the results.



MUSTARD AND TOMATO, HOLD THE NEMATODES — Indian mustard as a biofumigant may provide tomato growers an alternative to methyl bromide for root knot nematode control.

Putting horticulture in the public eye

A \$1,500 grant from the Arkansas Flower and Garden Show’s “Greening of Arkansas” program has put horticulture in plain sight. When a new Cross County Health Department building was constructed in 2010, no funds were available for landscaping. The Cross and St. Francis county extension offices developed a detailed landscape plan, which they used to obtain the grant. Local Master Gardeners, along with workers from the Cross County Special Workshop, did site preparation and planting. Thirty-one hours were devoted to the project, and a new sign will be placed at the location indicating the project’s maintenance by Master Gardeners. The Master Gardener program is conducted by the Cooperative Extension Service.



Investigating ways to improve sustainable health in poultry

Division scientists are investigating new technologies that combat disease and improve performance in poultry while reducing the need for antibiotics and other chemicals. For example, probiotics — microorganisms that are harmless to the host animals and provide some health benefit — successfully compete with pathogenic bacteria in poultry gastrointestinal tracts, improving poultry health and promoting growth while curbing production costs. A company was formed to produce and market a number of probiotic products developed by the Division of Agriculture and has become one of the top five biotech companies in Arkansas with estimated earnings of \$5 million in 2012. Research continues on probiotics, as well as prebiotics, bacteriophages and vaccines to help alleviate the need for antibiotics and other chemicals in poultry production, promote animal health and well-being and feed efficiency. Targeted diseases include



BIOLOGICAL DEFENSE — Amanda Wolfenden, program manager for the Division of Agriculture probiotics research in poultry science, counts *Salmonella* colonies in plated samples taken from chickens that received different doses of the same probiotic administered in drinking water. Wolfenden is looking for the actual killing of *Salmonella* over a period of time.

Salmonella, *Campylobacter*, *Clostridium*, *Coccidia*, *Bordetella* and avian influenza. Taken together, the multi-legged approach to developing methods aimed at decreasing the dependence of the poultry industry on antibiotics and chemical additives will increase the long-term sustainability and health of poultry, thus keeping poultry products at an affordable price for consumers.

Genetic tools to improve livestock fertility

Reproductive efficiency is a primary factor in modern livestock farm profit. Division of Agriculture scientists are leading efforts to better understand livestock reproduction and develop improved methods to realize higher and more dependable reproductive rates in herds. By understanding the process of livestock reproduction at the molecular level, greater reproductive efficiency is possible, which would reduce costs and increase profit. These methods would also result in healthier animals from birth. Fertility in livestock is controlled by many genes, thus one cutting edge method is to identify certain of these or related genes as markers, allowing livestock breeders to identify improved animals before having to grow them to maturity. This “marker-assisted selection” makes livestock breeding more efficient and less costly than the use of traditional methods.

National Agricultural Law Center offers webinar series

The National Agricultural Law Center of the Division of Agriculture began a webinar series aimed not only at producers but also those involved in insurance, finance and other industries serving agriculture. In 2012, the center offered webinars on the legal and policy aspects of the drought, the context and potential effects of a suit by environmental groups against the Environmental Protection Agency and the effects of the latest Farm Bill on agriculture in the South. The center also hosted a series of workshops in Louisiana, Mississippi and Arkansas on the Farm Bill and changes to crop insurance. The workshops were supported by the Banks Law Firm, PLLC.



DRY — In Arkansas, a dry spell that began in 2011 in western and southwestern Arkansas turned into a full-blown drought that covered all the state in 2012. It had an impact on gardens, yards, water supplies and farm operations.



In response to the 2012 drought, agents and specialists organized 30 summits for cattle producers, plus created the Arkansas Drought Resources blog. The blog, a one-stop shop for practical drought information received nearly 12,000 views. In addition, division economists conducted a study to determine the impact of the drought, while agents and specialists conducted dozens of media interviews with drought coping information being carried in hundreds of media outlets around the world.

Reducing the impact of drought in Miller County

Drought may have a minimal impact on most row crops, thanks to irrigation, if adequate. However, in 2011, drought in Miller County cut yields of corn, soybeans, rice and sorghum by 60-100 percent, pointing up the need for more irrigation. Miller County extension faculty addressed many aspects of the drought in a series of production meetings that explored management tactics for each crop, pond use and even tax implications. Miller County extension agents also helped producers select irrigation equipment, schedule irrigation, conserve soil moisture and select drought-tolerant varieties. As a result, more than 3,000 acres of irrigation was added in 2012. One producer, with five new center pivots, saw his irrigated corn yield 168 bushels per acre compared to the 72 bushels he achieved in nonirrigated areas. "It was the best row crop insurance I could buy," the producer said.

Drought resources blog

Deborah Tootle, associate professor – Community and Economic Development and a veteran of Hurricane Katrina recovery efforts, spearheaded Extension's drought disaster initiative. A WordPress blog, Arkansas Drought Resources, was

created as a one-stop shop for practical drought management information. The blog included sections for livestock, row crops, fisheries, forestry, home/garden, legal and water management. In its first 90 days, the blog achieved more than 12,000 visits from the U.S. and dozens of countries. The drought that afflicted Arkansas in 2012 and part of 2011 is being blamed for at least \$128 million in losses to the state's cattle industry.

Tapping into Phaucet for water savings

While irrigation insulated Arkansas' row crops from the drought of 2012, estimates by USDA and the University of Arkansas suggest that water used for agriculture in Arkansas must be reduced to ensure sustainability in the long term. In Mississippi County, on-farm visits, field demonstrations, social media and newsletters helped promote irrigation efficiency and reduce water use. Surge value demonstrations conducted on three farms showed a 34 percent reduction in water use. Field demonstrations of Phaucet, a computer-aided irrigation tool originally developed by USDA-ARS scientists, were established on nine farms representing corn, cotton and soybean production on 4,000 acres. Dal Luther, a Leachville producer, is convinced: "Before Phaucet, our flood irrigation was all guesswork.

Now we are using flood wells to their full potential. I wouldn't think about furrow irrigation without a Phaucet plan in place. I plan on taking it to an even more precise level next year by checking flow at every riser, not just at the well."

Genetically improved seedlings for southern forests

Division scientists are using new technologies in genomics alongside traditional techniques to help



STAND TALL - Division researchers are working to improve important trees for the timber industry.

ensure healthy and productive forests that meet growing demand for energy, wood and alternative crop production. By broadening the knowledge base of important timber species, they are working to improve species in regards to volume gain and disease resistance, develop superior propagation techniques to increase genetic gain for species important to Arkansas and develop superior

silviculture techniques. The goal of the project is to use traditional selection, storage techniques of seed and germplasm and deployment of seedlings by genetic groups for successful initiation and growth for superior forest stands.

Development of improved wheat varieties

In Arkansas, average wheat yields have increased about half a bushel per acre per year over the last 30 years, faster than the rest of the country. These yield increases are due to a combination of improved cultural practices and wheat breeding, with studies indicating up to 55 percent of

yield improvement due to superior genetics. Division scientists maintain a continuous breeding and testing program to identify better varieties adapted to Arkansas' environment and resistant to diseases. The Arkansas wheat breeding and variety testing program focuses on new wheat varieties with higher yield potential, better test weight, environmental stress tolerance and durable disease resistance. Developing a new variety is a slow and laborious process, and there is a continuous effort to identify useful new breeding lines through exchange and cooperative testing with other University breeding programs around the nation. Breeders, pathologists, entomologists, geneticists and extension specialists cooperate to provide the most useful cultivars and information to Arkansas producers.

Nitrate sampling to help livestock producers with crop residue

Extended drought is dangerous to livestock in many ways. In areas where forage supplies dried up, some livestock producers turned to their row crop counterparts to use post-harvest crop residue to feed herds, where permitted. In Greene County, 33 samples of corn, milo and other stubble were tested for high nitrate levels, which can be deadly to cattle. In addition, the county provided nutrient analysis on grass hay, peanut hay and cotton gin trash. Thanks to the testing, residue from approved fields could be used by livestock producers across the state.

iPads for agents

More than 100 tablets have been placed with county extension ag agents in Arkansas through an initiative called "iPads for Agents." The lightweight devices have been extraordinarily useful on-the-go and in real-time educational efforts, used from submitting diagnostic images of crops to demonstrating new technology to producers and other clients via video or "iBooks." One CES faculty has also created a wide-ranging collection of agricultural-related apps and iBooks for agent use as a result.



*"I have never seen the
yield monitor hit
100 bushels per acre
in wheat
... and now I have."*

— an Arkansas Department
of Correction combine operator

Wheat verification helps ADC make a profit

In a time of tight budgets, government agencies are always looking for ways to maximize what's left in the bank. In 2012, the Arkansas Department of Correction enrolled one of its wheat fields in the Lincoln County Wheat Research Verification Program, which finds ways to maximize profits for row crop producers. ADC enrolled a field that had the second highest operating expenses of the 10 fields enrolled statewide. When harvest was completed, the field averaged 92 bushel per acre. In 2011, ADC averaged 49 bushels per acre on about 2,300 acres of wheat. By using the verification program recommendations, yields on the ADC's 2,800 acres rose by 23 bushels an acre. Net return on the verification field was \$214.57 an acre and across the farm, gross returns were increased by \$149.50 per acre as compared to 2011 by applying recommendations for the verification field to other fields.



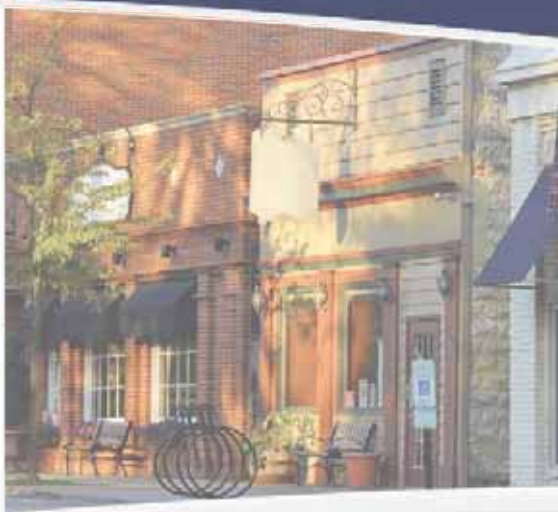
FIELDS OF GOLD — Working with the Wheat Research Verification Program has enabled the Arkansas Department of Correction to maximize its returns. By using verification program recommendations, ADC's yields rose by 23 bushels per acre.

Molecular genetics analysis of crop traits

Division scientists are using new molecular genetic techniques to identify genes and pathways important in controlling many beneficial crop traits like yield and resistance to diseases and other stress. Because the DNA or genome of rice is relatively small in size and has been mapped, Division researchers use it as a model system for study. Another important aspect of this study is to better understand how much genetic variability exists within modern rice varieties and breeding material. Without understanding, breeding improved varieties in any crops tends to result in varieties that are highly related and thus more susceptible to disastrous failure in a bad growing year. Even in rice, the number of genes in the DNA is enormous so understanding all of them and how they work together requires very complex data analysis. However, the positive outcome of this complicated work will be the identification of genes critical to better yields and reliable production, allowing breeders to more easily develop varieties for farmers that are more sustainable, profitable and dependable. In the future, this knowledge will be critically important as we try to feed more than 9 billion people in only another 35 years.



Hundreds of volunteers picked up 2,700 pounds of trash along Lee Creek to help protect water quality in the Ozark National Forest.



ENVIRONMENT, ENERGY & CLIMATE

Agriculture's existence is indelibly linked to the realms of energy, climate and environment. The University of Arkansas System Division of Agriculture is using its resources to enable farming to be sustainable by being more energy efficient, produce the stock needed for biofuel production, find ways to preserve in quality and quantity our limited water resources and to help farmers grow in ways that can withstand climatic extremes. It's an impact meant to assure the security of our food, fiber and fuel for years to come.

Discovery Farms project adds cotton farm

The Arkansas Discovery Farms, a project to monitor water quality of farm runoff, and assess the effect of best management practices, continues to expand, adding a cotton-corn-soybean farm with four monitored fields in southeastern Arkansas. The addition is partially supported by a grant from Cotton Inc. The project also has received a grant to establish a new pasture-cattle monitored farm in the Illinois River Watershed of northwest Arkansas, sponsored by the Walton Family Foundation. These will bring the total number of farms to six across the state, and a new web site describes the program and other water sustainability news at <http://watersustainability.wordpress.com/agriculture/arkansas-discovery-farms/>.

Water management program supports sustainable irrigated ag production

Arkansas ranks fourth in irrigated acres of farmland. In Arkansas, the primary source for water is groundwater, but currently, water is withdrawn faster than the aquifers can recharge. This imbalance can mean higher costs, eventual depletion and loss of irrigated agriculture. The Division of



MAINTAINING BALANCE — Arkansas is No. 4 in irrigated farmland, and most of that irrigation comes from slow-to-recharge underground sources. The Division's Water Management Program helps farmers reduce water use, while improving water quality

Agriculture Water Management Program provides leadership in the management of agricultural water resources and impacts on surface water quality from irrigation and crop production. The WMP supports graduate students and extension professionals and research-based information to improve best management practices. Resulting irrigation scheduling and the development and implementation of new technologies will reduce consumptive water use and improve water quality. The primary focus and efforts will be concentrated in the Arkansas Delta water resource region, but the program will address water management concerns statewide.

Systematics of water mites in North American streams and rivers

Water mites are among the most abundant, diverse and ecologically important arthropod groups in freshwater habitats like streams, rivers, ponds and lakes. But very little is known about water mite biology and diversity in North America, making incorporation of water mites into research programs nearly impossible. Additionally, very few water mite experts exist worldwide and few experts have been trained

in North America during recent decades. A Division of Agriculture project seeks to build a knowledge base of torrenticolids, one of the most abundant and diverse families of water mites, as a resource that can be used to, among other things, monitor the health and biodiversity of freshwater habitats. The project also is training a new generation of experts in the field by using students at every stage of the study. The project will contribute in-depth understanding of water mite biology and evolution, modernize the taxonomic process and disseminate results and interactive tools through a project web site. Outreach efforts will enhance the public's understanding of a part of the natural world few think about through workshops and presentations held in national parks.

Fostering wildlife conservation

As our world becomes more urbanized and technology driven, youth have fewer and more isolated experiences with animals. Six wildlife-related school enrichment programs were conducted with 140 sixth-grade students in Arkadelphia. All programs were hands-on learning opportunities, giving students a chance to use GPS receivers, use hammers and screwdrivers building houses, plant native trees and



FOR THE BIRDS — 4-H'ers had a hands-on opportunity to enhance the environment for local bird populations. Wildlife-related school enrichment programs built birdhouses, earned GPS skills and to ID wildlife tracks and scat.

shrubs on campus to attract wildlife and examine lifelike tracks and scat. The students built approximately 80 wood duck boxes that were donated to the Corps of Engineers to place around DeGray Lake, along with 140 bluebird boxes that each student could hang in his or her yard. Nearly 150 native plants were planted and maintained on the middle school campus to offer wildlife shelter and food sources. The students learned new skills, such as basic carpentry, landscaping, GPS technology and the ability to identify common Arkansas wildlife mammals. They also learned the importance of being good stewards of the environment in order to protect our wildlife habitat.

Assessment of carbon sequestration potential in southern soils

The agricultural community has a competitive advantage in the carbon economy because agricultural soils, if properly managed, can sequester appreciable amounts of atmospheric carbon as soil organic carbon. The Division of Agriculture is assessing the soil carbon sequestration potential of common agricultural and natural ecosystems of varying ages on benchmark soils across the South. This project will generate essential, scientifically-based field data to support accurate projections of and provide guidance for soil carbon sequestration potentials across the climate gradient of the southern U.S. The results will provide producers and policy makers credible and comprehensive information on the merit of adopting different land uses in the southern U.S. Improving our understanding of the relationships among climates, soils, land uses and carbon will contribute to increased awareness and protection of our natural resources and improve the quality of our air, soil and water for future generations. This information may also lead to increased on-farm profits for those producers who choose to use more sustainable land management practices.

Division of Agriculture responds to deepening drought needs

As the drought of 2011 expanded and deepened statewide in 2012, University of Arkansas Division of Agriculture faculty and staff were ready to provide producers with tools to cope. Extension agents in the Arkansas River Valley organized a drought summit. More than 300 cattle producers and others attended, learning ways to cope with shrinking pastures and disappearing forage. Agents and Animal Science faculty organized eight more meetings around the state. Community and Economic Development and Communications created an online one-stop shop, Arkansas Drought Resources, that included pages for live-stock and row crop producers, foresters, homeowners and aquaculture producers, as well as information on legal ramifications. The site had more than 10,000 visits in its first 120 days.

CED and Communications also developed a series of “Be Aware and Prepare” fact sheets that included one with tactics for protecting property and surviving wildfires. The Communications Department prepared dozens of news stories to keep the media engaged in a growing story. Arkansas drought was covered by local, national and international outlets including the BBC. Division economists released a preliminary report on damage to the state’s cattle industry, putting the number at \$128 million.



GREEN ROOFS — CSES graduate student Channon Toland collects data on the hardiness of different plant species and their ability to absorb rainwater that otherwise would run off into drainage.



CARBON — Swine have carbon footprints too, and researchers and extension faculty are working to help those with swine operations anticipate and manage their carbon footprints.

Mitigating the carbon footprint of swine produced in the U.S.

Division scientists are evaluating climate change mitigation technologies that may help swine producers reduce the carbon footprint of their production practices. The aim of the project is to create tools that will enable swine farmers to make more informed choices that will enhance productivity, profitability and environmental quality. Benefits of this project to the swine industry are multifaceted. The project's combination of experimentation, modeling and outreach meet a demonstrated need and provide the first generation of system scale farm productivity and environmental management tools. Goals of the research are to validate the effectiveness of selected mitigation strategies, including dietary feeding strategies, health and management effects and manure management options. The resulting models will help create a user-friendly tool to identify economical swine production

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system options that minimize greenhouse gas emissions and increase sustainability of swine production systems. Education and outreach programs will provide training on the use of the developed tools.

Water treatment processes to maintain water quality

Humans are part of the earth's ecosystem. But interaction between humans and water through agriculture, recreation, drinking water treatment and wastewater production and treatment can impair water quality. Division scientists are developing methods to effectively reverse detrimental impacts from overabundance of organics and nutrients from human processes. The natural environment has a tremendous capacity to convert polluted water to water suitable for human use. However, if the level of pollutants exceeds a certain capacity, the natural system can no longer perform these needed processes. The most common cause of this is the inability of dissolved oxygen to support natural bacterial respiration processes that remove organic matter from water. This project is studying methods for the addition of dissolved oxygen to natural waters to support the bacterial processes until the natural system can once again complete the process of cleaning environmental water. Other processes being studied include ozonation to remove pollutants from water and dissolve air flotation to remove algae that results from excess nutrients in the water from ponds and lakes



Sustainability applications across the agricultural supply chain

Agriculture contributes more than \$17 billion to Arkansas' economy and is responsible for one in six jobs in the state. Maintaining this agricultural economy while protecting the ability of future generations to meet their needs presents a challenge. To meet this challenge, Division of Agriculture economists are conducting sustainability analyses across the agricultural supply chain. The study undertakes a holistic approach by incorporating the knowledge from economics and other resources, policy, engineering, agriculture and business fields to address the economic, environmental and/or social impacts of agricultural production, processing and retail management decisions. It includes the evaluation of resource allocations (in both quantity and quality), production input substitution alternatives, site-specific best management strategies and voluntary and mandatory management practices that cause economic, environmental and/or social consequences to both firms and society.

Water quality research to support watershed-based management

The Division of Agriculture Water Quality Research Lab provides analytical support to graduate research assistants working on related water quality research projects. Division research evaluates the source and modes of travel for chemical constituents across watersheds and changes in water quality chemistry. The Watershed Research and Education Center and the fee-based water quality lab facilitate projects that provide data analysis support to local, state and federal agencies focused on water quality issues. In 2010, Siloam Springs began restoring segments of Sager Creek, and the lab evaluated chemical water quality within the creek before, during and after the restoration. In another study, division scientists collected water samples from the south fork of the Little Red River in the Gulf Mountain Wildlife Area, where USDA has leased rights for natural gas exploration. This watershed is home to endangered wildlife



photo by Jeff Heard

LITTLE RED RIVER — Division scientists are evaluating the effects of natural gas development in a wildlife area leased for exploration by USDA. The Gulf Mountain Wildlife Area is home to endangered species and is a source for Greers Ferry Lake.

species and is a source for Greers Ferry Lake. The research is evaluating the effects of natural gas development on this pristine river system. The Sager Creek restoration monitoring and Gulf Mountain monitoring demonstrate how stream restoration and natural gas exploration and drilling affect water quality and suggest appropriate stakeholder actions to maintain a clean environment.



"Even on my tight budget, I have learned that by planning meals, using what I have on hand and shopping wisely, my family can eat healthy."

— Crawford County Head Start parent



ACCESS TO SAFE & NUTRITIOUS FOOD

Increasing the ability of Arkansas families to meet their nutritional needs is part of the work being done by the University of Arkansas System Division of Agriculture. And the state is facing many challenges related to diet: obesity, heart disease and diabetes. There is also the challenge of limited resources, with nearly 20 percent of Arkansas households struggling to put food on the table. The Division's research and education arms are making an impact, helping Arkansans make the most healthy and economical decisions for themselves and their families.

Obesity prevention: young children in at-risk environments

A team of Division researchers is identifying the characteristics of the food environment that contribute to childhood obesity, a critical step toward determining the interventions necessary to address the problem. Such interventions are designed to improve children's diets, promote physical activity and encourage other healthy behaviors. The interventions are intended to become part of curriculum designed for use in Head Start, preschool and early elementary classrooms. The project promotes improved access to fresh fruits and vegetables through a direct farm-to-school distribution network that links local farmers to the schools. The project is also developing a formal education program that will prepare future child care providers and early childhood educators to better understand childhood obesity. Recent activities toward these ends have included development of surveys of more than 200 low-income parents regarding food-buying habits and their access to technology. Also, 100 college students learned how to teach and reinforce healthy nutrition and exercise to preschool children, Head Start teachers were informed on the importance of screening for nutrition deficiencies and child nutrition directors were instructed on aspects of farm-to-school programming.



ADDING UP — When families buy the groceries, the total purchase is more than just the price printed on the receipt. Decisions made in the store have an impact on individuals' health and nutritional well being. Studies and projects initiated by the Division of Agriculture find ways to assist families manage their nutritional needs.

Keeping good nutrition in budget

Approximately 19 percent of Arkansas households are food insecure, and studies show that those who are the most food insecure are at greater risk for obesity. The Baxter County Cooperative Extension office partnered with Ozark Opportunities, Inc., to provide nutrition education. Commodity recipients took part in multiple sessions that focused on healthy eating with limited income and choosing healthier beverages. Participants had the opportunity to assist in cooking demonstrations and to sample prepared recipes. They also prepared grocery lists based on sale ads and coupons, choosing nutritious and inexpensive meals to prepare for their families and rethinking their beverage choices based on its cost and nutritive qualities. After the sessions, 80 percent said they would drink more water and 70 percent planned to cut the number of sugar-sweetened beverages.

Plant an extra row for healthy living

Extension educators in Desha County took advantage of one of the original forms of social media – radio – to help residents battle the county's 31 percent rate for those overweight or obese. County Extension Agent Heather Reed, along with local doctors and other health workers, took to the airwaves on KVSA with daily tips on choosing to live in a more healthy way. Topics included the My Plate program, heart health, daily exercise recommendations and stroke prevention. Meanwhile the Plant an Extra Row for the Hungry program provided vouchers to local growers, encouraging them to either share their vegetables with neighbors or bring them to the local farmers' market. Displays in three local grocery stores provided recommendations from the My Plate program. The radio spots on KVSA were heard by approximately 5,600 listeners. Sixteen local growers from the Plant an Extra Row program sold their vegetables at the local farmers' market, while 25 participants in the program reported sharing their vegetables with neighbors. These fresh vegetables provided healthier alternatives to processed foods to the people who consumed them.

Fighting chronic health problems step by step

In Ashley County, 36 percent of adults are obese and 33 percent of youth in the Crossett and Hamburg school districts are either at risk for overweight or overweight. All are at higher risk for diabetes, high blood pressure, heart disease and other chronic illnesses. Educational programs included Reshape Yourself, Walk Across Arkansas, Strong Women & Men, Healthy Cooking classes, Nutrition Education seminars and Supplemental Nutrition Assistance Program-Education programs. Through these efforts, 242 educational sessions were conducted that reached 1,940 individuals. Participants in the Reshape Yourself program lost 78 pounds and decreased their blood pressure, blood glucose levels and cholesterol. Two-hundred eighty-one participants in Walk Across Arkansas lost 183.5 pounds and recorded exercising 644,987 minutes, which potentially saved \$62,299.00 in health care

costs. Results from the Strong Women and Men program indicate the following economic impact: Cost savings from fall reductions \$46,200; Medicare savings \$35,658; Hospitalization from hip fracture prevention \$30,240.

Learning how various factors affect food demand, consumption and obesity

A team of Division researchers is exploring the effect of a number of factors on food consumption, obesity and health behavior. The factors include exposure to fast food restaurants, food assistance programs, use of nutritional labels and socio-demographic factors. Knowledge about how psychological and sociological factors influence food consumption and obesity is important to developing food programs that can assure a safe, affordable, reliable and nutritious food supply and promote health. More effective public policies in the food sector are likely if there are improvements in understanding the elements of food consumption and the factors that determine the adoption of a healthy diet.

Changing processing procedures to improve quality of fruits and vegetables

Commercial food processing can affect the nutritional and sensory quality of fruits and vegetables. Division researchers have examined how to identify fruit and vegetable varieties that contain elevated levels of phytonutrients. They also are studying how processing conditions can be modified to improve the quality of fruits and vegetables and

how to prevent losses of phytonutrients during processing and storage. Their efforts led them to recommend grinding of frozen fruit prior to further juice processing to maximize the polyphenolic content of cranberry juice. They also found that dried cranberry pomace is a promising functional food ingredient.

Learning safe food preservation

The federal Centers for Disease Control and Prevention report 91 percent of potentially lethal botulism contamination is from a noncommercial food — most commonly home-canned vegetables. More people are canning, and many home canners, new and experienced, may be using unsafe, outdated canning practices. In Hot Spring County, Family and Consumer Science Agent Cheryl Maxwell held four canning workshops. Boiling water bath and pressure canning standards were taught in three workshops for adults, and a workshop for youth featured preserving food by the boiling water method. An article detailing safe canning practices prepared by Maxwell was published in the local newspaper. Individuals were urged to have canner gauges tested by extension for safety. Farmers' market vendors were provided information on rules for sale of preserved foods. As a result of these efforts, one farmers market vendor removed products from his stall that are not allowed by "cottage law" Arkansas Act 72 of 2010, and three antiquated and unsafe pieces of equipment were removed from use by home canners after testing.



SAFE CANNING – Canning workshops sponsored by the Cooperative Extension Service provide consumers valuable information that ensure safety. A federal study showed that outdated canning practices can lead to potentially lethal botulism contamination.





FOOD FACTS — Youngsters learn healthy eating (left) and have fun making what they'll eat, in a lesson taught by Crittenden Co. Extension Staff Chair VeEtta Simmons. Clay Co. WIC participants (below) toured local grocery stores during a Shopping Matters lesson, then received a \$10 grocery card to practice what they learned.



Across the state, Division staff provided hands-on food demonstrations, grocery store tours and nutrition education programs to more than 50,000 low-income Arkansans. Studies show that people who are the most food insecure are at greater risk for obesity.

Researchers explore consumer preferences

Reliable identification of consumers' preferences is critical to developing food products targeted to specific audiences. Division scientists are doing so by identifying groups of consumers who may have different expectations for the ideal sensory properties that they believe a food product should exhibit. The researchers also seek to optimize sensory properties in food products, accomplishing this in one project by investigating the effects of marination on the quality of poultry breast meat deboned at various times. They concluded that acceptable tenderness was achieved for marinated treatments that were deboned at three hours or later post mortem, noting that filets deboned before the three-hour mark were rated by consumers as tough.

Food education brings weight loss, increased fruit and vegetable consumption

There are many factors that go into eating healthier: knowing what to eat, knowing how to buy it and knowing how to prepare it. Boone

County extension staff members are helping low-income clients make a healthier difference in the kitchen. The staff used a multi-pronged approach including demonstrations, displays and meetings for WIC and Supplemental Nutrition Assistance Program audiences at schools, food banks and grocery stores. Most participating students and adults said they would, or had, made changes including increased fruit and vegetable consumption. One client reported learning "how to compare prices and always make a grocery list," and an



EATING WELL — A SNAP Ed school program participant saw this display at store, and brought her mother over to try a sample. The mother later attended a food preparation class, and now uses healthy recipes at home with her family. She has even lost a few pounds.

institutional client reported that “two participants had lost a total of 145 pounds due to a program on portion sizes.

Business partnerships incentive for health

Faulkner County extension educators work with local businesses in their efforts to help cut into the nation’s obesity epidemic. Extension conducted 12 weeks of nutrition education classes at local schools and farmers’ markets. Reinforcement materials were provided at each class and demonstration. Weekly nutrition e-mails were sent to ReShape program participants. Extension agents joined forces with the Faulkner County Healthy Weight Coalition to provide nutrition education materials and develop a healthy living plan for the residents of Faulkner County. One local business provided time for employees to exercise at work and provided a personal trainer, and two local businesses provided incentives to employees who reported eating a healthier diet.

Natural plant extracts display value-added uses

Division scientists have learned that green tea and rice bran extracts contain natural phenolics that can be used as natural antioxidants in suitable food products. They also carry the potential for commercialization in food systems. The researchers have evaluated natural plant extracts for antioxidant activity and also are exploring their capabilities for antimicrobial, anticancer and

anti-Alzheimer’s activity. Research seeks to find if the plant extracts can be used as natural alternatives to synthetic and expensive antioxidants and antidisease agents.

Seniors are active, healthy

Thirty-six percent of adults in Grant County are obese compared to the 32 percent state average. Grant County has a food insecurity rate of 13.4 percent, or 2,360 people. The Grant County SNAP-Ed program worked with the Grant County Senior Citizens Center to deliver 12 nutrition and physical activity programs. Forty seniors participated in monthly lessons on topics such as increasing fruits and vegetables, reducing sugar in your diet, choosing low-fat milk products, increasing whole grain foods, increasing the amount of water, increasing the amount of physical activity and choosing low-fat, protein foods. Seventy percent of the participants said they have increased fruit consumption by a half-cup or more and 80 percent said they have become more physically active.



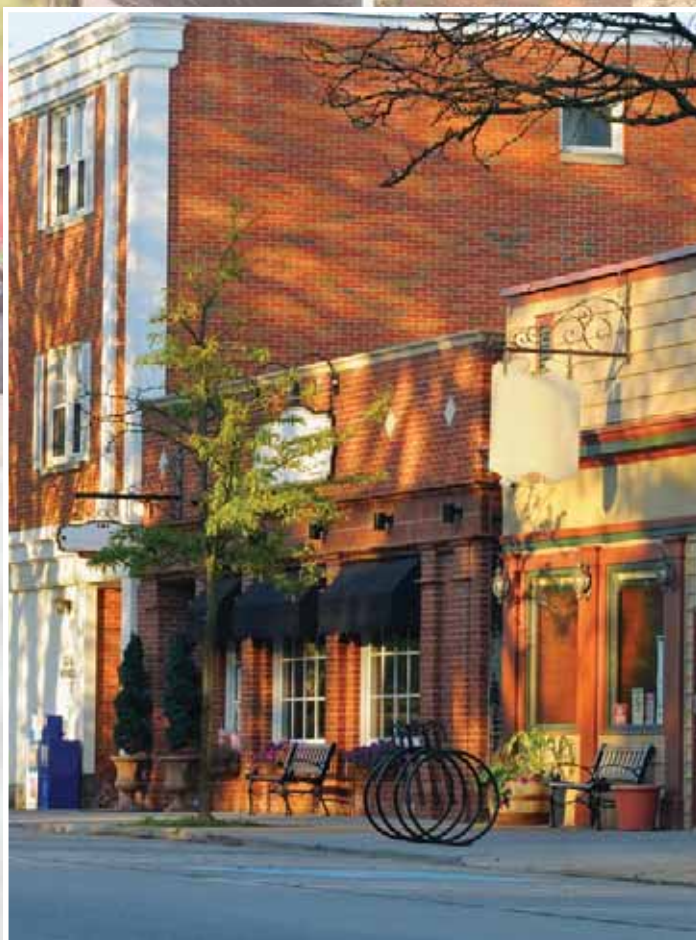
"I immediately went to the doctor after having my blood sugar checked at the Senior Health Fair. This health fair saved my life."

— Conway County Senior Adult Health Fair participant



ECONOMIC & COMMUNITY DEVELOPMENT

Transforming ideas for new opportunities into action that can create jobs, revenue and an improved quality of life is essential to the work being done in the area of economic and community development. The Division of Agriculture works to make an impact by enhancing or analyzing economic sustainability, rural infrastructure, leadership development and community involvement and helping communities cope with shifts brought about by changing populations.



More than 900 jobs and \$47,000 in contracts were awarded to Arkansas companies with the assistance of APAC.

APAC moves to more central location

The Arkansas Procurement Assistance Center, or APAC, has moved to a more central location: Little Rock. Long housed in Malvern, APAC moved July 1 into offices of the Cooperative Extension Service state headquarters. APAC also has a new director, Dr. David Jerome. "APAC's primary purpose is to work with businesses throughout Arkansas that wish to contract with the local, state or federal government," he said. "We want to be part of a stronger Arkansas economy by helping businesses grow." The staff at APAC provides counseling and training to clients at no fee. Jerome, who took the reins at APAC in June, said that "APAC can offer counseling and training because of the grant that funds the cooperative agreement." Over the years, APAC has helped clients win millions of dollars in contracts.

Improving labor quality in rural communities with an oversupply of labor

As rural locations in Arkansas seek to overcome obstacles to attract investment in communities with laborers who have limited skills for today's economy, Division personnel are responding with an assessment of the state's resources that can improve labor quality. Rural development based on entrepreneurship, industrial clustering and nontraditional agricultural businesses is being addressed. Researchers are assessing the current capacity of the adult population and how its skills mesh with

industry demands in the global economy. Community and technical colleges in the state are also being evaluated on how well they are prepared to provide training to promote entrepreneurial endeavors in rural locations and to prepare the existing labor force for jobs in advanced manufacturing firms. Development of agritourism in Arkansas is part of this effort through encouraging the diversification of farm operations through agritourism and by helping providers better understand opportunities and limitations that agritourism may provide for their operations.

Entrepreneurial development targeting rural Hispanic immigrants

Building on earlier research that suggested an entrepreneurial readiness among Mexican migrants to rural areas of the South, Division researchers are seeking to identify and describe the pool of potential entrepreneurs in Hispanic migrant subpopulations in Arkansas. The researchers are also identifying individual and institutional barriers to entrepreneurship and delivering educational material, training and support to targeted rural communities. Findings have shown a significant need for information tailored to the target audience and specific communities to supplement the general business education and information that is already available. Outreach materials have been designed and delivered to focus on these needs.



ECONOMIC DEVELOPMENT – Hispanic immigrants to Arkansas communities frequently open new businesses that boost local economies and serve community needs. Researchers are determining what essential information should be delivered to the new entrepreneurs.

Harnessing the renewable energy industry in the Mississippi Delta region

Increases in crude oil prices have created higher incentives for biofuel production, which has stimulated the demand for feedstock products. These developments have influenced the creation of the biofuel industry and the production of agricultural commodities in the Mississippi Delta region. As row crop farmers in the region find global competition for those crops is increasing, the region will need to diversify its production and market new crops that can expand economic opportunities. Division researchers are seeking ways to accomplish that diversification by identifying opportunities for producing bioenergy feedstock, dedicated alternative crops for the emerging biofuels industry and specialty crops for food processing facilities in the region. This activity can potentially help farmers make new agricultural investments, retain on-farm rural jobs and create new “green” jobs.

Exploring influences on the evolving market for blackberries

In the past 20 years the fresh blackberry market in the United States has grown from on-farm or farmers’ market enterprises to a major commercial business that offers its products in retail grocery produce departments. Division economists are examining the influences on consumer demand for the relatively new blackberry retail market and marketing costs’ impact on the competitiveness of various blackberry-producing regions. They are also reviewing price relationships among the market’s farm, wholesale and retail levels. The project aims to help assure the continued growth of the fresh blackberry industry by providing a better understanding of the factors that affect demand in a highly seasonal market.





SAMPLING THE BALLOT – Voters examine a copy of the ballot they will take into the booth at their polling precinct. Information provided by the Division's Public Policy Center reviewed the details of the statewide ballot issues so voters could read the arguments on each side of the questions before voting.



The Public Policy Center gave presentations at quorum courts, city councils, civic groups, chambers of commerce, and various association meetings to provide credible and unbiased information to Arkansas voters about the 2012 ballot issues. Over 20,000 fact sheets explaining each issue were distributed and the Public Policy ballot issue website received 21,658 hits.

Public Policy Center keeps voters apprised on ballot issues

To help voters make informed decisions about the state's complex 2012 ballot issues, the Public Policy Center of the Division of Agriculture supplied fact sheets that provided the strongest arguments from both supporters and opponents. PPC Director Tom Riley said the ballot issues in 2012 were complicated and that it was important for voters to understand the issues because of the potential to add new laws or alter the Arkansas Constitution. The PPC had fact sheets for Issue No. 1, Providing Additional Funds for State Highways County Roads, City Street, Bridges, and Other Surface Transportation; Issue No. 2, Giving Cities and Counties Additional Financing Powers and Issue No. 5, Making the Medical Use of Marijuana Legal Under Arkansas Law and Creating a System for Cultivation, Acquisition and Distribution. Hard copies of the fact sheets were made available at county extension offices and public libraries.

Community development efforts underway in W. Arkansas counties

Montgomery, Polk and Scott counties have lost more than 2,200 jobs between 2000-2010 and could lose another 1,972 jobs over the next 10 years, said Mark Peterson, professor – Community and Economic Development for the Division of Agriculture. Peterson is working with the Arkansas Coalition for the Ouachitas, or ARCO, to help the three counties identify and develop assets that could translate into a brighter economic future. Citizen-input charrettes were held in Polk and Montgomery counties last year to get the process rolling. A similar process in Boone County helped bring jobs and business back to the City of Harrison. This effort is part of the Partners for Creating a Vibrant, Sustainable Future initiative, sponsored ARCO; Rich Mountain Community College and the Division of Agriculture's Cooperative Extension Service.

MARKET GROWTH –
Farmers' markets have long been popular in Arkansas and more of them have been established recently in towns across the state.



Farmers' Markets off to a fast start

Consumers' desire for fresh, locally grown produce, plus the need to help bolster local economies has converged in a success story that's been repeated across Arkansas: the establishment of farmers' markets. Yell County's fruit and vegetable producers were in need of an outlet for their produce and coupled with a growing desire among consumers to purchase local produce, led to plans for a farmers' market. The first meeting of the Yell County Farmers' Market Association was held June 1, 2012. The market opened for business on June 12, with a dozen producers. Though drought shortened the market year and the amount of produce sold, more than 500 people took advantage of the new market. Farmers' markets also were established in Columbia, Dallas, Faulkner, Fulton, Howard, Saline, and Sevier counties. And two farmers' markets were established in Sharp County. Fulton County's farmers' market has created an opportunity for Fulton Co. residents to buy locally grown produce and flowers, and the market has resulted in a greater sense of community on Saturday mornings around the courthouse square and boosted the local economy. As one vendor said: "The new farmers' market has really helped my business. I no longer have to drive into Missouri as often to sell my produce."

Commodity volatility and risk management

Volatile commodity markets can affect the food system, particularly in developing Asian countries that are vulnerable to increased price volatility in rice. Division economists are

investigating ways to develop market-based risk management tools that will provide a better understanding of commodity price volatility and to analyze its effect on markets in Arkansas, the U.S. and the world. The research seeks to better understand price volatility behavior with respect to the markets and the food security of developing countries. It is also analyzing the informational role played by commodity futures and options markets and the informational content of U.S. Department of Agriculture crop and livestock reports. It also is developing risk management strategies using futures and options to aid in the marketing of Arkansas-produced commodities.

LeadAR alumni put learning to work

Graduates of Lead Arkansas, better known as LeadAR, are continuing to make use of their training in high profile positions. This year, David Hillman a Class 1 alumnus, won a seat in the state House of Representatives. He joined fellow LeadAR grads Nate Bell, Class 12, and David Branscum, Class 4, who were re-elected to the House. Bryan King, Class 10, was elected to a Senate seat after serving three terms in the House. LeadAR alumni were reappointed by the governor to key boards. Gary Sitzler, from Class 2, was tapped to serve another term on the Arkansas Soybean Promotion Board. Class 5 graduate Rick Bransford of Lonoke County was reappointed to the State Plant Board. Jackie Prince, Class 12, and Cal McCastlain of Class 8, each earned another term on the Arkansas Wheat Promotion Board. Rick Collins, Class 7,

was reappointed to a term on the Arkansas HIV/AIDS Minority Task Force. Mark Robertson, Class 10 was also appointed to a term on the Arkansas Legislative Task Force on Sustainable Building Practices. Jane Shipman, Class 6, was recently appointed by Senator Missy Thomas Irvin, as her designee, to represent her on the Arkansas Legislative Task Force on Abused and Neglected Children. Class 12's Kyle Baltz was appointed by Agriculture Secretary Vilsack to be an at-large alternate on the National Peanut Board. Other notable service includes Class 14's Robin Freeman being appointed to the Metroplan Regional Planning Advisory Council, and classmate Celia McQuiston, being elected as vice president of the Magnolia Economic Development Commission. She is the first female officer of the organization.

Preliminary drought impact: \$128M bite out of Arkansas beef industry

Drought that began in 2011 and intensified in Arkansas in 2012 was a calamity of epic proportions for Arkansas' livestock producers. Michael Popp and Nathan Kemper, economists with the Division of Agriculture, along with Ph.D. student S. Aaron Smith, conducted a study to help quantify the disaster. Their preliminary findings were released in September. They found that drought cost Arkansas' beef cattle industry \$128 million and the losses may continue to rise. The researchers also found that 3 percent of ranchers said they planned to sell all their livestock and leave the business. When induced impacts are calculated, the numbers increase to \$133 million in labor income losses and a \$136 million loss in value added. Results of a followup study were to be released in 2013.

Legal and regulatory issues in agriculture

The National Agricultural Law Center is a unit of the Division that manages and updates a clearinghouse of agricultural and food law research and information. It has a team of staff attorneys with backgrounds in agricultural and food law. Its research is conducted into various issues such as biotechnology, food safety, business organizations, animal welfare, farm bills and other topics. The center provides this research and information to the public through its outreach activities on a local, state, regional and national basis.

Its target audience includes attorneys, farmers, policymakers at all levels of government, congressional staffers, extension personnel, consumers, agribusiness personnel and others.



LEGAL KNOW HOW - Harrison Pittman and Shannon Mirus research Arkansas laws related to drainage districts. The NALC staff are an essential source of legal information about agricultural and related issues throughout the U.S.

"The leadership skills and self-confidence gained in LeadAR have led me into several new and challenging endeavors. I opened a very successful retail business and was recently elected chairperson of a city/county government commission"

— Cynthia Keheley, LeadAR alumni



INCREASING OPPORTUNITIES FOR FAMILIES & YOUTH

Helping Arkansas youth develop into productive citizens through the 4-H program is just one way the Division of Agriculture is helping to impact our future. The Division works to make quality child care accessible and keep child care providers current on techniques. It also provides guidance that can be used all through life, from new relationships to parenting and helping the older generations cope with the challenges of aging.



"I didn't think I would ever walk 10 miles and now I'm running in marathons. Your program gave me the start I needed to begin a healthy new life."

— ReShape Program participant

Growing community leaders

Howard County's well-rounded 4-H program offerings have provided ample opportunities for members to excel and fulfill the goals of the 4-H program in developing productive citizens. More than 22 educational and competitive activities were offered to Howard County 4-H members last year, including camping, STEM — science, technology, engineering and mathematics, animal sciences, food preservation, healthy snacks, arts and humanities, environmental sciences and sewing, just to name a few. The 4-H teens and pre-teens help plan, conduct and evaluate many of the programs conducted at the county, area and district level. Their achievements are boast-worthy:

- Two state 4-H officers.
- More than 2,100 volunteer hours, worth \$48,439 equivalent in volunteer hours.
- Six 4-H Ambassadors.
- Six Teen Stars.
- \$93,200 raised through the youth livestock auction.
- One state camp counselor.
- One member earning \$13,000-plus in scholarships.
- Three Quad-County Camp Counselors and four shooting sports leaders trained.
- Youth in 72 leadership roles at county activities, eight adult leaders trained.
- 15 youth leaders at district activities.
- Four youth taught workshops at the state level.



BLAZING TRAILS – Arkansans took exercise seriously by enlisting in the Walk Across Arkansas program. The eight-week effort not only contributed to participants' overall health but also resulted in financial savings from potential health care costs.

Walk Across Arkansas gets the state moving

With names like the Zeta Steppers, The Judges Foot Brigade and Egalitarian 7, dozens of teams set out to make the most of the eight weeks of Walk Across Arkansas. A semi-annual program implemented by the Cooperative Extension Service, Walk Across Arkansas' aim is to help Arkansans get into the habit of adding exercise to their days. During the Spring 2012 edition, teams from 20 counties took part, with walkers logging more than 800,000 minutes, or 607 hours, on their feet. According to LaVona Traywick, associate professor – gerontology for the Division of Agriculture, those who took part in Walk Across Arkansas in the spring had more than \$80,500 in health care savings. Ashley County dominated the numbers with 19 teams whose members walked more than 225,000 minutes. The fall edition of Walk Across Arkansas was still in play as this report went to press.

Poultry chain teaches responsibility

Raising animals can provide many life lessons for children, and the annual Poultry Chain event gave 46 Cleburne County 4-H members something to crow about. Over a 22-week period, the 4-H'ers cared for 690 chickens. Each member brought his or her best three chickens to the county fair for auction. They sold 138 chickens and raised \$3,000 that will be used for educational events for the county's 4-H members. The 4-H'ers also had the option of selling their chickens and eggs for individual profit. This exposed the youth to entrepreneur opportunities. These 4-H youth could receive an average maximum profit of \$10.50 a week from the sale of their poultry chain chicken eggs. Among the lessons they learned: caring for another living being, learning to be entrepreneurial, understanding the food value of chicken eggs and a brace of skills that will enable the youth to grow into productive citizens.

School garden gives full meaning to 'produce'

Elementary school students at Wynne are learning that math and science aren't just theories, but have practical applications. The teaching tool is the vegetable and flower garden established in 2010 at the Wynne Intermediate School. Each week, nine third-grade classes take part in 30-minute gardening sessions conducted by Cross County Extension Service staff. Teachers rated the gardening sessions at 9.2 out of 10. They indicated that the gardening visits provided them an opportunity to incorporate



more science and math into the classroom and continue to request the program as part of their classroom time. Funding for gardening supplies have been provided through various local and state grants

Intergenerational relationships and older persons' quality of life

As the population ages, older persons are expected to rely more on family members for assistance. This will likely result in a transfer of resources – money, caregiving and social support – between aging parents and their adult children. Division researchers are examining the impact of these changes on older residents in rural areas and the availability and willingness of the adult children to provide that assistance. Results have indicated higher levels of engagement among elderly male patients in long-term care when programming specifically targets them, although 70 percent of residents in long-term care facilities are women. The result is a reasonable expectation of lower rates of depression and health care costs for those men.


The changing nature of aging and retirement

Demands for support from the baby boomer generation have led to complex expectations of them as they move into retirement. Changes in family structure have transformed the retirement lifestyle for many from one of leisure to one of potentially high demand, shaped by a lack of adequate financial planning and a tendency by many baby boomers to remain in the work force.

Division researchers are probing attitudes about retirement among the oldest baby boomers and the diversity of their family structures as they are often called upon to provide support for both older and younger generations. The researchers are examining how the ethnic, financial, educational and family structure diversity issues are changing the nature of growing older and how these adults' social, political, economic and family systems are affected.

Drug use among adolescents and young adults and interpersonal relationships

The personal habits pertaining to drug and alcohol use among adolescents (ages 13-18) and young adults (ages 18-36) have impacts on their relationships with romantic partners, best friends and friendship networks. Division researchers are looking into how these relationships change with regard to the level of drug and alcohol use. They are examining how individual influences and friendship network influences affect drinking habits. The research is also exploring the impact of romantic/friend partnership behaviors on later behaviors as adults, particularly with regard to marriage, pregnancy and employment. The study includes an examination of the high rates of drug use among youths in rural Arkansas communities and how it relates to poverty, family structure, family drug use and community resources. The project's longer-term goal is to implement prevention and intervention designs to alleviate risky behavior among rural youth.



"You have transformed my son: he now has a passion for gardening! He worked very hard at taking care of his cabbage plant, and has enjoyed helping in the family garden all summer from the planting, weeding, picking and canning!"

— Amanda, mother of a Cross County third-grader

Emotional intelligence and financial well-being

Emotional intelligence — the ability to accurately identify emotions, to use emotions to help one think and to comprehend what causes emotions — can influence the financial behaviors of individuals and families. Division personnel are conducting surveys of people in Arkansas and surrounding states to examine the level of emotional intelligence and their money management attitudes and behaviors. The surveys seek to analyze differences among groups of people who have high levels of debt but are coping successfully without assistance; people who have high debt levels and are neither coping well with it nor seeking assistance, and people with high debt levels who are receiving assistance through consumer credit counseling.

4-H caring for those who care for us

The Berryville Mission Clinic in Carroll County provides free medical help to residents without health insurance or other access to health care. The mission clinic, a positive resource for the community, relies on charitable donations to support their efforts. The Carroll County 4-H Leadership Club started an annual chili cook-off and pie auction to raise donations and create awareness for public health care in the community. They arranged for a doctor from the clinic to speak at the event and planned to place

Berryville Mission Clinic collateral as the centerpiece at every table. To promote the cook-off, youth passed out flyers around town and offered pre-sale tickets. In a town with only 4,700 residents, the youth not only raised \$1,300 in their second year but also worked with local media to help create awareness of the issue. With this money, the Berryville Mission Clinic is now planning to enlarge their waiting room.

Banking on Long Shots

4-H project clubs play a vital role in educating. In Logan County, the shooting sports club — the Long Shots — educates members of their club on pistol, rifle and archery safety, giving the members hands-on experience through competition and shooting events. In 2009, local leaders approached the Logan County extension staff with the idea of starting a shooting sports club. After several meetings, the Logan County Long Shots 4-H Club was formed. The club began with five members. Three years later, with the aid of grants and a strong, supportive group of county leaders, the program has grown to 15, with seven new members added last year. The Logan County Long Shots regularly compete in statewide competitions through individual and team shooting sports events, earning a second place in the state senior shooting team and a fourth place in the state senior .22 pistol event.



SERVING COMMUNITY — The Carroll County 4-H Leadership club presents a check to Berryville Mission Clinic volunteers. The clinic provides free medical help to residents without access to health care. The youth hold an annual chili cook-off and pie auction to raise donations and create public awareness of the clinic.



DAY OF SERVICE — 4-H members from across the state put their hands, heart, head and health to work stocking food pantries, cleaning roadways and raising money for charities during the Oct. 5 Day of Service.



More than 1,700 4-H youth participated in a statewide 4-H Day of Service October 5, 2012. Five tons of trash was collected, 2,400 care packages assembled and 7.5 tons of nonperishable food was gathered for food pantries. More than \$8,600 was raised for various charities.

4-H Day of Service

More than 1,700 Arkansas 4-H members put heads, hearts, hands to volunteer projects on October 5 across the state during the 4-H Day of Service. Jack Boles, the 4-H state faculty member spearheading the project, said that in total, more than 3,700 people worked more than 12,500 hours on volunteer projects across Arkansas on that one day. Boles said the numbers included more than 500 4-H adult volunteers and more than 900 non-4-H'ers caught up in the spirit of service. Other impressive figures from the first, and soon-to-be-annual, event:

- Five tons of trash cleared from 1,200 miles of roads.
- 2,400 care packages of food and other items assembled, valued at more than \$50,000.
- 7.5 tons of nonperishable food items gathered for food pantries.
- More than \$8,600 raised for various charities around the state.
- More than 1,600 people reached through 4-H educational efforts.

Boles said an estimated 103,000 people felt the impact of the Day of Service statewide.

Reaching for the moon through science education

America faces a future of intense global competition with a startling shortage of scientists and an increase in demand for careers in science, technology, engineering and mathematics, or STEM. The National 4-H youth council has made a bold goal of engaging 1 million new young people in science programs by 2013. In Lonoke County, there were 54 school enrichment programs in schools across the county with a total of 1,713 youth, a volunteer leader training with nine adults, seven 4-H Afterschool programs with 340 youth, displays at the Rice Expo with 100 youth, and 11 day camps with 191 youth participating. Some of the STEM educational program topics were soil profiles, water cycle, scientific method, composting, rocketry, plant science, environmental concerns, microscopes, gardening, forestry, chemical reactions and the rock cycle.

John W. White

AWARDS OF EXCELLENCE

The John W. White Awards are presented each year to recognize excellence in scholarship, teaching, research and extension. Dr. White was the first University of Arkansas vice president for agriculture, serving in that role from 1959 to 1974.



Michael R. Evans

Outstanding Teaching Award

Professor Michael R. Evans has expanded the learning experiences for Horticulture students as an early innovator using web-based information in his course, Greenhouse Management and Greenhouse Crop Production. The class web

sites evolved into a small online textbook, which grew into a regional online textbook project with several collaborators, funded by nationally competitive grants. The "Greenhouse Management Online" learning center is now widely used

across the country by instructors and industry professionals. The site is organized in learning units and contains over 220 pages of text, 350 images, 130 videos, "Discovery Videos," "Learning Team Tasks" and self examinations. Dr. Evans led a team to create the Alliance for Cooperative Course Exchange in the Plant Sciences, which now offers 10 online courses. His popular online course was one of the first offered by Bumpers College. Dr. Evans also provides academic advising and mentoring to undergraduate and graduate students, is co-adviser of the Horticulture Club and coordinates the state FFA floriculture contests. He has a B.S. degree from Virginia Polytechnic Institute and State University and M.S. and Ph.D. degrees in Horticulture from the University of Minnesota.

Outstanding Student

Christopher Keith Addison of Hazen is an Animal Science major with minors in Equine Science and Agricultural Business. His many leadership activities include serving as FarmHouse fraternity president, New Greek Council delegate, Bumpers College Ambassador and Block and Bridle president, among others. He is a member of the Meats Quiz Bowl and Animal Science Academic Quadrathlon teams. Christopher is employed as a research assistant in the U of A System Division of Agriculture Wheat Breeding Program. He plans to enroll in graduate school and eventually pursue a doctorate in meat science.



**Christopher
Keith Addison**



Steven C. Ricke

Outstanding Research Award

Steven C. Ricke, who holds the Donald “Buddy” Wray Endowed Chair for Food Safety, joined the Department of Food Science in 2005. He is an international authority on food safety with a focus on preventing Salmonella contamination

during food production and processing. He has produced a remarkable number of scholarly publications just in the past six years, including five books edited or co-edited, 109 peer-reviewed journal articles (an average of 18 a year), 30 review articles and 19 book chapters. He is director of the Division’s Center for Food Safety and is co-founder and president of the Arkansas Association for Food Protection. Dr. Ricke has obtained nearly \$6 million in grants and contracts for Division programs. He has served on USDA and National Research Council panels on food safety and serves in leadership positions with the Poultry Science Association and American Dairy Science Association. He has held editorial positions with Poultry Science and other professional journals. He came to Arkansas from the Texas A&M Poultry Science Department, which he joined in 1992. He has B.S. and M.S. degrees from the University of Illinois and a Ph.D. degree from the University of Wisconsin.



Bob Scott

Outstanding Extension State Faculty Award

Bob Scott is a professor and extension weed specialist in the Department of Crop, Soil and Environmental Sciences with expertise in herbicide efficacy, weed resistance and new technology. His

research provides unbiased data on technologies available to Arkansas farmers, including Clearfield Rice, Liberty Link Soybeans and many herbicides and premixes. Dr. Scott has been a leader in developing and helping producers implement practices to manage glyphosate-resistant pigweed in soybeans. He has primary responsibility for MP-44, “Chemicals for Weed and Brush Control,” which is the most requested Extension publication. He is primary author of sections pertaining to rice, soybean and wheat. His comprehensive weed management program includes leadership of a program to prevent herbicide damage to crops by accidental spraying. In addition to many educational presentations, he writes numerous articles and is a frequent contributor to publications such as *Delta Farm Press*. Awards recognizing Dr. Scott’s accomplishments include Outstanding Young Weed Scientist from the Southern Weed Science Society in 2010. He has B.S. and M.S. degrees from Oklahoma State University and a Ph.D. degree from Mississippi State University.

Outstanding County Extension Educator Award

Robert Seay is Extension Staff Chair in Benton County, which has the highest value of agricultural products sold among all Arkansas counties. During his 24 years as county staff



Robert Seay

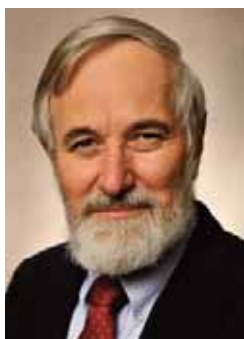
chair, Mr. Seay and his staff have supported a diverse agricultural sector with many small-scale and hobby farms as well as large poultry, livestock and hay farms. They serve families and youth with 4-H and educational programs, including programs for a large immigrant population, and they help lead and participate in community



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development initiatives. As an authority on forage management, with a focus on high-quality bermudagrass hay, Mr. Seay has helped make bermudagrass hay an important crop for Arkansas farmers, who frequently win national bermudagrass hay quality competitions. Mr. Seay is a prolific writer with many articles published in newspapers and specialty publications. He is active in forage and grassland associations and other professional and civic organizations. He is one of only four to receive the status of Distinguished Agent in Arkansas. Mr. Seay has B.S.A. and M.S. degrees from the University of Arkansas.

Outstanding Team Award

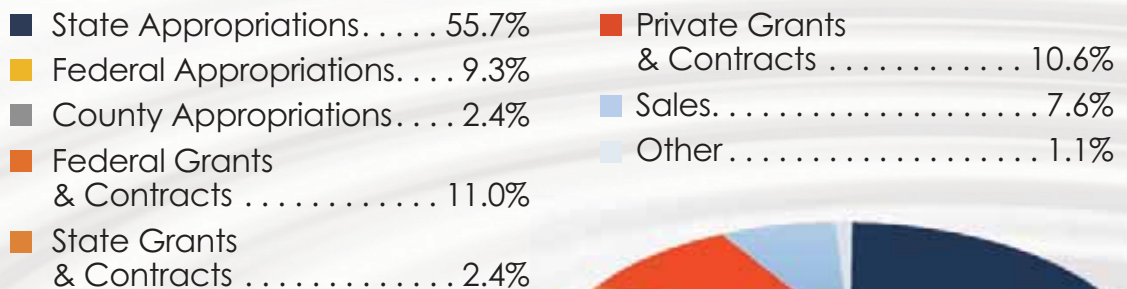
The Phosphorus Index Team developed a science-based risk assessment tool and training program to guide environmentally appropriate animal manure applications on pastures, which minimize phosphorus loss to streams via runoff. The team developed and implemented training programs to assist the State of Arkansas in educating and certifying nutrient management planners, including the Arkansas Nutrient Management Planner's Guide, fact sheets and publications on how to use the revised Arkansas Phosphorus Index. Implementation, in cooperation with the Natural Resources Conservation Service, U.S. Environmental Protection Agency, farm consultants and farmers, has resulted in significantly less land application of poultry litter in the Illinois River Watershed and lower levels of phosphorus in the river.

Team members are Mike Daniels, professor – extension water quality, Crop, Soil, and Environmental Sciences (CSES); Tommy Daniel, emeritus professor, CSES; Edward Gbur, director of the Agricultural Statistics Laboratory; Brian Haggard, director of the Arkansas Water Resources Center; Andrew Sharpley, professor, CSES; Nathan Slaton, director of soil testing and professor, CSES; Karl Van-Devender, professor/extension engineer, Biological and Agricultural Engineering; and Chuck West, professor, CSES.

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- National 4-H Council
- National Pork Board
- Neill Forestry Consultants
- Dr. and Mrs. Talmadge Nelson
- Ms. Janet C. Nesbit
- Nestle USA
- New Direction Consulting, LLC
- Mr. David Newberry
- Ms. Jane M. Newton
- NexGen Seed Research, LLC
- Nidec Motor Corporation
- Mrs. Etta Niswonger
- Mr. Rickey Norman
- Novozymes BioAg Inc.
- Nufarm Americas Inc.
- Numerator Technologies Inc.
- Nutramax
- Nutriad, Inc.
- Mr. Phillip Nutt
- Mr. Joseph O'Connell
- Mr. and Mrs. Robert D. Oliver
- Mr. and Mrs. Roy Olofson
- Mr. and Mrs. David A. Osburn
- The Honorable George W. and the
Honorable Betty Overbey
- Ozark Cattlemens Association, Inc.
- Ozark Electric Cooperative
- Ozark Shavings Company LLC
- P. I. Bioscience Limited
- Page, Thrailkill, and McDaniel
- Mr. and Mrs. Nick Palangio
- Ms. Tammy B. Parker
- Mr. William Parker
- Mr. Brandon Parker
- Mr. Michael J. Parks

- Mr. Perry Danny Parrish
- Mr. Joe W. Parsley
- Mr. and Mrs. Charles E. Parsons
- Paul Griffin Insurance Agency, Inc.
- Paw Paw Everlast Labels
- PBI/Gordon Corporation
- Mr. and Mrs. James R. Peachey
- Ms. Tanya Pearce
- Ms. Karin Pelley
- Mr. and Ms. Joel Pembleton
- Ms. Allisen Penn
- Performance Plus International Inc.
- Dr. and Mrs. Jackie L. Perkins
- Ms. Hannah R. Perkins
- Mr. Adam Person
- Pfizer Animal Health, Inc.
- Pfizer, Inc.
- Miss Elisabeth Jean Phelps
- Mr. Keith Phillips
- Ms. Sharon R. Phillips
- Phytogen Seed Company
- Pickle Packers International, Inc.
- Mr. and Mrs. Joe N. Pierson
- Mr. Bobby A. Pillow
- Mr. and Mrs. Scott Pillow
- Pines Broadcasting, Inc.
- Pioneer Hi-Bred International, Inc.
- Mr. and Mrs. Justin Pitman
- Mr. and Mrs. Larry H. Pitman
- Dr. and Mrs. Frank T. Plafcan
- Plantum NL
- Plum Creek Administrative Corporation, Inc.
- Polk County Farm Bureau
- Polk County Pulse
- Mr. Wayne Post
- Ms. Keona M. Pounds
- Ms. Adriana Pozos
- Precision Laboratories, Inc.
- Mr. Charles W. Prestridge
- Ms. Marianne Price
- Dr. and Mrs. Randel K. Price
- Price Services, Inc.
- Ms. Bobbie Proctor
- Producers Rice Mill, Inc.
- Dr. Frank L. Prouty
- Mr. Larry Pryor
- Pulaski County MG Association
- Putnam County Master Gardeners
- Quad B Farm
- Ms. Kathy Quick
- Raindrop Turkish House
- Ms. Martha Rainey
- Ms. Heather A. Raney
- Dr. and Mrs. Michel D. Ransom
- Mr. Cary Reed
- Rennier Associates Inc.
- Resource Management Service, LLC
- Revolutionary Designs, Inc
- Mr. Joseph W. Rheingans
- Rice Promotion Board
- RiceCo, LLC
- Riceland Foods Foundation
- RiceTec, Inc.
- Rich Mountain Electric Cooperative, Inc.
- Richard L. Maxwell & Associates, PLLC
- Mr. and Mrs. Donald Richardson
- Mr. and Mrs. Tom Riley
- Mr. and Mrs. Lino Rios
- Ms. Natasha Ritch
- River Valley Horticultural Products, Inc.
- Riviana Foods, Inc.
- RMK Timberland Group
- Mr. John A. Roach
- Robert and Marilyn Bogle Trust
- Robert Reiser & Company, Inc.
- Mr. Brian J. Robinson
- Mr. Tminski M. Rodgers
- Mr. Travis N. Rodgers
- Rodgers Financial Group, LLC
- Dr. Ella Mae Walker-Rolfe and Mr. Lott Rolfe
- Roll Giving
- Mr. and Mrs. Tim Romines
- Ms. Samantha Rosen
- Rosen's Inc.
- Rotary Club of Polk County
- Mr. Robert E. Roten
- Roten Family Trust
- Mr. and Mrs. James M. Royal
- Mrs. Glenda McLaughlin Rushing
- Mr. Scott Rushing
- Mr. William L. Russell Jr.
- Sakata UK, Ltd.
- Mr. and Mrs. Danny Sandy
- Mr. and Mrs. Arthur Sans
- Dr. Martha Ray Sartor
- Dr. Mary C. and Mr. Peter Joseph Savin
- Mr. and Mrs. Lance Albert Schmidt
- Mr. Lester D. Scott
- Ms. Erma Marine Scott
- Searcy & Associates LLC
- Sebastian County Farm Bureau
- Seed Science Inc.
- SePro Corporation
- Serepta Nca Foundation Tr
- Ms. Judith Serrell
- Shell-Ross Company
- Mr. Robert Tucker Shelton
- Mr. and Mrs. Curtis Shipley
- Mr. and Mrs. Bob Shofner
- Mrs. M. Portia Short
- Simmons First National Corporation
- Ms. Constance D. Smith
- Mr. Roy C. Smith
- Mr. and Mrs. Ricky M. Smith
- Mr. and Mrs. Alvis Snider
- Mr. Bruce W. Snyder
- Mr. Samuel Flores Solito
- Sorghum Partners LLC
- Dr. Anne R. Sortor
- Source Gas
- Southern Agronomic Resources, LLC
- Southern Bancorp Bank
- Southern Farm Bureau Life Insurance Company
- Southern Heritage Health & Rehab
- Southern Weed Science Society
- Southwestern Sales Company
- Soybean Promotion Board
- Mr. Mitchell Spearman
- Mr. James H. Springer
- Mr. Vance St. Columbia
- Mr. Christopher Stallings
- Mr. and Mrs. Truman Stamps
- Mr. Gregory Stanley
- Stanley & Company, LLC.
- Mr. Jon Larry Starr
- Stella B. Smith Trust
- Stephenson-Dearman Funeral Home, Inc.
- Mr. and Mrs. Aubrey Sterner
- Stevens Forestry Service, Inc.
- Mrs. Jill Stice
- Mr. and Mrs. Randy Still
- Stines Designs
- Ms. Dorothy J. Stokes
- Ms. Dana Stringfellow
- Mr. Stephen Kenneth Stroebele
- Mr. Martin Stumbagh

- Mr. Eric A. Suarez
- Mr. Charles W. Sullivan
- Summit Bank
- Ms. Tammy Sumners
- Sun Gro Horticulture
- Suncor Energy Inc.
- Sunrise Ranch
- Ms. Brenda C. Swboni
- Ms. Betty J. Swope
- Syngenta Crop Protection, Inc.
- Syngenta Seeds BV
- Mr. Kelly G. Tacker
- Takano Foods Company, Inc.
- Dr. and Mrs. Ronald E. Talbert
- Taminco
- Mr. Evan Tanner
- Target Specialty Products
- Mr. David L. Tate
- Ms. Virginia Tatum
- Mr. and Mrs. Phillip L. Temple
- The Agrotain Co, LLC
- The Andersons
- The Bank of Fayetteville, N.A.
- The Conard-Pyle Company
- The Cotton Foundation
- The Delta Center
- The Garick Corporation
- The GSI Group
- The Ross Foundation
- The Team Advertising & Publishing, Inc.
- Mr. Leon J. Thomas
- Mrs. Priscella Thomas-Scott
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- Dr. Krystal Humphrey and Mr. Danny Thrailkill
- Mr. and Mrs. Douglas L. Threlkeld
- Mr. Luis A. Tobar
- Tom Wingard Realty LLC DBA: Re/Max Premier
- Town and Country Garden Club
- Mr. Michael Tran
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- Mr. Daniel L. Traylor
- Mr. Clyde F. Traylor
- Ms. Nadine Trevino
- Mr. and Mrs. James Trusell
- Ms. Deltrinae Tucker
- Turks Crane Service, Inc.
- Turner Snax Inc
- Ms. Carla Tyson
- Tyson Foods Chick'n Quick
- Tyson Foods, Inc
- U.S. Poultry and Egg Association
- Mr. Todd Underwood
- Union Bank and Trust Company
- Union Bank of Mena
- UniSouth Genetics, Inc.
- United Phosphorus, Inc.
- United Way of Columbia County
- University of Arkansas Cooperative Extension
- US Rice Producers Association
- USA Rice Federation
- Mr. Angelo Ussery
- Val Products, Inc.
- Valent U.S.A. Corporation
- Van Buren Housing Authority
- Ms. Delores Van Hodge
- Mr. and Mrs. Chad L. Vanlandingham
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- Ms. Angelica Varela
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- Virginia Taylor LTD
- VitAG Corporation
- W. K. Kellogg Foundation
- W.A. Cleary Chemical Corp.
- Mrs. Rhianna Wagner
- Mr. Colt Wagner
- Dr. Joe D. Waldrum
- Ms. Regina A. Walker
- Mr. Mario D. Walker
- Mr. S. A. Walls
- Dr. and Mrs. Robert C. Walls
- Walmart
- Walmart Foundation
- Mr. Nicholas Ward
- Mr. and Mrs. Donald Ray Ward
- Dr. and Mrs. George W. Wardlow
- Dr. G. Lynn and Mr. Gary Warren
- Mr. and Mrs. Noah Washburn
- Washington County Master Gardeners
- Ms. Susan M. Watson
- Dr. and Mrs. Richard Weathers
- Mr. J. M. Webster
- Ms. Sharon L. Wesley
- Dr. and Mrs. Charles P. West
- West Liberty Foods Inc
- West Virginia Gardener Association
- Mr. and Mrs. Lloyd T. Westbrook
- Mr. Dale N. Weston
- Weyerhaeuser Giving Fund
- Weyerhaeuser Company
- Mr. and Mrs. Todd W. Weyl
- Wheat Promotion Board
- Mr. Yarvis C. White
- Dr. and Mrs. Robert N. Wiedenmann
- Wiese USA Inc
- Wilbur-Ellis
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- Ms. Mollie Wright
- Mr. Edward Jacob Yancey II
- Yara International
- Ms. Stephanie Yates
- Mr. and Mrs. David Young
- Mr. and Mrs. Howard S. Young
- Zinpro Corporation

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The Division of Agriculture is one of 18 major units of the University of Arkansas System. With a statewide campus, Division faculty are based at universities, research and extension centers and in every county.

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Arkansas Agricultural Experiment Station

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- Agricultural Economics & Agribusiness
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- Animal Science
- Biological & Agricultural Engineering
- Crop, Soil, & Environmental Sciences
- Entomology
- Food Science
- Horticulture
- Human Environmental Sciences
- Plant Pathology
- Poultry Science

Cooperative Extension Service

State Headquarters & Divisions, Little Rock

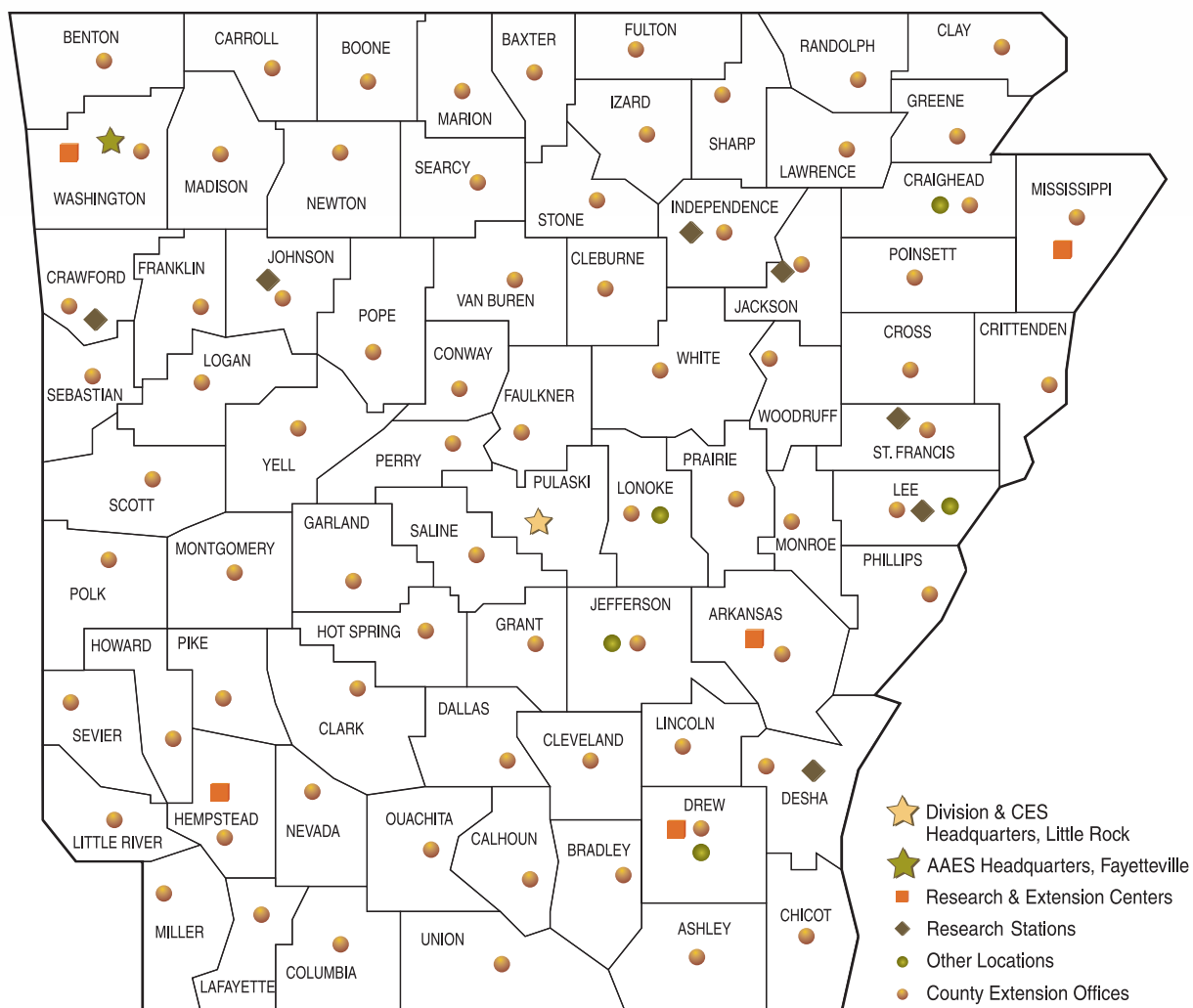
- Agriculture & Natural Resources
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 - Animal Science
 - Biological & Agricultural Engineering
 - Crop, Soil, & Environmental Sciences
 - Entomology
 - Forest Resources
 - Horticulture
 - Plant Pathology
 - Poultry Science
- Community & Economic Development
- Family & Consumer Sciences
- 4-H Youth Development
- District Directors — Delta, Ouachita and Ozark
- County Programs

Research & Extension Centers & Stations

- Arkansas Agricultural Research & Extension Center, Fayetteville
- Northeast Research & Extension Center, Keiser
 - Lon Mann Cotton Research Station, Marianna
 - Judd Hill Cooperative Research Station, Trumann
- Rice Research & Extension Center, Stuttgart
- Southeast Research & Extension Center, Monticello
- Rohwer Research Station
- Southwest Research & Extension Center, Hope
- Fruit Research Station, Clarksville
- Pine Tree Branch Research Station, Colt
- Livestock & Forestry Research Station, Batesville
- Vegetable Research Station, Alma
- Newport Research Station, Newport

Other Units

- Arkansas Forest Resources Center, Monticello
- Institute of Food Science & Engineering, Fayetteville
- Soil Testing & Research Laboratory, Marianna
- UA/ASU Cooperative Research, Jonesboro
- CES Agricultural Center, Lonoke
- UAPB Cooperative Research & Extension, Pine Bluff
- Savoy Research Unit, Savoy
- Public Policy Center



NOTES



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