

V(A). Planned Program (Summary)

Program # 15

1. Name of the Planned Program

Global Food Security and Hunger

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	5%		5%	
111	Conservation and Efficient Use of Water	5%		5%	
112	Watershed Protection and Management	5%		5%	
201	Plant Genome, Genetics, and Genetic Mechanisms	5%		5%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	5%		5%	
204	Plant Product Quality and Utility (Preharvest)	5%		5%	
205	Plant Management Systems	5%		5%	
213	Weeds Affecting Plants	5%		5%	
215	Biological Control of Pests Affecting Plants	5%		5%	
301	Reproductive Performance of Animals	5%		5%	
302	Nutrient Utilization in Animals	5%		5%	
303	Genetic Improvement of Animals	5%		5%	
305	Animal Physiological Processes	5%		5%	
306	Environmental Stress in Animals	5%		5%	
307	Animal Management Systems	5%		5%	
308	Improved Animal Products (Before Harvest)	5%		5%	
311	Animal Diseases	5%		5%	
703	Nutrition Education and Behavior	5%		5%	
704	Nutrition and Hunger in the Population	5%		5%	
724	Healthy Lifestyle	5%		5%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Extension	Research
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Year: 2010	1862	1890	1862	1890
	Actual	76.9	0.0	75.1

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
961349	0	2704707	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1275755	0	2742834	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
8702627	0	37105832	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The Division of Agriculture faculty developed, evaluated, and disseminated needs-based programs that focus on the reduction of food insecurity within vulnerable populations. The Expanded Food and Nutrition Education Program was conducted in eleven counties with a high percentage of Supplemental Nutrition Assistance program participants and Hispanic households. Program Assistants are used to conduct one-on-one and group training with individuals who fall within the parameters of the program. There is a series of eight lessons utilized by staff that focuses on food budgeting, food safety, healthy lifestyles, healthy food consumption, meal planning, and nutritious food preparation.

The Division developed improved crop and animal systems to boost U.S. agricultural production and improve the global capacity to meet the growing food demand:

The University Of Arkansas Division Of Agriculture provided unbiased research-based information and technical assistance on topics related to crop production, animals and animal products. Information was disseminated focusing on the needs of consumers, the general public and livestock and row crop producers. The UA Division of Agriculture faculty worked together to understand related issues of livestock and row crop production, products and processing, and aquaculture. Aquaculture programs were conducted through collaborative efforts between UA educators and aquaculture faculty of the 1890 land grant institution, University of AR Pine Bluff. These activities expanded our knowledge of the impact on environmental and economic sustainability and the well-being of animals and humans alike. The goal of the research program was to provide pertinent basic and practical information row crop, animal and poultry production in order to remain competitive in the global market place.

2. Brief description of the target audience

- The primary targeted audiences consist of the following:
- Supplemental Nutrition Assistance Program participants
- Low income adults
- Agricultural producers
- Aquaculture producers

Agricultural businesses
 Allied industry personnel
 Consultants
 Breeder managers
 Hatchery managers
 Commercial poultry producers
 Commercial poultry companies
 Other non-Division of Agriculture researchers
 Research funding personnel & agencies
 Policy and decision makers
 Public

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	{NO DATA}	{NO DATA}	{NO DATA}	{NO DATA}
Actual	293885	181248	22056	235

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

Patent Applications Submitted

Year: 2010
 Plan:
 Actual: 9

Patents listed

- 1)Application of material properties to improve grain drying
- 2)Predicting Fertilizer N Needs from Digital Images
- 3)Development of a Universal Vaccine for Campylobacter Species for Animals and Man
- 4)Enhanced Immune Responses to Bacillus-vectored Avian Influenza Epitopes
- 5)Recovery of Bound Procyanidins from Cranberry Pomace
- 6)White Diamond and White Cloud Peaches
- 7)APF-45 (Prime -Ark 45 Blackberry)
- 8)Iodinated Casein and Nutrient In Ovo Injection in Turkey and Chicken Eggs
- 9)Avian Influenza H5N1 Specific Monoclonal Aptamer

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	16	93	109

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of animal educational programs, workshops, educational meetings and/or field days.

Year	Target	Actual
2010	{No Data Entered}	386

Output #2

Output Measure

- Number of clientele attending animal educational programs (field days, workshops, etc.)

Year	Target	Actual
2010	{No Data Entered}	11906

Output #3

Output Measure

- Number of animal producers receiving educational material (newsletters, fact sheets, etc.)

Year	Target	Actual
2010	{No Data Entered}	133032

Output #4

Output Measure

- Number of animal producers conducting on farm demonstrations.

Year	Target	Actual
2010	{No Data Entered}	99

Output #5

Output Measure

- Number of farm visits or one-on-one consultations with animal producers.

Year	Target	Actual
2010	{No Data Entered}	5062

Output #6

Output Measure

- Number of agronomic production education meetings (multi-topic) for food-related plant & plant products.

Year	Target	Actual
2010	{No Data Entered}	27

Output #7

Output Measure

- Number of production education meetings that address fertilizer, soil and water management.

Year	Target	Actual
2010	{No Data Entered}	107

Output #8

Output Measure

- Number of agronomic production education meetings that address variety selection for food-related plant & plant products.

Year	Target	Actual
2010	{No Data Entered}	138

Output #9

Output Measure

- Number of production meetings that address soil & water testing for food-related plant & plant products production.

Year	Target	Actual
2010	{No Data Entered}	92

Output #10

Output Measure

- Number of production meetings that address variety/hybrid selection for food-related plant & plant products production.

Year	Target	Actual
2010	{No Data Entered}	113

Output #11

Output Measure

- Number of demonstrations/on-farm research for food-related plant & plant products production.

Year	Target	Actual
2010	{No Data Entered}	303

Output #12

Output Measure

- Number of farm visits for food-related plant & plant products production.

Year	Target	Actual
2010	{No Data Entered}	60

Output #13

Output Measure

- Number of field days for food-related plant & plant products production.

Year	Target	Actual
2010	{No Data Entered}	2

Output #14

Output Measure

- Number of informal surveys of participants to measure cultural practices for food-related plant & plant products production.

Year	Target	Actual
2010	{No Data Entered}	0

Output #15

Output Measure

- Number of hits to plant and plant products web-based educational material for food-related production information.

Year	Target	Actual
2010	{No Data Entered}	475716

Output #16

Output Measure

- Number of for food-related plant & plant products production clientele contacts from education classes, workshops, group discussions, one-on-one interventions, demonstrations, and other educational methods.

Not reporting on this Output for this Annual Report

Output #17

Output Measure

- Number of food-related plant & plant products production education classes, workshops, group discussions, one-on-one interventions, demonstrations, and other educational events.

Not reporting on this Output for this Annual Report

Output #18

Output Measure

- # of clientele trained on Agricultural and Food Biosecurity

Year	Target	Actual
2010	{No Data Entered}	1492

Output #19

Output Measure

- # of educational materials developed on Agricultural and Food Biosecurity.

Year	Target	Actual
2010	{No Data Entered}	245

Output #20

Output Measure

- # of Agricultural and Food Biosecurity assessments completed.

Year	Target	Actual
2010	{No Data Entered}	0

Output #21

Output Measure

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

Year	Target	Actual
2010	{No Data Entered}	30

Output #22

Output Measure

- # of hits to CES website regarding avian biosecurity.

Year	Target	Actual
2010	{No Data Entered}	22935

Output #23

Output Measure

- # of hits to CES website regarding livestock biosecurity.

Year	Target	Actual
2010	{No Data Entered}	17713

Output #24

Output Measure

- # of plants sites surveyed or monitored.

Year	Target	Actual
2010	{No Data Entered}	30

Output #25

Output Measure

- # of farms visited or one-on-one consultations with clientele related to Biosecurity.
Not reporting on this Output for this Annual Report

Output #26

Output Measure

- # of grants written and funded in support of Food and Nutrition education programming and research.

Year	Target	Actual
2010	{No Data Entered}	1

Output #27

Output Measure

- # of non-duplicated participants in Foods and Nutrition education 4-H programs.

Year	Target	Actual
2010	{No Data Entered}	2221

Output #28

Output Measure

- # of Food and Nutrition in-service trainings conducted

Year	Target	Actual
2010	{No Data Entered}	10

Output #29

Output Measure

- # of Foods and Nutrition education programs clientele contacts from education classes, workshops, group disucssions, one-on-one interventions, demonstrations, and other educational methods.

Year	Target	Actual
2010	{No Data Entered}	14001

Output #30

Output Measure

- # of Foods and Nutrition educational classes, workshops, group discussions, one-on-one interventinos, demonstrations, and other educational events.

Year	Target	Actual
2010	{No Data Entered}	13295

Output #31

Output Measure

- # attending Agricultural Systems education classes, workshops, group discussions, one-on-one interventions, and other educational methods

Year	Target	Actual
2010	{No Data Entered}	3867

Output #32

Output Measure

- # of demonstrations (for example demonstration study farm, food plots, etc.)

Year	Target	Actual
2010	{No Data Entered}	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of participants who indicated that they increased their knowledge related to foods and nutrition following an educational class, seminar or workshop.
2	Number of individuals who increased physical activities as a result of completing an Extension program.
3	Number of participants who adopted positive nutrition practices.
4	Number of participants who indicated that they intend to adopt one or more healthy food/nutrition practices.
5	Number of business start ups related to animal and animal products
6	Number of livestock producers who increased knowledge or gained awareness related to livestock production management practices
7	Number of livestock producers who adopted a new practice
8	Number of livestock producers who initiated or improved their record keeping
9	Number of poultry producers who adopted new practices or technology
10	Number of allied poultry industry personnel who adopt new practices or technology.
11	Number of livestock producers who changed a management practice
12	Arkansas cash receipts from farm marketing (\$1,000) related to aquaculture enterprises.
13	Number of clientele who reported knowledge gained related to aquaculture.
14	Number of clientele who adopted new aquaculture practices.
15	Acres of harvested wheat (all)
16	# of clientele who select improved varieties
17	# of clientele using soil testing

18	# of clientele using plant testing
19	# of impacted acres using soil testing
20	# of impacted acres using plant testing
21	# of clientele (non-duplicated) who use the DD50 program for improved production efficiency
22	# of impacted acres using the DD50 program for improved production efficiency
23	# of clientele using RICESEED program
24	# of acres planted based on output from RICESEED program
25	Yield (bushels) of harvested wheat (all)
26	Value of production of harvested wheat (all)
27	Acres of harvested soybeans (all)
28	Yield (bushels) of harvested soybeans
29	Value of production of harvested soybeans (all)
30	Acres of harvested rice (all)
31	Yield (pounds) of harvested rice (all)
32	# of growers/producers reporting knowledge gained or increased awareness of need for biosecurity.
33	# of growers/producers reporting intent to adopt new biosecurity practices for animal production facilities.
34	# of growers/producers adopting new practices outlined in educational programs to improve biosecurity through proper methods of sanitation, disease prevention, recognition, and control.
35	# of diagnostic invasive plant samples
36	# of diagnostic invasive nematode samples

37	# of avian samples submitted to diagnostic laboratories for exotic animal disease testing
38	# of Asian Soybean Rust positive samples
39	# of clientele who reported knowledge gained
40	# of clientele who initiated an alternative enterprise, as self reported

Outcome #1

1. Outcome Measures

Number of participants who indicated that they increased their knowledge related to foods and nutrition following an educational class, seminar or workshop.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	1573

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Food security is defined as households having access, at all times, to enough food for an active, healthy life for all household members. A report by the U.S. Department of Agriculture states that Arkansas is the fourth worst state in the nation for food insecurity (17.9 percent of all Arkansas households were food insecure). Groups with higher rates than the national average are households with incomes below the official poverty line, children in households headed by a single woman, Black and Hispanic households.

What has been done

EFNEP in Arkansas provides one-on-one and group education within 12 priority counties with a high food stamp and Hispanic population. The programs are informal and available at convenient locations and times. Program Assistants indigenous to the target population deliver intensive multi-session nutrition education lessons. The majority of adult participants complete the EFNEP curriculum in less than 12 months. Youth are taught in schools, after school environments and through summer enrichment programs.

Results

Participants enrolled - 2366, included 7,956 family members. Overall 1573 participants completed the program. The number of participants who indicated they increased their knowledge/skills related to healthy food choices as a result of completing a nutrition education program - 1566. The number of participants who reported they were more often comparing prices before they buy food as a result of completing the nutrition education program - 951. The number of participants who reported they seldom run out of food before the end of the month as a result of completing the nutrition education program - 876.

4. Associated Knowledge Areas

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

Outcome #2

1. Outcome Measures

Number of individuals who increased physical activities as a result of completing an Extension program.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	1466

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

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

Outcome #3

1. Outcome Measures

Number of participants who adopted positive nutrition practices.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	1474

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

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

Outcome #4

1. Outcome Measures

Number of participants who indicated that they intend to adopt one or more healthy food/nutrition practices.

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Number of business start ups related to animal and animal products

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Economic and environmental sustainability were two of the most critical issues to Arkansas livestock and poultry producers. Management at the production level is the most direct method of producer impact on these issues. During 2008, soaring costs of feed, fertilizer and fuel and challenging environmental regulations pertaining to use of poultry litter as fertilizer were foremost on the minds of livestock and poultry producers. Addressing these issues will determine the viability of animal agriculture in Arkansas.

What has been done

Extension personnel at all levels identified the most appropriate methods of dealing with the issues. A combination of traditional local extension programming, electronic newsletters, multi county programming, cooperation with industry organizations, and all forms of mass media and personal consultations were used to provide the latest production information. Three projects, two funded by NRI grants and one by industry, are developing different strategies to improve sustainability. Strategies are: use of direct-fed microbials to young pigs as a way to reduce antibiotic use, optimization of non-toxic fescues to reduce fuel and other inputs to cattlemen, and use of no-till and low-till technology that saves over \$100/acre in fuel, labor and equipment costs for cattlemen.

Results

By product feeds from biofuels production have replaced much of traditional sources of feed for cattle. Practices long known to be important (i.e. soil testing, forage testing, etc.) have been brought to the attention of producers who once again understood their importance. Management techniques like stockpiling forage rather than baling, using no till or minimum till to reduce fuel use, planning grazing systems to maximize production and reduce input costs, addressing the issue of increased internal parasite resistance, understanding target points for marketing cattle, and developing BMP's for poultry litter use have helped Arkansas producers adapt to the challenges presented in 2010.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
306	Environmental Stress in Animals

Outcome #6

1. Outcome Measures

Number of livestock producers who increased knowledge or gained awareness related to livestock production management practices

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	5514

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

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4. Associated Knowledge Areas

KA Code	Knowledge Area
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
303	Genetic Improvement of Animals
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)
311	Animal Diseases

Outcome #7

1. Outcome Measures

Number of livestock producers who adopted a new practice

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
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2010 {No Data Entered} 1334

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Economic and environmental sustainability were two of the most critical issues to Arkansas livestock producers. There are practices that can help deal with these challenges. Oftentimes, small producers who make up a large percentage of Arkansas producers are not aware of new issues and the solutions that may be available.

What has been done

Extension personnel at all levels identified emerging issues of importance to their stakeholders. Using appropriate information delivery venues, a combination of traditional local extension programming, electronic newsletters, multi-county programming, cooperation with industry organization, and all forms of mass media and personal consultations were used to provide options.

Results

Because of heightened awareness that provided teachable moments, new practices ranging from more efficient grazing systems, stockpiling forage rather than expensive hay baling, well-designed fertilization programs, changed market in points for cattle to capture the increased value of forage brought on by high feedlot finishing costs, increased targeted use of by-products from biofuels production, better designed programs for efficient and environmentally sustainable use of poultry litter on pastures and other practices were adapted. Numbers listed are direct contact and we recognize that others probably adapted these practices.

4. Associated Knowledge Areas

KA Code	Knowledge Area
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
303	Genetic Improvement of Animals
305	Animal Physiological Processes
306	Environmental Stress in Animals
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)
311	Animal Diseases

Outcome #8

1. Outcome Measures

Number of livestock producers who initiated or improved their record keeping

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	565

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

In addition to the traditional reasons for record keeping, other issues are forcing greater requirements for record keeping, environmental regulations for poultry litter application on pasture, new traceability requirements by industry to document management practices, and requirements by government to comply with country of origin labeling.

What has been done

Information was disseminated on all these subjects, including not only rules and requirements but information on modern technology to trace animals, record and store data and comply with existing and emerging requirements.

Results

Best management practices for utilization of poultry litter are being adopted and used. A number of cattle producers are utilizing electronic identification tags for their calves in order to receive bonus for age and source verified calves. Producers are aware they may be required to document age, source, management practices and other production information to compete in a market place that increasingly is requiring proof of these factors. Data from records (financial and production) are being used to make selection decisions at the herd level and document the real value of cattle in the market place.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals

303	Genetic Improvement of Animals
307	Animal Management Systems
311	Animal Diseases

Outcome #9

1. Outcome Measures

Number of poultry producers who adopted new practices or technology

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	254

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

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

Outcome #10

1. Outcome Measures

Number of allied poultry industry personnel who adopt new practices or technology.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	162

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Poultry related jobs accounted for nearly \$3 billion in labor income in Arkansas or \$1 out of every \$4 in agricultural labor income. The over \$3.3 billion in cash receipts from the poultry industry amounted to 46.2% of all agricultural cash receipts. In addition, the poultry industry contributed over \$2.6 billion in value added to the Arkansas economy. Yet owners of the 5640 poultry farms struggle to maintain competitive production efficiencies via new technology adoption.

What has been done

Applied research and field trials conducted by Extension Poultry faculty identified unsuitable energy technologies as well as problems with drinking water treatment, litter processing and feed delivery technologies. Information gained from applied research and field trials was shared with vertically integrated companies, allied industry representatives and production personnel via trade publications, workshop, one-on-one consultations, newsletters and CES publications.

Results

Informal observations indicated increase knowledge of drinking water treatment and litter processing technologies. In addition, technology adoption rates were estimated at 15%, resulting savings of proximately \$6.3 million. Poultry producers are researching the adoption of using more energy efficient lights which will decrease lighting electrical use by 80 to 85%.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
303	Genetic Improvement of Animals
305	Animal Physiological Processes
306	Environmental Stress in Animals
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)
311	Animal Diseases

Outcome #11

1. Outcome Measures

Number of livestock producers who changed a management practice

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	1118

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Economic and environmental sustainability were two of the most critical issues facing Arkansas livestock producers. There are practices that can help deal with these challenges. Oftentimes, small producers who make up a large percentage of producers are not aware of new issues and available solutions.

What has been done

After stakeholders repeatedly said they needed to see how technology could be applied to real-world scenarios, a model farm was established at one of our Research and Extension Stations. The model farm demonstrates to cattlemen, especially small producers, not only how to actually incorporate and integrate critical research-based practices in a practical setting but also how to monitor results with accurate budgets.

Results

Because of heightened awareness that provided teachable moments, new research based practices ranging from more efficient grazing systems, stockpiling forage rather than expensive hay bailing, well-designed fertilization programs, changed market in points for cattle to capture the increased value of forage brought on by high feedlot finishing costs, increased targeted use of by-products from biofuels production, better designed programs for efficient and environmentally sustainable use of poultry litter on pastures and other practices were adopted.

4. Associated Knowledge Areas

KA Code	Knowledge Area
204	Plant Product Quality and Utility (Preharvest)

205	Plant Management Systems
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
303	Genetic Improvement of Animals
305	Animal Physiological Processes
306	Environmental Stress in Animals
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)
311	Animal Diseases

Outcome #12

1. Outcome Measures

Arkansas cash receipts from farm marketing (\$1,000) related to aquaculture enterprises.

Not Reporting on this Outcome Measure

Outcome #13

1. Outcome Measures

Number of clientele who reported knowledge gained related to aquaculture.

Not Reporting on this Outcome Measure

Outcome #14

1. Outcome Measures

Number of clientele who adopted new aquaculture practices.

Not Reporting on this Outcome Measure

Outcome #15

1. Outcome Measures

Acres of harvested wheat (all)

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	150000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
201	Plant Genome, Genetics, and Genetic Mechanisms
205	Plant Management Systems
213	Weeds Affecting Plants

Outcome #16

1. Outcome Measures

of clientele who select improved varieties

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	5769

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Corn acreage has expanded in Arkansas in the past few years as corn grain prices have risen and producers see the benefit of including corn in their crop rotations. With the increase in acreage and increasing number of producers that are growing corn (many for the first time), there is a great need to educate county agents and producers how to grow high yielding profitable corn.

What has been done

The Arkansas Corn Research Verification program serves as an educational tool to educate county agents and producers about up-to-date management practices for growing corn in Arkansas. The program takes Arkansas generated research and demonstrates it on a whole field basis. The program begins the fall before corn is to be planted. The verification coordinator and county agent sit down with the producer and discuss hybrid selection, field selection, fertility needs for the field, seeding methods, and any other issues that may arise during the growing season. Once the corn is planted, the coordinator and agent make weekly visits to the field to monitor crop progress and prescribe any inputs that the crop may need. The producer also walks the field with the coordinator and agent to learn firsthand. The producer is asked to keep track of all inputs that are applied to the field so that an economic analysis can be performed at the end of the season to determine profitability of the field.

Results

In 2010, following University of Arkansas corn production recommendations for hybrid selection, fertility management, weed and insect control, and irrigation management, corn producers in the verification program were able to reach maximum yields. Yields in the verification program averaged 204 bu/acre, which was the second highest average yield the program has ever had. The state average corn yield was 150 bu/acre. The high yields in the verification program were due to proper hybrid selection, planting rates, adequate fertility, weed control, and irrigation. The drought of 2010 showed that irrigation is very important. With proper irrigation and management, verification fields yielded 54 bu/acre more than state average fields. $54 \text{ bu/acre} \times \$5.00/\text{bu} = \$270/\text{acre}$ gain in gross revenue compared to state average fields. This shows that Arkansas corn producers can grow high yielding profitable corn following University of Arkansas Cooperative Extension Service recommendations.

4. Associated Knowledge Areas

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

203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
213	Weeds Affecting Plants

Outcome #17

1. Outcome Measures

of clientele using soil testing

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	4131

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Direct-seeded, delayed flood rice (*Oryza sativa* L.) represents an important commodity for many Mid-south states in the US and is at times grown continuously, but more often grown in rotation with soybean [*Glycine max* (L.) Merr.] or other crops. Arkansas is the primary rice producing state in the US and harvests roughly 1.3 million acres per year. Current N fertilizer recommendations for rice in Arkansas are based on cultivar, previous crop, and soil texture which does not account for potentially mineralizable soil-N. Recommendations made using the current system do not take into account the amount of N that is being supplied by the soil and thus, can result in over or under application of N fertilizer. This in turn could cause economic losses due to reduced grain yields, increased disease susceptibility and lodging. Identification of a soil-based nitrogen test for rice production will allow more precise application of nitrogen fertilizers while utilizing native soil nitrogen and lowering potential environmental impacts due to excessive nitrogen application.

What has been done

A seven year study involving laboratory and field trials have developed an alkali direct steam distillation technique for determining the nitrogen mineralization potential of a soil. Results collected from 25 site-years on silt loam soils shows a strong correlation ($r^2= 0.89$) between the nitrogen fertilizer required to achieve 95% relative grain yield for rice and the nitrogen liberated with the new soil test when the soil was sampled to the 18 inch depth. The new soil nitrogen test is named 'Nitrogen-Soil Test for Rice' or 'N-ST*R'. N-ST*R was validated at 12 silt loam sites in

2010 that varied in native soil nitrogen availability. N-ST*R predicted the correct nitrogen fertilizer rate to achieve 90, 95 and 100% relative grain yield at all 12 sites. Validation studies will continue in 2011 with more focus placed on the implementation of field-scale strip trials for research and demonstration. The states of Louisiana, Mississippi, and Texas have continued to collaborate with us on the development of N-ST*R for silt loam soils and validation should begin shortly. The success of N-ST*R on silt loam soils in Arkansas has led to research with clay soils in the hope that we can have a nitrogen test for all of the soils where rice is grown in Arkansas and the southern Ricebelt.

Results

The new Nitrogen-Soil Test for Rice or N-ST*R will allow site-specific nitrogen fertilizer rate recommendations for rice because it will enable the producer to make nitrogen fertilizer decisions on an individual field basis rather than relying on a regional soil type basis. Implementation of N-ST*R will enable the optimal use of nitrogen fertilizer leading to the most optimum agronomic and economical rice yield with minimal disease and lodging while lowering the potential impact of the nitrogen fertilizer to the surrounding environment.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
205	Plant Management Systems
213	Weeds Affecting Plants

Outcome #18

1. Outcome Measures

of clientele using plant testing

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	3419

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
205	Plant Management Systems
213	Weeds Affecting Plants

Outcome #19

1. Outcome Measures

of impacted acres using soil testing

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	1848462

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Phosphorus is an essential plant nutrient and P fertilization may increase corn yields in Arkansas soils. However, excessive build up of P in agricultural soils will increase the likelihood of P loss via runoff and pose a risk to water quality. Accurate soil test-based, assessment of soil P fertility and appropriate P fertilizer recommendations is the most effective process for producing optimum corn yields and reducing the risk of excessive soil P buildup.

What has been done

Five replicated P fertility experiments were conducted to evaluate corn response to application of 0 to 160 lb P₂O₅/acre in 40 lb P₂O₅/acre increments. These soils were typical of soils used for corn production in Arkansas. Soil texture ranged from silt loam to clay loam and available soil P as measured by Mehlich-3 procedure ranged from Low to Above Optimum.

Results

Corn seedling P concentration, dry matter accumulation, or P uptake at two of the sites that were rated Above Optimum were not influenced by P fertilization. However, P fertilization significantly increased P concentration, dry matter, and P uptake at one site that was rated Low in P. At this site P application significantly increased ear-leaf P. Yields at the Low P testing site were lower than expected and ranged from 122 to 128 bu/acre suggesting that another factor (such as N availability) was more limiting than P availability. Corn grain yields at the other four sites were not influenced by P fertilization. The lack of significant grain yield increases to P fertilization is not surprising since soil test P was either Medium or Above Optimum at these sites.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management

Outcome #20

1. Outcome Measures

of impacted acres using plant testing

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	12482

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Nitrogen fertilization is important for corn yield, but applying too much N is expensive and has environmental consequences. Current methods of determining how much N to apply during the season require specialized equipment or have long turn-around times that limit their utility.

What has been done

We developed a method of determining N status of corn leaves by measuring "greenness" of leaves from digital images. Data from two years at multiple locations show that "greenness" is closely associated with leaf N concentration and that "greenness" from digital images taken at tasseling is closely associated with corn grain yield.

Results

The only equipment necessary for measuring "greenness" of corn leaves is a digital camera. Digital images could be sent to a website or researcher for quick and inexpensive evaluation of leaf N status. Continuing research is focused on calibrating "greenness" values from young corn plants to determine appropriate amounts of N fertilizer to apply.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
213	Weeds Affecting Plants

Outcome #21

1. Outcome Measures

of clientele (non-duplicated) who use the DD50 program for improved production efficiency

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	621

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

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

Outcome #22

1. Outcome Measures

of impacted acres using the DD50 program for improved production efficiency

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	434628

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Conditions for optimum production were less than ideal during 2010. Optimum planting weather lead to record acreage planted about 3 weeks ahead of normal. However, heat and drought that followed resulted in significant crop failures due to inadequate irrigation water and high incidence and severity of bacterial panicle blight. The heat, particularly high night time temperatures, was also responsible for overall reduced yield and reduced milling yield. While the state average yield of 144 bu/acre were less than any year since 2000 and certainly less than the 161 bu/acre record, the yield was as higher than any yield prior to 2000. In spite of the weather adversity, variety development and rice management has allowed many growers to still produce good rice yields

What has been done

Rice educational programs have included traditional means such as county production meetings, newsletters, and fact sheets for several years. As the clientele have become more dependent upon electronic access to data and social media, an opportunity was present to expand the educational methods with which we have become familiar. We initiated the use of social networking and internet blogging as an additional means of providing access to unbiased

recommendations. Educational information written for was posted to a blog and then also posted on a Facebook fan page and a Twitter page. One of the advantages of these opportunities has been the access to non-conventional audiences.

Results

We have had over 4,000 visits to the blog, we have 65 followers in Twitter and 455 following on Facebook who receive information weekly during the growing season. This technology has not only allowed us to meet the needs of traditional clientele, we have also been able to reach the technologically savvy client base and the numbers continue to grow each week. An additional, yet unexpected, impact has been the ability to reach non-traditional clientele. While the history of this program is to provide timely production technology information to growers, consultants, and agricultural industry representatives, the use of social media has allowed us to reach everyday citizens that are not directly involved in the agriculture business. The general public's awareness of the importance of agriculture in this country for their food supply is declining. This technology has allowed us to reach a new audience and be able to highlight the contribution of rice production to the US economy and food supply.

4. Associated Knowledge Areas

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

Outcome #23

1. Outcome Measures

of clientele using RICESEED program

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	213

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

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

Outcome #24

1. Outcome Measures

of acres planted based on output from RICESEED program

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	89063

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

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

Outcome #25

1. Outcome Measures

Yield (bushels) of harvested wheat (all)

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	56

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Urea is the most common N source used for fertilization of row crops in Arkansas. A large proportion of the urea that is applied to summer-grown crops is commonly amended with Agrotain, a urease inhibitor. Research has shown that this product consistently reduces N loss via ammonia volatilization from surface applied urea when environmental (weather and field conditions plus crop management) conditions are conducive. Growers have questioned whether a urease inhibitor would be of benefit for urea applied to winter wheat in February and March, when weather related factors are less conducive for ammonia loss.

What has been done

Research was established in six different fields during a 3-year period with N applied at four different times between mid February and early April. Urea and Agrotain-treated urea were applied at a suboptimal rate of 75 lb N/acre and at a near-optimal rate of 125 lb N/acre. The suboptimal N rate was used to evaluate whether wheat yield benefited from the urease inhibitor and the near optimal N rate examined how N application time influenced wheat yield.

Results

Research results, averaged across 24 N applications, showed a 3% yield benefit from urea amended with the urease inhibitor compared to urea alone. Wheat yield response to the urease inhibitor across 24 N applications was further characterized to understand the magnitude and frequency of the benefit. Results indicated the urease inhibitor, compared to urea only, provided no significant yield change 58% of the time, but yields were increased by, on average, 4, 6, 13 bu/acre for 21, 13, and 8% of the N applications, respectively. These results indicate that ammonia loss can be significant and lead to reduced yield in some wheat fields. Additional research is needed to understand the factors controlling these losses and provide more specific recommendations to wheat growers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
201	Plant Genome, Genetics, and Genetic Mechanisms
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
213	Weeds Affecting Plants

Outcome #26

1. Outcome Measures

Value of production of harvested wheat (all)

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	140000000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #27

1. Outcome Measures

Acres of harvested soybeans (all)

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	3150000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
201	Plant Genome, Genetics, and Genetic Mechanisms
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
213	Weeds Affecting Plants

Outcome #28

1. Outcome Measures

Yield (bushels) of harvested soybeans

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	37

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

An estimated 350,000 acres of soybean were infested with glyphosate-resistant Palmer amaranth (pigweed) in Arkansas in 2010. This problem cost growers an estimated 42 million dollars in the form of added weed control cost and lost yield. The only weed-control system similar to RoundUp Ready is the LibertyLink/Ignite herbicide system. Since LibertyLink soybean varieties have only been commercially available since 2009, little is known about how these varieties will perform in Arkansas.

What has been done

In 2009 and 2010, a RoundUp/LibertyLink Systems Comparison study was conducted at two different locations. Three LibertyLink and four RoundUp Ready soybean varieties were evaluated in this study. Soybean varieties ranged in maturity groups from 4.8 to 5.1. Each location was sprayed with Prefix herbicide preplant, and two applications of RoundUp or Ignite herbicides during the growing season depending upon the soybean variety. Yield and other agronomic characteristics were evaluated for each soybean variety.

Results

Results from this research have shown that currently available LibertyLink soybean varieties have yields very comparable to some of the highest yielding and popular RoundUp Ready soybean varieties. It appears that these LibertyLink soybean varieties do not have the "yield drag" that the original RoundUp Ready soybean varieties had when initially released. With the increase in soybean acreage infested with glyphosate-resistant Palmer amaranth, as much as 875,000 acres in Arkansas can be planted with LibertyLink soybean varieties. Use of the LibertyLink/Ignite system could save soybean producers 105 million dollars in lost yield due to glyphosate-resistant Palmer amaranth.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #29

1. Outcome Measures

Value of production of harvested soybeans (all)

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	1165500

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Soil tests are not infallible, but they represent the best available science for making sound soil nutrient and crop fertilizer management decisions. Proper interpretation of soil-nutrient availability index values requires that the availability index be reasonably well correlated with crop growth/yield response to the addition of that nutrient. Previous Arkansas research has shown that the Mehlich-3 soil test is an excellent indicator of soil K availability, but the accuracy and interpretation of phosphorus (P) extracted by this method have not been properly assessed for soybean.

What has been done

Forty site-years of research were established from 2004 to 2010 to evaluate soybean response to P fertilization. Each trial evaluated soybean yield response to two to five different P rates compared to soybean receiving no P. Mehlich-3 extractable soil P (0-4 inch depth) was measured at each site.

Results

The Mehlich-3 P availability index was significantly correlated with the relative yield of soybean receiving no P fertilizer. Mehlich-3 P explained 32% of the soybean yield variation among site-years and was highly (90% of the time) accurate at predicting that soil with >20 ppm P required little or no P fertilizer to increase yield. For soils testing 11-20 and <11 ppm, positive (6-12% increases) yield responses to P fertilization occurred 25 and 63% of the time, respectively. Based

on these findings, P fertilizer recommendations for soybean were revised for the 2011 cropping season. The rates of P recommended for soils having Very Low to Medium P levels were reduced. Additional research is being conducted in effort to improve the accuracy of P fertilizer recommendations on soils having low P availability index values by the addition of more site-years, examining other soil test methods, and use of other soil chemical properties in addition to P.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #30

1. Outcome Measures

Acres of harvested rice (all)

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	1785000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Arkansas farmers produce more than 45 percent of the rice grown in the United States under dynamic production conditions that differ from those in other rice-growing areas. Because of their prominence in this crop, Arkansas rice farmers depend on an Arkansas variety development program that provides a progression of improved varieties to meet the challenges of changing conditions in their fields and in the marketplace for rice.

What has been done

Arkansas rice producers provide check-off funds administered by the Arkansas Rice Research and Promotion Board to help support a dynamic rice breeding program by Arkansas scientists in cooperation with researchers in other states and the USDA. Check-off funding for the breeding program was started in 1980 and has increased substantially over the years. Twenty-four varieties have been released from the Arkansas breeding program since 1980. Each variety comes with management recommendations developed through research on plant nutrients,

diseases, insect pests, weeds and other areas. These recommendations help farmers tailor practices to the genetic potential of each variety. Genetic improvement in disease resistance, plant types, grain and milling yields, quality and other traits have helped increase yield and grain quality while controlling production costs.

Results

Twenty-four percent of the rice grown in Arkansas in 2010 was comprised of varieties developed in the Arkansas rice variety improvement program. When the program was started in 1980, the average rough rice yield in Arkansas was only 4,110 lbs/acre compared to 6300 lbs/acre in 2010. Assigning a conservative value of 60 percent of this 2190 lbs/acre yield increase to new varieties, the average monetary gain in 2010 over 1980, at a rough rice price of \$9.60/cwt, would be \$210/acre or \$353 million for the 1.681 million acres grown in Arkansas, of which \$85 million is due to the Arkansas varieties.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
201	Plant Genome, Genetics, and Genetic Mechanisms
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
213	Weeds Affecting Plants

Outcome #31

1. Outcome Measures

Yield (pounds) of harvested rice (all)

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	6480

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Water costs for producing rice in Arkansas have been increasing in the recent past by a combination of deeper available water, increased fuel and energy costs and two extremely dry summers. Ways to reduce these costs are needed very much. One way to reduce these costs is to drain rice fields for harvest at a time which will allow water savings and a low likelihood of reducing rice yield or quality.

What has been done

A computer program to drain rice fields based on stages of development has been developed. The program includes inputs from farmers on variety, soil and heading date. The results from the program are predicted dates for successive reproductive rice growth stages, water use during each stage and a predicted stage of development for draining which will allow the field to be drained and the water held in the soil at draining will allow the crop to develop to maturation without experiencing a yield- or quality-limiting water deficit.

The model has been tested for five years in the field against later draining control treatments. Yields have not been reduced for the treatments drained by the program compared to the control treatments in any year. Head rice yields have not been reduced in any year so far for the treatments drained by the computer program compared to later drained controls.

In 2010, six additional cultivars have been observed to provide extension of the model to a number of different rice cultivars and eventually for all rice cultivars common grown in Arkansas. In addition, in 2010, experimental tests of the water use predictions of the model were tested and confirmed.

Results

We find a usual minimum water savings of one less 3 inch irrigation. Water savings from one less 3-inch irrigation would be \$4.15 per acre for a water depth (depth to pump) of 50 feet. Water savings would be \$22.45 per acre for a water depth (depth to pump) of 300 feet. Other potential savings include reduced tillage costs due to harvesting in wet soil conditions. Moreover, earlier draining of rice fields would result in less depletion of aquifers. In the future, the model will be extended to a wide range of rice cultivars.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #32

1. Outcome Measures

of growers/producers reporting knowledge gained or increased awareness of need for biosecurity.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	1686

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Soybean rust continues to be a potential threat to Arkansas. Each year spores move northward into Arkansas. With no resistance to the disease, it is imperative that the geographic development of soybean rust over time be monitored so growers can protect their crops, or avoid unnecessary fungicide applications if not warranted.

Livestock and poultry producers contribute significantly to the economy of Arkansas. Any disease outbreak in a herd or flock has the potential to severely impact the growers and producers and the economy.

What has been done

With support of the Arkansas Soybean Promotion Board, the United Soybean Board, and the North Central Soybean Research Program, Division of Agriculture plant pathologists monitored 30+ sentinel plots, various kudzu locations, and cooperating grower fields in 2010 for Soybean rust. An awareness and information campaign was also implemented to warn growers and provide them with the knowledge to make informed control decisions statewide if the disease was detected.

Educational efforts were provided by Division personnel to assist livestock and poultry producers with Biosecurity and disease prevention on their farms and ranches.

Results

Soybean rust was first detected in August 2009 in southeast Arkansas and was confirmed in every soybean production county of the state that year. Soybean sentinel plots in 30+ counties were monitored for the disease in 2010. No samples were positive for the disease in 2010 due to abnormally hot, dry conditions. Vigilance and implementation of Biosecurity measures by commercial and individual livestock and poultry producers continue to enhance efforts to diseases on Arkansas farms and ranches.

4. Associated Knowledge Areas

KA Code	Knowledge Area
213	Weeds Affecting Plants

311 Animal Diseases

Outcome #33

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	320

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The total farm value of livestock, poultry and crops in Arkansas is over 3 billion dollars with poultry a major agricultural product. Exotic disease outbreaks in Arkansas or in the United States could result in a quarantine of poultry and poultry products severely impacting the economy of the state and individual growers/producers in particular.

What has been done

Biosecurity and early disease recognition continue to be the mainstay for prevention and control of disease. Biosecurity enhancement measures were communicated to growers/producers through formal presentations and publications. The continued improvement of Biosecurity protocols allows for better disease protection of a flock by reducing the exposure risk.

Results

Prevention and/or reduction in the incidence of disease can result in savings of millions of dollars. This vigilance and implementation of Biosecurity protocols by growers/producers further enhances the efforts to prevent diseases such as "bird flu" which are of great concern not only because of the economic consequences of an outbreak but because of the potential adverse human health problems associated with the disease.

4. Associated Knowledge Areas

KA Code	Knowledge Area
311	Animal Diseases

Outcome #34

1. Outcome Measures

of growers/producers adopting new practices outlined in educational programs to improve biosecurity through proper methods of sanitation, disease prevention, recognition, and control.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	279

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Poultry is a major agricultural product in Arkansas and is valued at close to 3 billion dollars. Mortality figures associated with broilers, turkeys, and layers, are 4%, 8%, and 16% respectively over the life of the flock with infectious diseases a major cause of the mortality and responsible for an additional 1+% loss in condemnations.

Exotic disease outbreaks in Arkansas or in the United States could result in a quarantine of poultry and poultry products severely impacting the economy of the state.

What has been done

The continued threat of Agroterrorism against the United States animal population is such that vigilance is needed to prevent the use of infectious diseases as a weapon against the United States food supply. The impact of an Agroterrorism attack against the US food supply would cause a devastating effect on product exportation and losses of markets which could be irreparable.

Results

The loss of confidence in the safety of the US food supply could be incalculable. Informal surveys indicate that growers/producers in Arkansas have implemented procedures and practices to increase Biosecurity to decrease the risk of disease introduction or spread. The continued concern over H1N1 (Swine Flu) and H5N1 (Bird Flu) reinforce the continued need for Biosecurity practices to prevent disease. The control of diseases is greatly enhanced as growers/producers continue to improve their Biosecurity practices.

4. Associated Knowledge Areas

KA Code	Knowledge Area
213	Weeds Affecting Plants
311	Animal Diseases

Outcome #35

1. Outcome Measures

of diagnostic invasive plant samples

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	700

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Monitoring of crops for potential biosecurity pathogens remains a systematic and sustained challenge for Arkansas production. Introductions of new pathogens, or the evolution of new strains from existing populations, continue to be a potential threat to sustainable food production in the U.S. A single, new disease can result in millions of lost dollars in additional control costs, on top of new investments in research and education to modify management systems.

What has been done

With support of the Arkansas Soybean Promotion Board, the United Soybean Board, and the North Central Soybean Research Program, Division of Agriculture plant pathologists monitored 30+ sentinel plots, various kudzu locations, and cooperating grower fields in 2010 for Soybean rust. An awareness and information campaign was also implemented to warn growers and provide them with the knowledge to make informed control decisions statewide if the disease was detected.

Results

Soybean rust was first detected in August 2009 in southeast Arkansas and was confirmed in every soybean production county of the state that year. Soybean sentinel plots in 30+ counties were monitored for the disease in 2010. No samples were positive for the disease in 2010 due to

abnormally hot, dry conditions.

4. Associated Knowledge Areas

KA Code	Knowledge Area
213	Weeds Affecting Plants

Outcome #36

1. Outcome Measures

of diagnostic invasive nematode samples

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Plant-parasitic nematodes can be a significant economic concern in many agronomic, horticultural, and ornamental commodities. The soybean cyst nematode (SCN) is the most important pest of soybean in the U.S., the southern root-knot nematode (SRK), and the reniform nematode (RN) are of major concern in many agronomic and horticultural crops. The rice white tip nematode (WT) is a seed borne pest that is endemic in Arkansas and is a pest of concern in international trade.

What has been done

The Arkansas Nematode Diagnostic Laboratory monitored incidence and population density of economically significant nematodes in grower-submitted samples and focused surveys of the state in 2010. In addition, soybean cultivars (296) were evaluated for resistance to SCN, SRK, and RN, and field collections of SCN from around the state were monitored for pathogenic variability in greenhouse bioassays. In addition, a survey of rice-production areas of the state were surveyed for the presence of both WT and the exotic nematode pest *Ditylenchus angustus*.

Results

Of the 957 grower-submitted samples statewide that were assayed by the ANDL, 351 (37%) contained SRK, 213 (22%) contained SCN, and 22 (3%) contained RN. In addition, 60% of 3,000

additional research or extension demonstration samples from cotton and vegetables from projects around the state that were assayed contained SRK and 80% of an additional 330 samples submitted from soybean research plots had SCN. Rice seed assays from 125 barges scheduled for international markets were assayed. WT was not detected in any of these samples. However, WT was found in 5 of 218 commercial rice fields surveyed in August, 2010, and in 11 of 54 experimental breeding line plots. No *D. angustus* was detected. In addition, bioassays of SCN from 67 fields in the state indicate that the majority of races in the state are races 2 and 5. Only 10 of the fields (15%) were the races that traditionally were found in Arkansas (races 3, 9, and 14), indicating that a shift to newer and more difficult to control races has occurred.

4. Associated Knowledge Areas

KA Code	Knowledge Area
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems

Outcome #37

1. Outcome Measures

of avian samples submitted to diagnostic laboratories for exotic animal disease testing

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	6

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The value of the United States animal agriculture production is approximately 14% of the gross domestic product and represents approximately 19% of all employment with almost 1 million jobs. Exports represent approximately 24% of all animal production and account for over 140+ billion dollars. Poultry, a major agricultural product in Arkansas, is valued at almost 3 billion dollars and represents a significant portion of the state economy.

What has been done

New and continued foreign animal disease threats, the continued threat of Agroterrorism, and the continued concern over H5N2 and H1N1 necessitated increased awareness of diseases and

efforts to monitor for and prevent outbreaks. Poultry integrators continued to conduct routine serological surveillance for Avian Influenza on all poultry. This was conducted under the National Poultry improvement Plan. Backyard and small non-commercial poultry flock owners were contacted and provided with information on testing services and where these services were available.

Results

Commercial poultry growers and backyard hobby flock owners, due to increased awareness as a result of educational efforts, are more aware of testing programs and diagnostic laboratory assistance for disease determination and control. They recognize that the surveillance testing and diagnostic assistance are an integral part of the Biosecurity effort to reduce the risk of disease introduction and/or spread and protect the US food supply.

4. Associated Knowledge Areas

KA Code	Knowledge Area
311	Animal Diseases

Outcome #38

1. Outcome Measures

of Asian Soybean Rust positive samples

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Soybean rust continues to be a potential biosecurity threat to Arkansas and U.S. production since it first entered the country in 2004 and became established along the Gulf Coast subsequently. Each year, depending on temperatures and weather fronts, spores move northward into the soybean production states, and Arkansas with 3.4 million acres planted over 5 months in the spring, remains a keystone region for disease development and further advancement toward the Midwest. With no resistance to the disease in soybeans grown here, it is imperative that geographic development of soybean rust over time be monitored so growers can protect their

crops, or avoid unnecessary fungicide applications if not warranted.

What has been done

With support of the Arkansas Soybean Promotion Board, the United Soybean Board, and the North Central Soybean Research Program, Division of Agriculture plant pathologists monitored 30+ sentinel plots, various kudzu locations, and cooperating grower fields in 2010 for Soybean rust. An awareness and information campaign was also implemented to warn growers and provide them with the knowledge to make informed control decisions statewide if the disease was detected.

Results

Soybean rust was first detected in August 2009 in southeast Arkansas and was confirmed in every soybean production county of the state that year. Soybean sentinel plots in 30+ counties were monitored for the disease in 2010. No samples were positive for the disease in 2010 due to abnormally hot, dry conditions.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #39

1. Outcome Measures

of clientele who reported knowledge gained

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	524

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Honey bee populations have been declining across the country. Beekeeping is at risk of becoming a "graying" enterprise if new beekeepers are not recruited and trained. Increasing the number of people maintaining healthy honey bee colonies will eventually increase population of honey bees in the wild as well.

What has been done

Honey Education Short Courses were presented in 10 locations around the state. The courses were designed to present information on practical beginning beekeeping in an easy-to-understand format, and encourage participants to begin keeping bees themselves.

Results

About 500 participants came to the classes. Experienced beekeepers seeking to expand their knowledge and new beekeepers or those who were not yet beekeepers attended. A total of 19% of participants filled out an evaluation form at the end of the course. Overall, 71% of respondents, 99% indicated that they planned to begin keeping bees in the future, and 86% of these indicated that the course had positively influenced their decision to do so.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
112	Watershed Protection and Management
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
307	Animal Management Systems

Outcome #40

1. Outcome Measures

of clientele who initiated an alternative enterprise, as self reported

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	15

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
112	Watershed Protection and Management
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
307	Animal Management Systems

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

External factors that impacted outcomes included the following: 1) Program realignment impacted efforts expended in several of the listed programs within the new Global Food Security and Hunger initiative; 2) Several state defined outcomes were moved from the Food, Nutrition and Health State Planned Programs to the Global Food Security and Hunger initiative; 3) A reduction in staff (FTEs), which reduced the amount of programming in several counties, had a negative impact on program delivery for this area.

Global food production outcomes were influenced by market conditions, including the fuel versus food pressure, changes in payments to farmers, increased production input costs, land grant university funding, the downturn in the economy, and as always weather conditions. Any or all of these factors could cause projected outcomes to vary widely.

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)

- Before-After (before and after program)
- During (during program)

Evaluation Results

The Division of Agriculture faculty developed, evaluated, and disseminated needs-based programs that focused on boosting agricultural production to meet growing food demand and to reduce food insecurity within vulnerable populations.

The Expanded Foods and Nutrition Programs were conducted within thirteen counties with a high percentage of Supplemental Nutrition Assistance program participants. Program Assistants are used to conduct one-on-one and group training with individuals falling within the parameters of the program. There is a series of twelve lessons used by staff that focused on food budgeting, healthy lifestyles, healthy food consumption, meal planning, and nutritious food preparation. The target population for the program: Single women, African-Americans and Hispanic individuals and families, and children of families receiving supplemental nutrition assistance.

1769 EFNEP participants reported they were comparing prices before they purchased food as a result of completing the nutrition education program.

1109 (63%) of EFNEP graduates thought about healthy food choices when deciding what to feed their families.

1249 (71%) of EFNEP graduates more often planned meals in advance.

1106 (71%) of EFNEP graduates used a list for grocery shopping.

1159 youth from 69 groups reported eating a variety of foods.

A state-wide survey was conducted asking livestock producers their most preferred methods for receiving information from Extension, direct methods were not ranked very high. Indirect methods, however, were ranked high. These results provided the impetus for developing electronic newsletters. The actual number of indirect contacts adults was above target due to concerted effort to establish electronic newsletters in the area of beef cattle production, dairy cattle production, small ruminates production, forage and grazing management production.

The number of on farm demonstrations was much higher than expected. This was due to a special program called "300 Day Grazing" which demonstrated research based practices to reduce the dependences of harvest forages. In 2009 over 70 300 Day Grazing demonstration were implemented alone.

The number of producers who actually initiated or improved record keeping was higher than expected. The increase was due to more producers keeping both financial and production records. Both types of records are important and play key roles in managing a livestock operation.

Yields in corn, soybean, and rice verification fields that used UA Division of Agriculture recommendations were compared to state averages. The overall rice yield potential has increased by an average of 83 lbs/acre each year. The contribution of genetic gain to this

yield increase is 47 bushels/acre. Considering more than 50% of the rice acreage in Arkansas is planted to cultivars developed by the University of Arkansas Breeding Program, this contribution has resulted in an additional 429 million dollars additional farm income over this 20-year period. Four new cultivars were released in 2009 by the University of Arkansas that is anticipated will continue the major impact on the rice industry in the Southern USA. 'CL 142 AR' and 'CL 181 AR' appear to provide an additional 4% in yield potential compared to similar cultivars. It is also expected that 'CL 142 AR' may be produced on as much as 25% of the acreage in 2011. Data on shifts in production technology, acreage, cropping systems, and enrollment were compared to historic levels and trends. The data shows that the yield levels of these crops increased.

Key Items of Evaluation

Betty G. enrolled in the Expanded Food and Nutrition Education Program in March 2009. After successfully graduating from the program she was able to secure a position in a community restaurant. Betty G. indicated that her knowledge of portion sizes, food safety and meal planning helped her get the position of head cook. She accredits this success to what was learned through EFNEP (Lee County).

"An EFNEP participant and her family had been having money problems with the state of the economy and not enough work for the husband. Their 3-month-old infant had to be hospitalized. Through EFNEP the participant learned to read labels and choose good quality foods by using generic brands and reading sale ads. She began to plan meals for the week and make menus. Now they do not run out of food and are able to save up to \$50 each month on food. As a result of saving money on food they have been able to pay on some of their debts such as the hospital bill," Sandra Guzman, EFNEP Program Assistant, Benton County. An EFNEP participant said that "Learning that I need healthy snacks between meals has been a blessing. It has definitely decreased the number of blackouts I was having," (Benton County).

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Applied research and field trials conducted by Division of Agriculture Poultry faculty identified unsuitable energy technologies as well as problems with drinking water treatment, litter processing and feed delivery technologies. Information gained from applied research and field trials was shared with allied industry representatives through a variety of delivery methods. Observations indicated increased knowledge of drinking water treatment and litter processing technologies. In addition, technology adoption rates were estimated at 15%, resulting savings of approximately \$6.3 million.