2014 University of Arkansas at Pine Bluff Combined Research and Extension Annual Report of Accomplishments and Results

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I. Report Overview

1. Executive Summary

The School of Agriculture, Fisheries and Human Sciences administers 1890 research and Extension programs at the University of Arkansas at Pine Bluff (UAPB). The School consists of three academic departments: Agriculture, Fisheries and Human Science. Approximately 7.7 million in combined Federal and state funds (Evans Allen, Extension and State Match) supported 15 approved ongoing projects with most of the projects conducted at the UAPB campus site, and some activities occurring at the UAPB Lonoke and Marianna farm sites. Additional studies were conducted on private cooperating farm sites in Jefferson, Lee, St. Francis, Monroe and Phillips counties and with other institutions such as the University of Arkansas Division of Agriculture.

Seven new Evans-Allen research projects were approved and seven Evans-Allen projects were completed. The knowledge gained by these research activities was extended to families and communities through a variety of outreach and Extension programs. The extension program has structured programs in 29 counties with staff housed in 10 of those counties.

Research and Extension in Agriculture are conducted in the areas of plant science, animal science and agricultural economics. The efforts in the Department of Human Science are directed toward human nutrition, food safety and family life. An ongoing project in the textiles program includes the utilization of new applications for biomaterials such as traditional fibers and new modified regenerated proteins like spider silk and cellulosic fibers in relation to aspects of sustainability of materials.

School of Agriculture, Fisheries and Human Sciences Research and Extension programs are designed to provide information and assistance to small-scale and limited resource farmers and disadvantaged families and youth. The Aquaculture/Fisheries program supports both the state's aquaculture industry and recreational fishing as an avenue for enhancing tourism as an economic engine for the state. Research and Extension in Agriculture are conducted in the areas of plant science, animal science, natural resources and agricultural economics. The efforts in the Department of Human Science are directed toward human nutrition, food safety, family life and textiles.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	23.5	0.0	21.3
Actual	0.0	23.1	0.0	26.5

II. Merit Review Process

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

- External University Panel
- Expert Peer Review

2. Brief Explanation

Our research and Extension programs are monitored annually through a performance appraisal system that assures adherence to planned goals. Each department in the school of Agriculture, Fisheries and Human Sciences has an internal peer review system that evaluates research proposals prior to their implementation. A peer review panel process is in place to review extension publications and internal research publications. The performance appraisal system is also used to assign credit for published papers, fact sheets, manuscripts, funded grants, presentations, contacts, output and outcomes.

External review of the Agriculture Department was conducted during the fall 2011 and concluded in fall 2012. One of the suggestions for the review was that the Department should develop an advisory board for review of academic programs. Although there is an advisory board for research and Extension program, none exists for academic programs. The Regulatory Science Program which is a component of the Agriculture Department, successfully underwent an external review in the fall of 2014. Reviewers suggested including distance education courses to the program's future priorities. The Aquaculture/Fisheries program is scheduled to undergo program review in 2015.

The Department of Human Sciences completed an accreditation self-study report for the Council for Accreditation of the American Association of Family and Consumer Sciences (CAAAFCS) and received a site visit; as a result of this process, the Department of Human Sciences received re-accreditation for a ten year period which will expire in the fall 2022. The Department's next self-study report to CAAAFCS will be due September 1, 2021. A self-study report for accreditation for the Didactic Program in Dietetics Education was completed in 2014. A site visit for this program is scheduled for March 29 - 31, 2015. The child development center was re-accredited by the Arkansas Department of Human Services/Division of Child care and Early Childhood during 2011.

III. Stakeholder Input

1. Actions taken to seek stakeholder input that encouraged their participation

- Use of media to announce public meetings and listening sessions
- Targeted invitation to traditional stakeholder groups
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to selected individuals from general public
- Survey of traditional stakeholder individuals

Brief explanation.

The Dean/Research Director uses the formal stakeholder input developed by the Agriculture Research & Extension Council and the Aquaculture-Fisheries Center of Excellence Advisory Committee as external advisors for the School's Extension and research programs. He also evaluates the makeup of these two stakeholder groups for effectiveness in the input process. Both stakeholder groups provide meaningful suggestions for programmatic improvements. The Agriculture Research and Extension Council met during both the summer and winter of 2014. It is scheduled to meet again during the summer of 2015.

The UAPB Aquaculture/Fisheries Center (AFC) receives input and interacts with stakeholders on a regular basis with personnel in the Center. Individual farmers, representatives of trade associations,

and board members interact frequently with Center Researchers and Extension specialists. The interaction often is initiated with a request for some specific type of information. The specific questions often expand into broader discussions as the state of knowledge in particular areas through which additional research needs become readily apparent. For the natural fisheries research and Extension areas, the primary stakeholder defined for the UAPB Aquaculture/Fisheries Center is the Arkansas Game and Fish Commission (AGFC). The increased interaction with the Arkansas Game and Fish Commission in recent years has facilitated greater communications. Formal input is obtained through the representation of the Arkansas Game and Fish Commission on UAPB'S National Aquaculture/Fisheries Advisory Council. Additional opportunities for interaction and input are available at the statewide meeting of the Arkansas Chapter of the American Fisheries Society (AFS). Many AGFC managers and biologists attend these meetings. Also, the increasing involvement of Center scientists on committees of the Southern Division of the AFS and at the national level provide opportunities for additional input because a number of AGFC personnel continue to be active in those settings.

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

1. Method to identify individuals and groups

- Use Advisory Committees
- Open Listening Sessions
- Use Surveys

Brief explanation.

Stakeholder input is a core component of all 1890 research and Extension programs. Means for acquiring input varies depending upon the nature of the research or Extension program and the diversity of relevant stakeholders. These include local and state agencies, community groups, producers and other targeted audiences, as well as business and industry groups. Producer meetings, advisory groups, conferences, and focus group discussions are major means for gaining input. Our stakeholder input process is structured individually by departments/schools to represent the differences in audiences served. This approach is taken because the clientele's needs for research and Extension assistance in programs other than aquaculture are broad in scope, local in nature and geographically limited. While the Aquaculture Program provides research and Extension support for all aquaculture producers in the state, other programs support under-served and diverse audiences.

The Agriculture Research and Extension Advisory Council (AREAC)
Members will serve on the Counsel for a three year rotating basis. Membership includes seven (7) producers engaged in a variety of agricultural enterprises (i.e. alternative crops, row crops, livestock, etc.) one (1) retired Extension professional (from 1862 system) two (2) federal agency (NRCS, FSA) representatives, four state agency (Arkansas Department of Environmental Quality, Rural Development, Arkansas Land and Farm Development, and Arkansas Natural Resources Commission) representatives and two (2) industry (Monsanto, Delta Yams) representatives. The broad based representation of Council membership provides a broadened perspective of challenges facing producers and promotes the creation of partnerships to address the challenges.

The Aquaculture-Fisheries Center of Excellence Advisory Committee
The primary advisory committee that provides feedback and input into the UAPB Aquaculture/Fisheries Program is the National Aquaculture/Fisheries Advisory Council. It includes representation from catfish, baitfish, and sport fish farms, feed mills, Arkansas Game and Fish Commission, U.S. Fish and Wildlife Service, and other state university programs. Some committee members also serve as representatives for other state and national aquaculture industry organizations, so that these individuals contribute a much broader perspective to advisory committee meetings than their formal capacity might otherwise suggest. Both the Chicot and Lonoke County Extension programs derive their input from this committee's advice. The Lonoke County Agricultural Office also hosts an annual advisory committee meeting. UAPB Aquaculture/Fisheries Center staff is invited to participate in these meetings to facilitate information transfer between the 1890 Cooperative Extension Program, the 1862 State Extension Service and industry members.

The Young Scholars Advisory Committee Structure
A Young Scholars Task Force is currently in the process of being developed into an 1890 4-H Program. As part of this process, a separate advisory committee is currently being developed to lend relevant stakeholder advice for youth programing including the UAPB collegiate 4-H group . Both research and Extension programs in Aquaculture/Fisheries and in Agriculture and the Family and Consumer Sciences Extension program utilize an advisory committee structure as a major component of the stakeholder input process. The Human Sciences Research program employs other mechanisms to obtain stakeholder input.

2(B). A brief statement of the process that was used by the recipient institution to identify individuals and groups who are stakeholders and to collect input from them

1. Methods for collecting Stakeholder Input

- Meeting with traditional Stakeholder groups
- Survey of traditional Stakeholder groups
- Meeting with traditional Stakeholder individuals
- Survey of traditional Stakeholder individuals

Brief explanation.

Informal input from stakeholders is presented and discussed at formal meetings with research faculty and staff. Strategies are developed to address identified concerns as appropriate. Faculty are represented on all structured committees for purposes of participating in the discussion and gathering the input from stakeholders that will later be presented back to faculty and staff.

The most recent stakeholder meeting resulted in suggestions by the group for conducting research that will provide a foundation for introducing additional herbicides for weed control in sweetpotato production. Both graduate research projects and a faculty research program have been developed to address this stakeholder issue. Conversely, an individual stakeholder suggested that the research we currently conduct with straight head disease in rice was not important for our clientele. This is an instance where the Director must weigh the comments of the individual with the needs of the overall state and other agricultural clientele. Other suggestions included holding additional meetings each year during Agriculture Field Days, and taking care not to shift a disproportionate amount of the attention to the new foundation sweetpotato seed program to the detriment of other 1890 agricultural programs.

3. A statement of how the input will be considered

- In the Budget Process
- To Identify Emerging Issues
- In the Action Plans
- To Set Priorities

Brief explanation.

The input from stakeholders has been incorporated into outreach efforts with sweetpotato outreach programs and enhanced technical support for value-added processing with various agricultural commodities. The most recent stakeholder meeting resulted in suggestions by the group for conducting research that will provide a foundation for introducing additional herbicides for use in sweetpotato production. Both graduate research projects and faculty research programs have been developed to address this stakeholder issue.

Brief Explanation of what you learned from your Stakeholders

Input from stakeholders through the agricultural Extension agents and program assistants in the field continue to play a major part in program development. Farmers and packing house operators continue to voice the need to support increasing sweet potato production in Arkansas. Sweet potato research was expanded in the area of product development and the Extension program has given increased attention to farmer production problems. The Aquaculture-Fisheries Advisory Committee continues to give input for the research and Extension programs. Particular interests center around developing techniques for producing food fish more economically.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	1906550	0	2314040

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	0	1721907	0	2091549
Actual Matching	0	1765632	0	2037964
Actual All Other	0	0	0	0
Total Actual Expended	0	3487539	0	4129513

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous				
Carryover	0	113746	0	80351

V. Planned Program Table of Content

S. No.	PROGRAM NAME
1	Families, Youth and Communities
2	Food Safety
3	Climate Change
4	Global Food Security and Hunger - Agriculture
5	Childhood Obesity
6	Food Safety in Aquaculture
7	Sustainable Energy
8	Global Food Security and Hunger - Aquaculture

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Families, Youth and Communities

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
802	Human Development and Family Well-Being		45%		0%
806	Youth Development		55%		0%
	Total		100%		0%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	1.3	0.0	0.2
Actual Paid	0.0	2.3	0.0	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	231965	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	281681	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Three focused programs were addressed in the Families, Youth and Communities Program. These included the **Arkansas AG Adventures and Awareness Program, Teens on the Go, and the Young Scholars Program**. The **Arkansas AG Adventures and Awareness Program** was implemented in the southeastern region of the state for students in elementary through high school.**Teens on the Go** is a newsletter that was developed for students in grades 7-12. Students received 6 issues of the newsletter during the school year. The **Young Scholars Program** was implemented in a housing project in Monroe County, located in the Delta Region of the State. The children, referred to as **Young Scholars**, met 5 days a week, year-long, in an after-school program that emphasized math and science skills. Parents of the children were also enrolled in the **Young Scholars Program** and met in small groups weekly. They focused on parenting education, stress management, coping and job related skills, family relationships, and economic-and self-sufficiency skills.

2. Brief description of the target audience

The target audiences included students in elementary through high school (Arkansas AG Adventures and Awareness Program), students in grades 7-12 (Teens on the Go), and low-income minority children and their families who live in a housing project (Young Scholars Program).

3. How was eXtension used?

Faculty used eXtension to learn about valuable resources they could use in programming. Some used eXtension for professional development opportunities.

V(E). Planned Program (Outputs)

1. Standard output measures

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	45	100	55	60000

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

Patent Applications Submitted

Year: 2014

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2014	Extension	Research	Total
Actual	0	1	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- The number of participants in these programs will include direct and indirect contacts with youth and adults.

Year	Actual
2014	60200

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	To increase performance in school (Young Scholars Program), help students develop decision-making skills (Teens on the Go), help families gain economic security (parents enrolled in the Young Scholars Program),and to increase understanding and awareness of agriculture as a scientific discpline with many career opportunities (Arkansas AG Adventures and Awareness Program).

Outcome #1

1. Outcome Measures

To increase performance in school (Young Scholars Program), help students develop decision-making skills (Teens on the Go), help families gain economic security (parents enrolled in the Young Scholars Program),and to increase understanding and awareness of agriculture as a scientific discpline with many career opportunities (Arkansas AG Adventures and Awareness Program).

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	60200

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Policy makers, educators and the public in general continue to be concerned about the American family. In Arkansas nearly 7.5 percent of children live in communities that have been labeled severely distressed with high numbers of unemployment, high school dropouts and teenage pregnancies. Experts predict that many of these children have great odds to overcome.

What has been done
A newsletter, Teens on the Go was implemented 34 years ago to teach decision-making skills to students in grades 7-12. A Young Scholars Program was implemented 19 years ago to teach math and science skills to minority children living in a housing project.Parents of the children are also enrolled in the program.

Results
Total contacts with Teens on the Go were 60000.One student had this to say about Teens on the go: "This newsletter was very informative. It helped me make more positive decisions in my life." The Young Scholars Program is noted for helping low-income minority children improve school performance and graduate from high school. Ninety-four percent of students in the Young Scholars Program passed the Bench Mark test. Forty former Young Scholars are currently enrolled in a community college or a four year institution. More than 40 students have graduated from college.

4. Associated Knowledge Areas

KA Code	Knowledge Area

802 Human Development and Family Well-Being
806 Youth Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

The struggling economy affected the Young Scholars Program. As families lost jobs, beginning in 2008 many moved away to live with relatives. This affected the enrollment in the program. Many young mothers (16 to 18 year olds) and their children populate the housing project today; the interest in the program by these young mothers just is not there. After 19 years of implementation the Young Scholars Program was phased out in FY 2014. After 34 years of continuous development the 1890 Family and Child Development Specialist who is also the Associate Extension Administrator phased out Teens on the Go because her assignment in administration left little to develop the newsletter.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Students continue to credit Teens on the Go for helping them make good decisions. Total contacts from Teens on the Go in FY 2014 was 60000.One student had this to say about Teens on the Go: "this newsletter was very informative. It helped me make more positive decisions in my life." Ninety-four percent of children in the Young Scholars Program had an increase in school performance. Forty-two percent of parents in the Young Scholars Program reported meeting monthly financial obligations. Fifty -six percent of parents reported having food last to the end of the month. When food security was first tracked in the program very few parents reported having food last to the end of the month.

Key Items of Evaluation

Teens on the Go is in its 34th year of implementation. Total contacts with Arkansas' 7-12 grade students were 60000. Topics included: 1) Words Can Hurt: Kids are Standing up to Bullying at School; 2) Head of the Class--Treat Your Teacher Well; 3) Lost in Love: Keeping True to You When You're One of Two, 4) Tangled Web: The Intersection of Sexuality and Cell Phones, E-mail and the Internet, 5) The Power and Peril of Cults, and 6) "My name is Eric, and I'm an Addict." The Young Scholars Program was implemented in a housing project in Brinkley. The children referred to as **Young Scholars** met 5 days a week, year long, in an after school program that emphasized math and science skills. Parents enrolled in the Young Scholars Program met in small groups weekly and focused on parenting education, stress management, coping and job related skills, family relationships, and economics and self-sufficiency skills.

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Food Safety

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
501	New and Improved Food Processing Technologies		10%		0%
502	New and Improved Food Products		10%		0%
503	Quality Maintenance in Storing and Marketing Food Products		10%		0%
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins		70%		0%
	Total		100%		0%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	0.0	1.0
Actual Paid	0.0	0.4	0.0	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	85920	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Commercially available sanitizers and natural antimicrobial compounds will be evaluated.

Edible coating containing natural antimicrobials will be evaluated.

Bacteriophages against Escherichia coli O157:H7, Salmonella spp and Listeria monocytogenes will be evaluated.

2. Brief description of the target audience

Local farmers, limited resource farmers, and state and federal agencies.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	52	0	0	0

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

Patent Applications Submitted

Year: 2014

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2014	Extension	Research	Total
Actual	1	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Three abstracts and three presentations at the scientific annual meetings. Three peer reviewed publications. Three presentations and/or workshops to farmers.

Year	Actual
2014	0

Output #2

Output Measure

- Number of emails, phone calls, and conference calls to catfish farmers and processors

Year	Actual
2014	15

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	# of procedures, technology, and food commodity varieties adopted by public and private sectors

Outcome #1

1. Outcome Measures

# of procedures, technology, and food commodity varieties adopted by public and private sectors

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

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

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
502	New and Improved Food Products
503	Quality Maintenance in Storing and Marketing Food Products
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Climate Change

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
133	Pollution Prevention and Mitigation		50%		33%
403	Waste Disposal, Recycling, and Reuse		50%		67%
	Total		100%		100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.5	0.0	0.5
Actual Paid	0.0	1.4	0.0	1.9
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	164919	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	96317	0	99640
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Compile beginning and ending water quality measurements associated with swine waste treatmen lagoon. Compile beginning and ending water quality measurements associated with constructed

wetland cells and varied aquatic plants.
Compile water quality measurements associated with the UAPB Demonstration Farm pond.
Conduct at least one Swine Waste Treatment System Outreach/Demonstration Meeting each year.
Conduct at least one Farm Water Quality Improvement Outreach/Demonstration Meeting each year.
Complete one peer reviewed research article every two years. Complete one fact sheet every year.
Document the number of small, local and limited resource farmers that have been assisted with swine waste treatment, odor and/or water quality issues each year.

County agents will be encouraged to have pond owners submit water samples for analysis and offer workshops. One-on-one visits will be made to producers to visually inspect existing ponds and potential pond sites.
I will re-organize and manage an already established collegiate tournament circuit for Arkansas university bass fishing teams, the Arkansas Collegiate Series (ACS).
I will visit Arkansas high schools that already have bass fishing teams to meet with their members, encourage them to consider going to college and join collegiate fishing teams, teach valuable lessons in fish locating, presentations, public speaking tips, etc while focusing on drawing students to UAPB.
I will also make efforts to establish high school, and perhaps collegiate, fishing teams at schools and institutions that do not already have them.

Annual updating of the aquatic herbicide section of the cooperative extension publication MP44, Recommended Chemicals for Weed and Brush Control; annual weed and pond in-service for cooperative extension agents; presentations at Master Gardener, Wildlife, and other state meetings; article in Arkansas Aquafarming

Develop and provide research-based information to the public through county extension faculty and direct contacts, and through newsletter articles, extension materials, and presentations at meetings and workshops. Identification of problematic aquatic plants is provided, as it is essential for selecting appropriate control measures, and basic water quality analysis is also provided.

· Provided the studies are considered feasible by AGFC, we will conduct largemouth bass population assessments in selected waters, with special emphasis on the age-0 cohort.
· Attempt to fit standard stock-recruitment models as outlined above if feasible.
· Characterize system-specific abiotic and biotic conditions and incorporate these data into modeling to improve fit as feasible.
· Assess contribution of age-1 crappies to year class using hatchery crappie previously marked with OTC and stocked in AGFC lakes.
· Assess contribution of walleye to year class using hatchery walleye previously marked with OTC and stocked into Ouachita River and Beaver Reservoir.
· Model contribution of hatchery fish to largemouth bass fishery in Arkansas River under a variety of management scenarios using EnhanceFish software and existing data on Arkansas River largemouth bass.
· Other activities planned dependent on successful completion of above objectives.

Monitoring agricultural storm water discharges from agricultural fields, water quality and biological condition in adjacent streams in southeast Arkansas since April 2011.

A range of activities will be conducted in support of this program, particularly in the areas of: 1) evaluating effects on wild largemouth bass of hatchery-reared bass in small impoundments; 2) understanding factors associated with successful sportfish stockings in Arkansas waters; 3? on-farm herbicide trials; and 4) extension programming related to control of aquatic weeds.

On-farm herbicide trials will be conducted using both pre-emergence and post-emergence herbicides. Results will be disseminated through meetings, a newsletter, fact sheets and a presentation for agent use. Fact sheets on nutrient management for small impoundments and on interpreting water testing results will be revised.

Information on managing these resources will be disseminated directly to the general public, through county offices, and through natural resource agencies. Proper identification of problematic aquatic plants is essential, and this service is provided to the general public. Activities include direct contacts with the general public, indirect contacts through county extension faculty, fact sheets, freshwater aquaculture eXtension content, newsletter articles and presentations at meetings and workshops. Radio interviews reached a wider audience across rural America. A wide variety of educational activities are utilized in this program, however, reaching a major segment of the target audience still requires individual contact for effective implementation.

Data logging devices have been installed in commercial fish farms across the state. Continuous monitoring of water temperatures will provide a basis for developing a comprehensive database of changing water temperatures.

Youth fishing and aquaculture education is a continuation of a long standing program. UAPB has a youth fishing trailer which contains enough rods and reels and other type fishing gear for 80 or so youth to fish at the same time. UAPB makes the trailer available to 4-H or other interested youth groups by reserving the trailer. Assistance is provided through extension to maintain the fishing trailer and gear in a good state of repair and assist with youth fishing derbies on request.

Wild age-1 largemouth bass abundance will be determined using Petersen method. Boat-mounted electrofishing in littoral areas will be used exclusively to collect fish. Age-1 largemouth bass should be effectively sampled using standard boat-mounted electrofishing methods (Jackson and noble 1995). This it anticipated that other gears will not be needed to collect representative samples of age-1 largemouth bass. Wild age-1 largemouth bass collected during the first sample period will be given a different color VIE tag and released. A census will occur 2-7 d after the first sample period. Collected fish will be counted as tagged or tagless, length (TL; mm) and weight (g) recorded, and scales removed in length classes where age overlap is expected. The Chapman modification of the Petersen method will again be applied to provide estimates of wild age-1 largemouth bass abundance. Daily instantaneous mortality rates will be calculated in each impoundment by regressing the natural log (loge) of wild largemouth bass population abundance on the natural log of the sampling day. The slope of the regression will be the daily instantaneous mortality rate. One-way analysis of variance (ANOVA) will be used to compare mortality of wild age-1 largemouth bass among impoundments stocked with defferent densities of hatchery-reared largemouth bass. For all ANOVAs, &alpha=0.05 and H0= no difference. Tukey's HSD test will be used to determine significant differences between treatment levels if H0 is rejected by ANOVA. Habitat and biotic factors measured during sampling may be used as covariates if high variation is encountered. Principal Component Analysis may also be used to examine variability among systems due to uncontrollable habitat and biotic sources of variability. Axes scores for each impoundment would be used as covariates in ANOVA to examine effects of stocking density on condition and vital rates of largemouth bass.

Growth will be determined for wild largemouth bass in each impoundment. The change in mean length will be divided by the number of days to between the two periods to estimate growth rate (i.e., mm/d). Growth will be compared among treatment levels using one-way ANOVA. Relative weights of age-1 largemouth bass will be used as an index of condition. Relative weights will be calculated and compared among treatment levels using one-way ANOVA.

In the first phase of this planned research, largemouth bass will be emphasized because they are the most sought-after sportfish in Arkansas. AGFC's Largemouth Bass Management Plan (LMBMP: AGFC 2002) specifies that rates of recruitment, growth, and mortality are poorly known for many Arkansas waters. More recent work done with largemouth bass since 2002 has provided information from the Arkansas River, but information is scarce for many of the state's other lakes (e.g., those < 3,000 ha without largemouth bass will shed light on factors important in understanding and identifying waters with better prospects for largemouth bass stocking success.

For the first study, twenty (20) lakes will be selected for assessment in conjunction with AGFC

biologists. These lakes will represent those covered under the current LMBMP, and will contain largemouth bass populations with known or suspected poor, moderate, and high recruitment. This judgement will be based on any historical data that may exist for the lake input from the respective district biologists. Thus, work in 2014 focused on data collection in the sample lakes.

2. Brief description of the target audience

The target audience includes but is not limited to small, limited resource landowners, underrepresented communities, and families.
The target audience is farm pond owners in Arkansas and those interested in developing new farm ponds

High school and college students interested in bass fishing

The target audience is Pond owners, pond managers, county agents

The main target audience is county Extension faculty. We also respond to direct contacts from small impoundment owners and natural resource managers. Many of the impoundments are less than ½-acre, are located in rural areas, and are owned by a broad cross-section of the general public in terms of income, education and other socio-economic factors.

Fisheries managers of Arkansas, Arkansas Game and Fish Commission (AGFC), AGFC fisheries biologists and managers, competitive and recreational anglers.

The target audience is small impoundment owners, commercial fish farmers, and natural resource managers. Many of the impoundments are less than 1/2 - acre, are located in rural areas, and are owned by a broad cross-section of the general public in terms of income, education and other socio-economic factors.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	2275	3706	1424	3

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

Year:	2014
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2014	Extension	Research	Total
Actual	1	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Complete one peer reviewed research article every two years.

Year	Actual
2014	0

Output #2

Output Measure

- Document the number of small, local and limited resource farmers that have been assisted with swine waste treatment, odor and/or water quality issues each year.

Year	Actual
2014	1

Output #3

Output Measure

- Complete one fact sheet regarding water quality, swine waste management or environmental stewardship each year.

Year	Actual
2014	0

Output #4

Output Measure

- Number of project annual and final reports

Year	Actual

2014	3

Output #5

Output Measure

- Number of presentations and scientific meetings

Year	Actual
2014	2

Output #6

Output Measure

- Number of abstracts published

Year	Actual
2014	4

Output #7

Output Measure

- Number of refereed journal articles

Year	Actual
2014	0

Output #8

Output Measure

- Number of research reports submitted to stakeholders

Year	Actual
2014	2

Output #9

Output Measure

- Number of non-peer reviewed pubications

Year	Actual
2014	0

Output #10

Output Measure

- Number of extension articles

Year	Actual
2014	0

Output #11

Output Measure

- Number of research projects on populations of important fisheries in Arkansas

Year	Actual
2014	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	The number of conservation practices utilized by swine farmers as a result of this project is an outcome measure.
2	Increase awareness of environmental issues and policies that pertain to operating small swine farms.
3	Good fertilization program that will increase fish production in farm ponds
4	Number of high schools teams visited
5	Student Participation in ACS Tournaments
6	Number of farm pond-related contacts with county faculty and the public
7	Water bodies free of weed problems that benefit their owners by allowing the pond to be used as intended
8	Number of fisheries biologists and other aquatic scientists that are informed of study results
9	Mississippi River Basin Health
10	Number of farm pond owners who indicate new knowledge of pond management
11	Number of fisheries biologists indicating new knowledge of populations of important Arkansas fisheries

Outcome #1

1. Outcome Measures

The number of conservation practices utilized by swine farmers as a result of this project is an outcome measure.

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Both individual farmers, adjacent land owners and society in general care about the management of small swine farmers in their community.

What has been done
Demonstrations have been developed and displayed at farm field days and farm tours.

Results
The conservation practice has been demonstrated to both the target and non-target public.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation
403	Waste Disposal, Recycling, and Reuse

Outcome #2

1. Outcome Measures

Increase awareness of environmental issues and policies that pertain to operating small swine farms.

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Small, limited resource landowners, underrepresented communities, and families. These clientele groups are typically the ones which own and operate small swine farms in the south.

What has been done
Demonstrations have been developed and displayed at farm field days and farm tours. Fact sheets have been developed to help disseminate the environmental issues.

Results
The conservation practice has been demonstrated to both the target and non-target public.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation
403	Waste Disposal, Recycling, and Reuse

Outcome #3

1. Outcome Measures

Good fertilization program that will increase fish production in farm ponds

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

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

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #4

1. Outcome Measures

Number of high schools teams visited

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

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

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #5

1. Outcome Measures

Student Participation in ACS Tournaments

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual

2014	0

3c. Qualitative Outcome or Impact Statement

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

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #6

1. Outcome Measures

Number of farm pond-related contacts with county faculty and the public

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

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

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #7

1. Outcome Measures

Water bodies free of weed problems that benefit their owners by allowing the pond to be used as intended

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

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

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #8

1. Outcome Measures

Number of fisheries biologists and other aquatic scientists that are informed of study results

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

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

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #9

1. Outcome Measures

Mississippi River Basin Health

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Human activities especially agricultural development can largely affect water quality and aquatic ecosystem health. Agriculture is one of the biggest issues in the Mississippi River Basin. These agricultural activities are causing water use (e.g., irrigation) and potential environmental problems (e.g., eitrophication).

What has been done
Monitoring of agricultural storm water discharges from agricultural fields, water quality and biological condition in adjacent streams in southeast Arkansas has been since April 2011.

Results
The current results found that agricultural conservation activities have positive effects on reducing nutrients and sediments runoff to streams. One graduate student (Sagar Shrestha) has completed his M.
S. thesis comprehensive exam, and two other graduate students (Christopher Laskodi and Matthew Skoog) have completed their M.S. proposal defense and finished all their thesis related field data collection from this research. The current study provided practical guidance for farmers in the Mississippi Delta to better implement conservation practices in their fields, reduced economic loss from sound fertilizer management, and reduced environmental impacts on the Mississippi River and Northern Gulf of Mexico.

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

<u>Outcome #10</u>

1. Outcome Measures

Number of farm pond owners who indicate new knowledge of pond management

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	80

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #11

1. Outcome Measures

Number of fisheries biologists indicating new knowledge of populations of important Arkansas fisheries

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	40

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

The project was not significantly affected by adverse weather conditions. Although colder than normal winter temperatures affected the survival of swine research animals. This in turn delayed the timing of animal scientist's feeding projects which in turn delayed the timing of nutrient inputs into the swine waste treatment system.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Results of the constructed wetland project suggest that the quality of the wastewater was improved after passing through the Swine Wastewater Treatment System and constructed wetland, with respect to the removal of total nitrogen, phosphorus, and ammonia. The annual nutrient removal percentages were 49% (phosphorus), 45% (total nitrogen) and 38% (ammonia). After treatment, wastewater concentration levels for each nutrient were below 10 mg/L each month throughout the duration of this study; which is in compliance with Arkansas state law regulation No. 6. The parameter with the highest annual standard deviation (11 mg/L) was ammonia, indicating large concentration variations of this nutrient in the wastewater; likely due to its relatively short existence in the environment before its rapid conversion to ammonium, as suggested by Hargreaves and Tucker 2004. The parameter with the second highest annual standard deviation (4 mg/L) was total nitrogen, and lastly phosphorus (2 mg/L). The standard deviations for total nitrogen and phosphorus suggest they may have been more "stable" nutrients in the wastewater than ammonia. No additional research was conducted after the project ended.

Key Items of Evaluation

Constructed wetlands for swine waste nutrient removal can be very effective as demonstrated by the swine waste treatment system project.

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Global Food Security and Hunger - Agriculture

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
202	Plant Genetic Resources		5%		10%
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants		12%		10%
205	Plant Management Systems		12%		8%
211	Insects, Mites, and Other Arthropods Affecting Plants		6%		0%
213	Weeds Affecting Plants		10%		0%
301	Reproductive Performance of Animals		5%		5%
302	Nutrient Utilization in Animals		6%		5%
307	Animal Management Systems		0%		10%
311	Animal Diseases		10%		7%
502	New and Improved Food Products		4%		5%
601	Economics of Agricultural Production and Farm Management		5%		13%
602	Business Management, Finance, and Taxation		12%		0%
603	Market Economics		0%		10%
610	Domestic Policy Analysis		5%		7%
701	Nutrient Composition of Food		4%		5%
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures		4%		5%
	Total		100%		100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	5.0	0.0	6.5

Actual Paid	0.0	12.0	0.0	15.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	708213	0	1107873
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	949685	0	955638
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

• The Small Farm Program staff assisted approximately 184 Small and Socially Disadvantaged Farmers (SSDF) in signing-up for USDA Programs including the operating and farm ownership loan programs, EQIP, CSP, LFP, the Noninsured Assistance Program (NAP), Good Agricultural Practice (GAP) Program, USDA/RD Housing Programs, and the crop insurance program.

• Winter and summer forage experiments were conducted with cattle and goats in the same pasture to find alternatives to feeding hay when little or no forage is growing. During the winter, wheat, rye and barley were inter-seeded with crimson clover and hairy vetch or rape. In the summer, sorghum sudangrass was inter-seeded with cowpeas and soybeans or rape to determine the most suitable combinations for animal nutrition.

• Nine workshops (5 gastrointestinal parasite management, 2 beef cattle management and 2 youth workshops with small ruminants) were conducted to educate SSDF about the use of FAMACHA scoring, fecal egg counting and proper use of chemical dewormers to reduce the development of resistance, cost of medicine and losses due to gastrointestinal parasites.

• Five Gladiolus genotypes were studied to determine which genotype was profitable for production in Southeast Arkansas. Flower spikes were placed in 5, 10, and 15 mg solution of sucrose, fructose or glucose for 10, 20, 40 or 60 minutes to evaluate vase life. Another study was conducted to see the effect of GA3 (75 and 100 ppm) and Ethrel (100 and 200 ppm on vegetative growth, reproduction and chemical constituents of gladiolus.

• The sweet potato Foundation Seed Program provided virus indexed sweet potatoes through shoot meristem culture for greenhouse production. Subsequently the virus indexed sweet potatoes were planted in the field to provide foundation seed potatoes to SSDF.

• Two studies were conducted to determine the effect of N fertilizer and use of micronutrient fertilizers on yield of sweet potatoes following a winter cover crop that is used to protect and conserve the soil in a conventionally tilled field.

• Two cowpea cultivars (UAPB-1 and UAPB-2) were increased as foundation seeds by planting in 20 X 200-ft plots at the Pine Bluff and Lonoke experiment stations. The plots were thorough rouged and produced 40-50 lbs. foundation seed of each cultivar.

• A field day was held at the Lonoke experiment station to showcase research that is being done at the

station. In addition to the 300 plus participants, the event was seen by thousands as a result of filming and subsequent broadcasting by the University's television station (KUAP). Many positive comments have been received as a result of the broadcasts.

- 12 conventional cultivars and 12 hybrid breeding lines were selected from our previous studies for evaluating straighthead resistance in an infected silt loam soil at the UAPB experiment station. Ca _was used in a greenhouse study on soil where straighthead had naturally and repeatedly occurred in the past years.
- The PI working with textiles continued to review literature on major bio-based and sustainable fibers (alpaca, organic cotton, hemp, recycled polyester, and linen/flax); attended a Climate Change and Apparel &Textiles Education Workshop; presented a related paper at an international conference; and interviewed alpaca breeders at the Alpacas in the Ozarks show as a case study.
- A new project was initiated on vegetable and fruit production by students who are mentored by SSDF and university personnel. Two meetings were facilitated with the advisory team; a plot design has been formulated; an undergraduate Agricultural Business student has been hired; and the student attended a vegetable production workshop.

Data analysis and manuscripts writing

Conduct fish nutrition research and disseminate results to target audiences

Research activities focus on methods to reduce hydrogen sulfide concentrations in baitfish production ponds, and methods to destick goldfish eggs from spawning substrate. Extension efforts focus on water quality and dissemination of research materials to the producers.

Research activities focus on develop of new production system (split-pond) and on an indoor hatchery system for fathead minnows. Extension efforts focus on aquatic invasive species prevention, water quality and quantity, and regulatory issues.

Activity will include monitoring the diseases cases that come through the lab and being prompt in correctly identifying specific problem.

Prompt diagnosis of fish diseases, water quality analyses and routine health checks will be performed.

1) Active communication with baitfish farmers and research and extension scientists.
2) Development of research grants.
3) Development of a prototypeSPS with a sluiceway screenand field applications.
4) Public demonstration and presentationof research results.
5) Publication of research results in scientific journals.
6) Utilizationof research resultsas teachingmaterials.

Working with farmers to determine appropriate herbicides and then calculating rates and appropriate application methods.

Weekly visits to each verification ponds will be made where samples are collected for analyses. Additionally, stocking and harvesting will be given assistance.

Research activities will focus on commercial production methods of crappie. Extension efforts focus on dissemination of research materials to the producers.

Conduct fish nutrition research and disseminate results to target audiences

Updating the aquaculture alternative fact sheet. Answering requests for information. Helping current

farmers of alternative species, particularly Arkansas turtle farmers.

Activities consist of research studies in the laboratory and on the experiment station, on-farm research trials, extension farm visits, calls, e-mails, newsletters, workshops, and presentations. Water quality and fish health services are provided to support educational programs. Program planning is conducted through discussions with individual farmers and with farmer associations (e.g., Catfish Farmers of Arkansas, Arkansas Bait and Ornamental Fish growers Association). Results of research studies and extension programs are shared with peers across the country at national meetings and in journals and other publications.

Data describing the efficacy of novel therapies to induce spawning will be collected and analyzed.

Evaluation of non-invasive strategies to evaluate annual reproductive cycles of finfish will include collection of digital images of catfish, largemouth bass and smallmouth buffalo.

Evaluation of hatchery fry, fingerling, food fish conditioning methodologies to enhance resistance to external environmental stress. This activity includes gaining an understanding of cellular machinery involved with the stress response, development and testing putative methods to induce favorable cellular responses, and finally assessing whole animal responses to treatment administered before exposure to acute physical and/or water quality changes.

Water quality and fish production monitoring

Activity will involve on farm visits where feeding of all ponds will be observed. Data will be analyzed and projections made.

Pond production studies

Long-tem business planning support

Continued committee meetings to identify and implement an improved marketing structure

1) Active communication with baitfish farmers and research and extension scientists.

2) Development of research grants.

3) Development of a prototypeSPS with a sluiceway screenand field applications.

4) Public demonstration and presentationof research results.

5) Publication of research results in scientific journals.

6) Utilizationof research resultsas teachingmaterials.

Conduct fish nutrition research and disseminate results to target audiences

Much of the time spent working with the catfish industry deals with health inspections for individual lots of fish destined for other states stocking programs. The fish are required to appear in good health prior to transport.

Data for catfish study in the past few years will be collected at various UAPB aquaculture and fisheries extension stations as well as through literature review. Power analysis will be used to assess and validate the required sample sizes for a typical aquaculture experiment. Power is the probability of rejecting a false null hypothesis. A power of 80% is recommended for research (if a difference is looked for) and 95% for validation (if there is no difference).

2. Brief description of the target audience

The primary audience for this program consists of Small and Socially Disadvantaged Farmers (SSDF) as defined by the National Commission on Small Farms ($250,000 in gross sales or less). Socially Disadvantaged Farmers are those who have been subjected to racial or ethnic prejudices because of their identity as a member of a group without regard to their individual qualities. Identified groups include: African Americans, Hispanics, Asians, American Indians or Alaska Natives, and Native Hawaiians or other Pacific Islanders. UAPB does not discriminate against any individual and services are provided to all who request it. The scope of the program has been broadened to include students and consumers of fabrics

and textiles.

Baitfish farmers of Arkansas

Fish producers, feed manufacturers, researchers, recreational fishers

The target audience is commercial bait and forage fish farmers in Arkansas, Extension agents, and state regulatory agencies.

The target audience is commercial bait and forage fish farmers in Arkansas and across the nation. In many cases, research and biosecurity/fish health programs are also applicable to sportfish farms, also an important aquaculture crop.

The audience is aquaculture producers in Arkansas and the state game and fish hatchery system.

Commercial producers of aquatic animals in Arkansas, private pond owners, county Extension agents, state agencies involved in the regulation or control of aquatic animal diseases.

Commercial producers of aquatic animals in Arkansas, private pond owners, county Extension agents, state agencies involved in the regulation or control of aquatic animal diseases.

1) Baitfish farmers.
2) Baitfish and live fish marketshops.
3) Public school teachers and students.
4) State-level, national, and international research and extension scientists.

Baitfish farmer owners, managers and employees.

The audience are current producers who want to improve farm production and efficiency and other land owners searching for alternative for land use.
Aquaculture producers, Extension agents, State agencies, small pond owners
Fish producers, feed manufacturers, researchers, seafood consumers
Current farmers, potential fish farmers, county agents
Program activities were targeted towards aquaculture producers, potential producers, and farm pond owners. Aquaculture production primarily occurs on family farms; most are small businesses without resources to conduct internal research, and many find it increasingly difficult to keep informed of changing rules and regulations without assistance from extension.

The direct target audience includes commercial aquaculture entities and public agencies involved with the production of fish for enhancement purposes.

Catfish farmers in Arkansas
The audience is current fish producers and lending institutions in the area.
catfish farmers and processors
1) Channel and hybrid catfish farmers.
2) Live catfish haulers.
3) Public school teachers and students
4) State-level, national, and international research and extension scientists.

Fish producers, feed manufacturers, researchers, seafood consumers
Catfish farmers, live fish haulers, representative for other states.
The target audience are researchers in Aquaculture and Fisheries department as well as the catfish farmers in Arkansas.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	17710	75000	45	440

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

Patent Applications Submitted

Year: 2014
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2014	Extension	Research	Total
Actual	2	2	4

V(F). State Defined Outputs

Output Target

<u>Output #1</u>

Output Measure

- The number of research studies and demonstrations conducted

Year	Actual
2014	14

Output #2

Output Measure

- The number of farmers provided assistance in applying for USDA programs

Year	Actual
2014	184

Output #3

Output Measure

- The number of newsletters, fact sheets, etc. distributed

Year	Actual
2014	2000

Output #4

Output Measure

- The number of newspaper articles published

Year	Actual
2014	56

Output #5

Output Measure

- The number of field days held

Year	Actual
2014	1

Output #6

Output Measure

- Number of presentations made

Year	Actual
2014	53

Output #7

Output Measure

- The number of workshops and training sessions conducted

Year	Actual
2014	17

Output #8

Output Measure

- Number of abstracts

Year	Actual
2014	5

Output #9

Output Measure

- Number of trade magazine articles

Year	Actual
2014	56

Output #10

Output Measure

- Number of factsheets and newsletters developed

Year	Actual
2014	3

Output #11

Output Measure

- Number of internally reviewed publications

Year	Actual
2014	5

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Increased economic opportunity and profitability for SSDF
2	An increase in the number of SSDF that adopt one or more Best Management Practices for crop production
3	Increase the number of farmers that develop an estate plan to reduce land loss by Socially Disadvantaged Farmers
4	Enhanced crop diversity on SSDF to increase profitability
5	Increase the number of SSDF that adopt one or more Best Management Practices for livestock production
6	Generation of new ideas/concepts for textile structures/end products from bio-fibers
7	Number of presentations, abstracts, publications, newsletter articles and other forms of delivery of research-based information to baitfish farmers,directly and indirectly
8	Number of scientists that learned what we know
9	Number of producers who learn project results
10	Financial impact of diagnostic services
11	Value of aquatic animals exports requiring inspection and biosecurity assistance
12	Number of alternative aquaculture-related contacts with producers, potential producers, and county faculty
13	Enhanced efficiency in hatchery management practices through the development of improved spawning protocols and hatchery management strategies
14	Number of catfish farmers using improved management practices
15	Number of completed long-term business plans

Outcome #1

1. Outcome Measures

Increased economic opportunity and profitability for SSDF

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
In Arkansas, sweet potato production has been steadily growing with a 30% increase in 2014. Viral diseases cause significant damage to yield. In Beauregard, viruses account for 25 to 40 percent yield reduction. The chief viruses are the Sweet potato feathery mottle virus (SPFMV), Sweet potato virus G (SPVG), Ipomoea vein mosaic virus (IVMV); the crinivirus Sweet potato chlorotic stunt virus (SPCSV), and the begomovirus Sweet potato leaf curl virus (SPLCV). Virus-indexed sweet potato lines will help farmers maintain high yield and quality.

What has been done
Shoot meristems were isolated and cultured on MS medium for sweet potato plant regeneration. The regenerated plants were screened for the presence or absence of viruses by PCR. Virus indexed sweet potato explants (Variety Beauregard) were developed and transferred to the greenhouse for multiplication.

Results
Virus-indexed slips were produced and contributed to the production of 30,000 slips that were planted in two acre plot. This led to production of about 400 bushels (50lbs.) of G1 sweet potato roots.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #2

1. Outcome Measures

An increase in the number of SSDF that adopt one or more Best Management Practices for crop production

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The Glyphosate Resistant Pigweed (GRP) is a troublesome weed in Eastern Arkansas. This weed affects both vegetables and row crops (soybeans, cottons, corn). Under ideal conditions, the weed can grow an inch a day and produce over a million seeds per plant. If not controlled early, the expensive hand hoe is control method often used or total crop losses occur. Since most SSDF do not attend educational meetings where control methods are discussed, they tend to have a large percentage of their fields infected with GRP with yields and income being reduced.

What has been done
Extension Associates (EA) discussed GRP control methods with SSDF seeking loans during the preparation process and non-applicants before the cropping season begins. These producers were given fact sheets with different GRP Control methods. A article on GRP control methods that is mailed to approximately 400 SSDF was in the ?Farm Sense? Newsletter. The EAs also encouraged all producers to sign-up for a crop consultant through EQIP to develop a conservation activity plan (CAP)to receive financial incentives to manage GRP in conservation tillage systems.

Results
Approximately 20 SSDF signed up for the CAP plans under NRCS where a weed resistant management plan was developed for their operations. These producers are now eligible to receive cost share assistance on their resistant weed management plans. Also, about 30 SSDF took the GRP information that was discussed and implemented GRP Control Plans. We estimate that about 10,000 acres of SSDF soybeans were controlled from GRP as a result of the adoption of GRP Control Plans. Willie Iverson, a participant, who implemented his plan, said that ?I am controlling the Pigweeds this year?.

4. Associated Knowledge Areas

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

Outcome #3

1. Outcome Measures

Increase the number of farmers that develop an estate plan to reduce land loss by Socially Disadvantaged Farmers

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Enhanced crop diversity on SSDF to increase profitability

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Small and Socially Disadvantaged Farmers (SSDF), master gardeners, students, horticulture staff, and other volunteers could benefit from developing a cut flower business. Previous research results have shown that certain varieties/genotype(s) of gladiolus can be grown successfully in the area. Planting genotypes with superior market grades for cut flower should encourage SSDF and gardeners to pursue a cut flower agribusiness that may be profitable in the Southeast Arkansas Delta.

What has been done
Five selected genotypes of Gladiolus bulbs were studied for four years in the field and in vases. To evaluate vase life, flower spikes were placed in 5, 10, or 15 milligram solutions of sucrose, fructose or glucose for 10, 20, 40 or 60 minutes. Also, $MgSO_4$, $AgNO_3$ and $Al_2(SO_4)_3$, were used at 250, 500 or 750 ppm, plus sucrose at 1, 2 or 5 %. A second study was done with corms (2.6 ± 0.4 cm in diameter) being soaked for 6 hours in GA_3 (75 and 100 ppm) or Ethrel (100 and 200 ppm) before planting at 30 and 40 corms/m^2 densities.

Results
The results suggest that $AgNO_3$ (500 ppm) + 2% sucrose is a good vase solution for preserving quality and longevity of gladiolus spikes.
Higher plant density increases the plant height, length of flower stalk and corm yield/unit area, while it decreases the number of florets/ spike and the length and diameter of flower, irrespective of the treatments including control. Treatment with ethrel inhibited plant growth but markedly increased the corm yield.The production of gladiolus spikes in southern Arkansas has potential to provide cash flow for SSDF through the cut flower business.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #5

1. Outcome Measures

Increase the number of SSDF that adopt one or more Best Management Practices for livestock production

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
SSDF rely on small ruminant production to provide farm income, especially on marginal lands. They have kids and pregnant and lactating females that are susceptible to Haemonchus infection

which frequently kills its host. These producers need more effective methods of controlling Haemonchus on their farms to reduce economic losses. Thus, they require training in basic livestock management skills to have a chance of being successful. Many of these farmers are new or beginning farmers that do not know how to properly manage livestock.

What has been done
Five gastrointestinal parasite management workshops were conducted to educate producers about the use of FAMACHA scoring, fecal egg counting and proper use of chemical dewormers to reduce the development of resistance, reduce the cost of medicine and reduce death losses to gastrointestinal parasites. Two beef cattle management workshops, 1 CES New Agent training, 1 NRCS training on grazing behavior, 8 small ruminant management workshops and 2 youth workshop/field days were held in several locations across Arkansas.

Results
Fifteen CES agents and 32 NRCS employees gained knowledge to help SSDF raise livestock successfully. Over 120 goat and sheep producers learned integrated parasite management methods. Twenty goat producers reduced the frequency of deworming saving an estimated $460 each and slowing the rate of development of parasite resistance to anthelminthics. Sixty new producers learned the basic needs and management requirements of small ruminants and 300 youth and adults learned the important role that small ruminants play in Arkansas agriculture. Twenty five learned youth learned about parasite management for small ruminants.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems
311	Animal Diseases

Outcome #6

1. Outcome Measures

Generation of new ideas/concepts for textile structures/end products from bio-fibers

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Climate change and environmental sustainability remain the major issues facing the fiber and textile industries. There is increased need for Human Sciences Programs in Merchandising, Textiles, & Design to assist with: 1) generating science based research to help demystify which textiles are eco-friendly and 2) disseminating this information to students, academics, industry professional, retailers, and consumers must occur in a timely manner to have an impact in a world where climate change has been accelerating (U.N. Climate Change Study).

What has been done
A paper was presented that outlined the need to speed up research in this area. Nine new proprietary products were conceptualized. Educational materials have been developed and incorporated into two textile courses. A workshop sponsored by NIFA was attended and the information is used in a textile class this semester. The workshop helped researchers to conceptualize the needs of HBCU students and provided the basis for a USDA NIFA proposal. A case study on scaling up alpaca as an eco-friendly fiber in Arkansas has begun.

Results
The education received by attending the USDA NIFA Climate Change workshop is being used in class this semester. Students have an appreciation of how fiber, textiles, and textile products are affected by climate change. This understanding is the basis for a USDA NIFA proposal that is being prepared. Nine products were conceptualized ? one was selected for further development and possible entry into a competition. One paper was presented at an international conference. Textile performance testing is getting started including moisture management as related to comfort which is a factor in consumer satisfaction.

4. Associated Knowledge Areas

KA Code	Knowledge Area
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures

Outcome #7

1. Outcome Measures

Number of presentations, abstracts, publications, newsletter articles and other forms of delivery of research-based information to baitfish farmers,directly and indirectly

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

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

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

Outcome #8

1. Outcome Measures

Number of scientists that learned what we know

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

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

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
302	Nutrient Utilization in Animals

Outcome #9

1. Outcome Measures

Number of producers who learn project results

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

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

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area

302 Nutrient Utilization in Animals

Outcome #10

1. Outcome Measures

Financial impact of diagnostic services

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

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

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems
311	Animal Diseases

Outcome #11

1. Outcome Measures

Value of aquatic animals exports requiring inspection and biosecurity assistance

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

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

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems
311	Animal Diseases

Outcome #12

1. Outcome Measures

Number of alternative aquaculture-related contacts with producers, potential producers, and county faculty

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

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

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
302	Nutrient Utilization in Animals
311	Animal Diseases

Outcome #13

1. Outcome Measures

Enhanced efficiency in hatchery management practices through the development of improved spawning protocols and hatchery management strategies

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

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

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

Outcome #14

1. Outcome Measures

Number of catfish farmers using improved management practices

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

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

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

Outcome #15

1. Outcome Measures

Number of completed long-term business plans

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual

2014	0

3c. Qualitative Outcome or Impact Statement

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

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

An unusually wet spring delayed the planting of row crops and vegetables in the area. Farmers who were able to get in the filed early saw good yields while those that were late had reduced yields. Fortunately, the commodity prices were somewhat stable when compared to previous years.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

1. Approximately 184 Small and Socially Disadvantaged Farmers (SDF) signed-up for USDA Programs including the operating and farm ownership loan programs.
2. About $500,000 in EQIP funds, $100,000 in CSP funds, $150,000 from the Livestock Forage Program funds and $100,000 in home improvement loans/grants were obtained by SSDF.
3. An estimated 10,000 acres of Glyphosate Resistant Pigweeds (GRP) were controlled on soybean farmed by SSDF this year as a result of adoption of GRP Control Plans.
4. Foundation seed (80-100 lbs.) were produced for two cowpea cultivars (UAPB-1 and UAPB-2) that can be used to increase the seed lot for subsequent use by SSDF.
5. Fifteen CES agents and 32 NRCS employees gained knowledge to help SSDF raise livestock successfully while 120 goat and sheep producers learned integrated parasite management methods.

6. Twenty goat producers reduced the frequency of deworming saving an estimated $460 each and slowing the rate of development of parasite resistance to anthelminthics.
7. Students (25) and non-students (140) have been exposed to information on bio-based and sustainable fibers (alpaca, organic cotton, hemp, recycled polyester, and linen/flax).

Key Items of Evaluation

The primary goal of this program is to help Small and Socially Disadvantaged Farmers ($250,000 in gross sales or less) and their families to remain viable in an ever changing and competitive world. We do this by providing the necessary technical help to obtain the resources needed to produce crops, animals and fiber that can be used by an ever growing population.

1. About $500,000 in EQIP funds, $100,000 in CSP funds, $150,000 from the Livestock Forage Program funds and $100,000 in home improvement loans/grants were obtained by SSDF.
2. An estimated 10,000 acres of Glyphosate Resistant Pigweeds (GRP) were controlled on soybean farmed by SSDF as a result of adoption of GRP Control Plans.
3. Twenty goat producers reduced the frequency of deworming saving an estimated $460 each and slowing the rate of development of parasite resistance to anthelminthics.
4. The production of gladiolus spikes in southern Arkansas has potential to provide cash flow for SSDF through the cut flower business.

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Childhood Obesity

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
702	Requirements and Function of Nutrients and Other Food Components		50%		20%
703	Nutrition Education and Behavior		50%		80%
	Total		100%		100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	0.0	1.7
Actual Paid	0.0	0.0	0.0	2.7
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	4454	0	175823
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	0	146006
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Probiotics have been linked to health benefits to include improvement of lactose digestion, enhancing the immune system, synthesizing and enhancing the bioavailability of nutrients, and reducing risk of certain cancers. Approximately 60-80% of African Americans are lactose intolerant. Lactose intolerance is the clinical condition caused by the inability to digest lactose in milk and dairy products. The more consumers become aware of the health benefits of yogurt containing probiotics, the more they will demand them. Still, the presence of a probiotic in yogurt does not guarantee its effectiveness; survival of a probiotic in yogurt during shelf-life as well the fact that it can be delivered to the site of the gastrointestinal where it exerts its effects are crucial to its health benefits. Streptococcus thermophilus and Lactobacillus delbrueckii subsp bulgaricus and other lactobacilli with lactase activity in yogurt will be evaluated for their efficacy: 1/ their enumeration in samples of yogurt to document concentration of probiotics at different times during the shelf-life when stored at 4 degree celsius; 2/ the testing of their ability to survive in the stomach by exposing cells of probiotics to simulated gastric juice at pH 3.0 and 2.0 and recovering viable cells in MRS agar; and 3/ the testing of their ability to survive in the bile salts by detection of bile salt hydrolase (BSH) enzyme activity in MRS agar supplemented with 0.5% taurodeoxycholic acid. Yogurts with effective probiotics will be used in a human study to demonstrate that increase consumption of yogurts can relieve lactose symptoms, increase calcium intake, and reduce weight gain in lactose intolerant African Americans college students (18-20 years old).
Nutrition education program will be developed where students diagnosed as lactose intolerant will be educated to increase their consumption of dairy products to 3 servings per day. Courses related to dietary guidelines, Foods and dairy products composition in calcium, vitamin D, and lactose; low-lactose foods; and strategies to increase dairy products will be taught. Group and individual approaches will be applied. Pre and post data will be collected to include dairy products intake, calcium and vitamin D intakes, weight, and symptoms of lactose intolerance.
Currently more than 25-29% of Arkansans 18 years of age and older are obese (Centers for Disease Control and Prevention (CDC) 2007a). Less than 28% of Arkansans participated in "No Leisure-Time Physical Activity", which is slightly above the national average of 24.1%. A qualitative and quantitative design was used to explore original data on the dietary and physical activity patterns common to African-American students in the Lower Mississippi Delta (LMD) to develop an educational program, "Eating to Live," that will empower college/university aged students with knowledge and skills to evaluate their current diet and physical activities. Students were taught how to modify food choices at individual meals to meet the Dietary Guidelines for Americans, 2005 (DG) and encouraged to increase physical activity (PA), with the long-term goal of lifetime weight maintenance.

2. Brief description of the target audience

UAPB students who are diagnosed or self-diagnosed aslactose intolerants and, therefore, are avoiding consumption of dairy products. The majority of participants will be African Americans and aged from 18 to 25 years old; there will be males as well as females. A Junior student in Nutrition and Dietetics in the department of Human Sciences, Para Nosakhere, assisted in the literature review and recruitment of participants. Results of survey on education sessions to increase consupmption of dairy productsreported to participants at UAPB and the campus of UAPB (through UAPB Faculty and Students Research Forum 2013), and the 1890 Community through the ARD Research Forum (Jacksonville, FL, 2013). Education of African American adults on the health benefits of yogurts containing probiotics through an acceptability study and education sessions based on increasing knowledge about the importance of consuming dairy products and using strategies to allow for consumption of lactose containing dairy food with minimal or no symptoms for this group. Also, smaller portions of dairy foods regulated consumption of lactose-free milk, as well as low-lactose yogurt (with probiotics) and cheese (cheddar, Swiss, Mozzarella) Consumption of enzyme preparations to lower lactose content are emphasized.

This projects 3 objectives: 1/ the selection of yogurts containing effective probiotics to reduce symptoms of

lactose intolerance through quantitative and qualitative microbiological tests from 2008 to 2010; 2/ Feeding study of African Americans adults (18-20 years old) to examine the health benefits of selected yogurts in reducing lactose intolerance symptoms, increasing calcium intake, and reducing weight gain in 2010-2012; 3/ Education of African American adults on the health benefits of yogurts containing probiotics in 2012-2013.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	15	120	130	0

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

Patent Applications Submitted

Year: 2014

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2014	Extension	Research	Total
Actual	0	1	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- 1. Education sessions

Year	Actual
2014	1

Output #2

Output Measure

- 2. Increase dairy products consumption

Year	Actual
2014	10

Output #3

Output Measure

- 3. Increase calcium intake

Year	Actual
2014	10

Output #4

Output Measure

- 4. Increase vitamin D intake

Year	Actual
2014	10

Output #5

Output Measure

- 5. Weight gain
  Not reporting on this Output for this Annual Report

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	1. Number of participants in the education program
2	2. Increase dairy products consumption
3	3. Increase calcium intake
4	4. Increase vitamin D intake
5	5. Weight gain

Outcome #1

1. Outcome Measures

1. Number of participants in the education program

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	15

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Individuals with lactose intolerance symptoms avoid dairy products resulting in reduced intake of calcium and vitamin D. Deficiencies of these two nutrients may predispose individuals to bone mineral deficiency, osteoporosis, and maybe obesity.

What has been done
Fifteen African American students enrolled at UAPB and who are lactose intolerant participated in two, one hour education, sessions on the benefits of consuming dairy products.

Results
Results showed an increase from 0.7 cup to 1.85 cup of dairy products per person and per day. The average daily intake of calcium increased from approximately 500mg to 800mg. There was an increase in vitamin D intake from 1.3 µg per to 2.5 µg.

4. Associated Knowledge Areas

KA Code	Knowledge Area
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior

Outcome #2

1. Outcome Measures

2. Increase dairy products consumption

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Individuals who want to experience improvement to health, lactose digestion, improved immune system and want to reduce the risk of certain cancers.

What has been done
The results have been disseminated at the 2014 Rural Life Conference to approximately 80 poster viewers. Fifteen African American students enrolled at UAPB and who are lactose intolerant participated in two, one hour education, sessions on the benefits of consuming dairy products.

Results
Results showed an increase from 0.7 cup to 1.85 cup of dairy products per person and per day.

4. Associated Knowledge Areas

KA Code	Knowledge Area
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior

Outcome #3

1. Outcome Measures

3. Increase calcium intake

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Individuals interested in growing new bone and maintaining bone strength and preventing osteoporosis/ osteopenia.

Research shows evidence that calcium can help prevent or control high blood pressure and reduce PMS symptoms as well as play a role in preventing certain cancers. Calcium may also aid in weight loss.

What has been done
The results have been disseminated at the 2014 Rural Life Conference to approximately 80 poster viewers. Fifteen African American students enrolled at UAPB and who are lactose intolerant participated in two, one hour education, sessions on the benefits of consuming dairy products.

Results
Results showed an increase of 300mg of calcium intake per day (an increase of 52%) and an increase of dairy intake from 0.7 cup to 1.85 cups per person and per day.

4. Associated Knowledge Areas

KA Code	Knowledge Area
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior

Outcome #4

1. Outcome Measures

4. Increase vitamin D intake

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Individuals who are vitamin D deficient (approximately 50%). Vitamin D intake is important for the regulation of calcium and phosphorus absorption, maintenance of healthy bones and teeth, and is also recommended to supply a protective effect against multiple diseases and conditions such as cancer, type 1 diabetes and multiple sclerosis.

What has been done
The results have been disseminated at the 2014 Rural Life Conference to approximately 80 poster viewers. Fifteen African American students enrolled at UAPB and who are lactose intolerant participated in two, one hour education, sessions on the benefits of consuming dairy products.

Results
The intake of vitamin D increased from 1.3 µg per to 2.5 µg per day.

4. Associated Knowledge Areas

KA Code	Knowledge Area
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior

Outcome #5

1. Outcome Measures

5. Weight gain

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	130

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Youth in African-American communities and their relatives who have a goal of preventing obesity in late adolescents and young adults.

What has been done
The "Eating to Live" program's was initiated as part of the Delta Obesity Project to investigate the effectiveness at long-term weight maintenance. Weight loss and weight maintenance was evaluated in an 18-month intervention, consisting of a 6-month education phase and a 12-month maintenance phase, using 130 student, aged 18-24 years, with a BMI of 18.5 to 29 who were recruited from the University of Arkansas at Pine Bluff.

Results
More than 130 students were reached through the obesity project. African-American students (age 18-24 years) participated in the ?Eating to Live? intervention which encouraged weight maintenance using intervention strategies including adapted dietary and physical activity patterns together. Adoption of the Dietary Guidelines and participation in the "Eat to Live" program education goals were substantially met.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Appropriations changes
- Other (limitations; students dropout)

Brief Explanation

Ten out of fifteen participants submitted their pre and post 24-hour recalls. This was a lower than expected response rate.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Results showed an increase of 1.2 cups of dairy products consumption per person and per day (from 0.7 cup to 1.85 cups, an increase of 62% from pre-intervention). There was an increase of 300 mg of calcium intake per day and per person from 500 mg to 800 mg (increase of 52%) and an increase of 1.2 micrograms of Vitamin D per day and per person (from 1.3 micrograms to 2.5 micrograms). It will be interesting to take anthropometric and weight data in the future to see how weight is affected by calcium and vitamin D intake.

Key Items of Evaluation

Short nutrition education intervention on the benefits of increasing dairy products consumption in lactose intolerant can have an effect in increasing dairy products consumption and thus, calcium and vitamin D intakes in African American college students.

lactose intolerant
college student
dairy product consumption
calcium intake
vitamin D intake

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Food Safety in Aquaculture

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
702	Requirements and Function of Nutrients and Other Food Components		100%		0%
	Total		100%		0%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.2	0.0	0.0
Actual Paid	0.0	0.4	0.0	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	52342	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The 2008 Farm Bill included provisions to move inspection of catfish from FDA to USDA-FSIS. However, this provision was not adopted. Efforts have were made to increase the understanding of production and

processing practices of catfish in the U.S. and of basa/tra/swai in Vietnam.

2. Brief description of the target audience

The targeted audience are members of USDA-FSIS and the general public, including catfish farmers and processors.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

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

Patent Applications Submitted

Year: 2014

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2014	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

<u>Output #1</u>

Output Measure

- Briefings to catfish farmers and catfish processors

Year	Actual
2014	0

Output #2

Output Measure

- Number of presentations to catfish farmers and processors

Year	Actual
2014	0

Output #3

Output Measure

- Number of emails, phone calls, and conference calls to catfish farmers and processors

Year	Actual
2014	0

Output #4

Output Measure

- Number of newsletters, fact sheets, etc.

Year	Actual
2014	0

Output #5

Output Measure

- Number of field days held

Year	Actual
2014	0

Output #6

Output Measure

- Number of presentations made

Year	Actual
2014	0

Output #7

Output Measure

- Number of workshops and training sessions conducted

Year	Actual
2014	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Access to best-available science by USDA-FSIS personnel
2	Increased understanding of food safety issues in imported catfish and catfish-like products as compared to U.S. farm-raised catfish by public agencies, the aquaculture industry, and the general public

Outcome #1

1. Outcome Measures

Access to best-available science by USDA-FSIS personnel

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

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

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
702	Requirements and Function of Nutrients and Other Food Components

Outcome #2

1. Outcome Measures

Increased understanding of food safety issues in imported catfish and catfish-like products as compared to U.S. farm-raised catfish by public agencies, the aquaculture industry, and the general public

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

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

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
702	Requirements and Function of Nutrients and Other Food Components

V(H). Planned Program (External Factors)

External factors which affected outcomes
- Public Policy changes

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Sustainable Energy

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
201	Plant Genome, Genetics, and Genetic Mechanisms		0%		100%
	Total		0%		100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	0.0	0.1
Actual Paid	0.0	0.0	0.0	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Create gene silencing vectors
- rice transformation

- analysis of lignin content

2. Brief description of the target audience

- rice farmers
- alternate energy users

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

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

Patent Applications Submitted

Year: 2014

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2014	Extension	Research	Total
Actual	0	1	0

V(F). State Defined Outputs

Output Target

<u>Output #1</u>

Output Measure

- - One peer reviewed publication/abstract in conference

Year	Actual
2014	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Generation of rice plants with reduced lignin concentration for efficient conversion to biofuel

Outcome #1

1. Outcome Measures

Generation of rice plants with reduced lignin concentration for efficient conversion to biofuel

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

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

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

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

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Government Regulations

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 8

1. Name of the Planned Program

Global Food Security and Hunger - Aquaculture

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
301	Reproductive Performance of Animals		9%		10%
302	Nutrient Utilization in Animals		4%		15%
307	Animal Management Systems		50%		43%
311	Animal Diseases		32%		9%
601	Economics of Agricultural Production and Farm Management		5%		8%
603	Market Economics		0%		15%
	Total		100%		100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	3.5	0.0	4.0
Actual Paid	0.0	6.6	0.0	6.9
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	526436	0	807853
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	385607	0	836680
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

A wide range of activities will be conducted in carrying out this planned program. Aquaculture in Arkansas provides a local source of healthy, high protein, low fat food, and creates economic activity and jobs. To support family fish farmers, potential producers, and the general public, integrated research and extension programs were developed. Program planning was conducted through discussions with individual farmers and with farmer associations (e.g., Catfish Farmers of Arkansas, Arkansas Bait and Ornamental Fish Growers Association). Activities consisted of research studies in the laboratory and on the experiment station, on-farm research trials, extension farm visits, calls, e-mails, newsletters, workshops, webinars, freshwater aquaculture eXtension content, and presentations. Water quality and fish health services were provided to support educational programs. This activity includes a variety of projects aimed at improving productivity and competitiveness of U.S. aquaculture. Projects to be conducted in 2012 included: 1) pond production samples; 2) nutrition studies; 3) water quality studies; 4) disease work; 5) hatchery studies; and 6) economics and financial management analyses. Extension methods include farm visits, producer meetings, newsletter, a verification blog, a field day, and e-mail lists.

Annually, Arkansas Catfish Producers lose over $1 million worth of catfish due to catfish diseases. With the need to increase production and improve economics, new diseases are emerging such as the "hot aeromonas" seen during summers of 2010 and 2011. The new diseases have the potential to devastate the cafish industry across Arkansas. Samples will be collected from the field when the disease cases occur. The samples will be incubated at the Lake Village Laboratory and shipped to UAPB for further diagnostic procedures. The goal is to develop techniques to rapidly identify the disease and to improve treatment success results.

Currently there are no medications that are legally approved to treat the disease. The only avenue of treatment is to attain an INAD, Investigative New Animal Drug Permit from the US Fish and Wildlife Service for the use of the drug Aquaflor.

Evaluating split-pond aquaculture systems for catfish production in Arkansas is a completely new verification study offered for the first time in Arkansas in 2012 and will continue to shrink over the years to less than 10,000 acres. The loss in acreage can be attributed to importation of cheaper foreign fish products and low profitability of our product due to higher production costs such as feed and energy. A split poond system offers a new production system which should improve pond production and increase farm efficiencies.

A pond study will be conducted to identify the best alternative use of 5-inch hybrid catfish fingerlings, whether in single or multiple-batch production.

A spreadsheet-based economic risk analysis of hybrid striped bass fingerling production in ponds and tanks will be developed to compare the level of risk in hybrid striped fingerling production in ponds and in tanks. A mixed-integer model of hybrid striped bass fingerling production will be developed to examine the trade-offs among various hybrid striped bass fingerling production strategies.

A two-year linear programming model will be built to identify optimal feed strategies over a 2-year period with varying feeding strategies for channel catfish. Other mathematical models will be developed to predict the mean weight of channel catfish under a variety of stocking densities, stocking sizes, and feeding strategies.

Intensive financial management workshops will be held.

Enhancement of hatchery efficiency through applied physiology. This program will identify specific areas of hatchery inefficiency (e.g., broodstock selection, low fecundity, and fry-fingerling survival) and adapt viable alternatives to existing practices by integrating fish physiology with hatchery management.

Research will be conducted to develop better methods for the detection, control, and eradication of aquatic animal diseases. Diagnostic laboratories will assist in the diagnosis and management of aquatic animal diseases. Regulatory testing and biosecurity management will be provided to facilitate the interstate and international movement of aquaculture products.

Research will be conducted to develop methods to control predators of larval fish which cause death and disease in small fish. Laboratory, mesocosm and pond studies will be conducted to determine the LC50 value of several aquaculture chemicals to copepods.

Research will be conducted to determine the feasibility of producing a triploid hybrid striped bass.

Work to develop methods to rear alligator gar to 10-15 inches for stock enhancement will continue in 2012. Nine 0.1-acre earthen ponds will be drained and dried during the winter. Three ponds will have rye grass planted on the pond bottom in a 1-m band around the perimeter. Three ponds will have artificial structure along the pond perimeter. In the spring, the ponds will be filled and fertilized according to standard procedures for fish fry production. Alligator gar (5 dph) from the Tupelo USFWS Hatchery will be stocked into ponds at a rate of 10,000 fish/acre. A subset of fry will be weighed and measured to determine initial size of stocking. At 30 dph, fry will be seined from each of the ponds and enumerated. A subsample of alligator gar will be weighed and measured at the time of harvest. Survival and growth will be compared among the two treatments and control using a one-way ANOVA.

Thirty day post hatch alligator gar finhgerlings will be tocked into concrete raceways. Three raceways will receive forage fish and formulated feed, and the alligator gar in these raceways will be hand graded daily into three size groups (small, medium, and large) using subdividers within the raceways. This is treatment number two. Two raceways will receive formulated feed, and the alligator gar in these raceways will be hand graded daily into three size groups as described above.

A proper design of fish retainer and management regime needs to be developed for the commercial application of the SPS to baitfish culture.

Performance of the water circulator must be evaluated in terms of power consumption and water flow, and water quality dynamics in a SPS.

A new fingerling production system/strategy are needed by employing "out of season" fall spawning of largemouth bass, followed by winter feed-training and the on-growing of fingerlings indoors.

Enhancement of hatchery efficiency through applied physiology. This program indentifies specific areas of hatchery inefficiency (e.g. broodstock selection, low fecundity, low fingerling survival) and adapt viable alternative to existing practices by integrating fish physiology with hatchery management.

There is a need for determining optimal stocking density for Alligator Gar in tanks. The relationship between the frequency of grading and production characteristics, such as growth, survival, and yield, needs to be established.

2. Brief description of the target audience

Aquaculture production primarily occurs on family farms; most are small businesses without resources to conduct internal research, and many find it increasingly difficult to keep informed of changing rules and regulations without assistance from extension. Thus, primary target audiences include commercial baitfish and catfish producers, hatchery managers, and private pond owners throughout Arkansas, County Extension agents, grocery store managers, consumers, and state agencies involved in the regulation or control of aquatic animal diseases.

Local baitfish farmers who need improved baitfish culture regimes ans systems in tems of productivity and disease prevention.

AGFC and USFWS Hatcheries producing alligator gar.

The direct target audience includes commercial aquaculture entities and public agencies involved with the production of fish for enhancement purposes.

Primary target audiences are catfish farmers who are interested in employing split-pond systems to increase productivity and improve culture regimes/inventory control.

Primary target audiences are largemouth bass farmers who need improved overwintering culture regimes for largemouth fingerling and shortened periods for food size fish production.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	9385	6972	750	300

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

Patent Applications Submitted

Year:	2014
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2014	Extension	Research	Total
Actual	0	0	13

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of abstracts

Year	Actual
2014	0

Output #2

Output Measure

- Number of presentations

Year	Actual
2014	0

Output #3

Output Measure

- Number of trade magazine articles

Year	Actual
2014	0

Output #4

Output Measure

- Number of factsheets and newsletters

Year	Actual
2014	0

Output #5

Output Measure

- Number of peer reviewed journal articles

Year	Actual
2014	13

Output #6

Output Measure

- Number of research reports submitted to stakeholders

Year	Actual
2014	0

Output #7

Output Measure

- Number of agricultural production education meetings related to food, fiber and bioenergy production

Year	Actual
2014	23

Output #8

Output Measure

- Number of demonstrations/on-farm research related to food, fiber, and bioenergy production

Year	Actual
2014	65

Output #9

Output Measure

- Number of farm visits related to food, fiber, and bioenergy production

Year	Actual
2014	418

Output #10

Output Measure

- Number of field days related to food, fiber, and bioenergy production

Year	Actual
2014	8

Output #11

Output Measure

- Number of educational materials distributed related to food, fiber, and bioenergy production

Year	Actual

2014	1006

Output #12

Output Measure

- Number of website hits and downloads related to food, fiber, and bioenergy production

Year	Actual
2014	83

Output #13

Output Measure

- Number of diagnostic samples related to food, fiber, and bioenergy production

Year	Actual
2014	2091

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Financial impact of diagnostic services
2	Number of fish farmers using improved management (nutrition, water quality, stocking, production systems, economics, financial) practices
3	Value of aquatic animal exports requiring inspection and biosecurity assistance
4	Number of hatcheries using improved or novel management practices
5	Number of stakeholders using results of marketing studies
6	Improving Hatchery Production Efficiency
7	Agricultural Production & Processing
8	Improved Management and Marketing Options to Improve Catfish Production Efficiencies and Lower Costs
9	Development of channel Catfish Farming Models for Improved Management
10	Design-build Extension Delivery: A New, Integrated Model for Rapid, Cost-Effective Technology Transfer
11	Catfish Split-Pond Engineering
12	Improving Management Techniques for Baitfish
13	Baitfish Split-Pond Engineering
14	Largemouth Indoor Production
15	Number of clientele using improved fish farming best management practices
16	Number of producers using improved biosecurity practices
17	Number of fish samples submitted for disease testing

18	Number of fish samples submitted for disease-free certification
19	Development of alternative culture technologies for largemouth bass

Outcome #1

1. **Outcome Measures**

Financial impact of diagnostic services

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

Number of fish farmers using improved management (nutrition, water quality, stocking, production systems, economics, financial) practices

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

Value of aquatic animal exports requiring inspection and biosecurity assistance

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

Number of hatcheries using improved or novel management practices

Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

Number of stakeholders using results of marketing studies

Not Reporting on this Outcome Measure

Outcome #6

1. Outcome Measures

Improving Hatchery Production Efficiency

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
This program identifies specific areas of hatchery inefficiency (e.g. broodstock selection, artificial spawning procedures, low fecundity, impact of stress on performance, and fry-fingerling survival) and creates viable alternatives to existing practices by integrating fish physiology with hatchery management and fish production. The direct target audience includes commercial aquaculture entities and public agencies involved with the production of fish for enhancement purposes.

What has been done
We examined the efficacy artificial spawning practices to characterize bottlenecks in fry production, propose solutions, evaluate proposals, and distribute findings to stakeholders. We continue to work with Baxter Land Company in satisfying requirements for the use of Investigational New Animal Drugs necessary for the production of hybrid catfish fingerlings. A collaboration with AQFI extension is employing respirometry techniques as an approach to understand high winter losses of baitfish during winter 2012/2013.

Results
While Baxter Land company has emerged as an independent leader in hybrid catfish fingerling production, other farmers rearing different species require more support. A manuscript reporting the results describing the utility of surface mucus constituents in assessing sexual maturation in white bass brookstock was published. We have performed techniques that enhance resistance to ammonia challenge in channel catfish fingerlings however we do not observe this response as consistently in catfish fry. This reported resistance was induced by heat shock and no applicable to applied commercial settings. While copper sulfate treatments are reported to induce processes similar to heat shock, inconsistent outcomes for enhancing resistance to aquaculture stressors have been observed. We have developed an approach for channel catfish in measuring a quantitative marker for stress resistance (HSP70 mRNA) and are developing assays for the HSP70 protein.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

Outcome #7

1. Outcome Measures

Agricultural Production & Processing

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
All of the objectives of this project have now been met. We compared growth and survival of alligator gar larvae fed formulated feed and wild zooplankton, formulated feed along serving as a control. We characterized growth from 5 dph to 150 mm in acrylic tanks. We characterized growth from 150 mm to 300 mm TL in raceways. We examined the influence of manual grading on growth, survival, and yield during both phases of production. We used two different types of mechanical graders to improve production characteristics during culture of alligator gar to 300 mm TL.

What has been done
We used our culture techniques to raise alligator gar rescued as eggs from the floodplain of the Fouche La Fave River (a tributary of the Arknsas River in Scott County, Arkansas. Collaborators from the U.S. Fish and Wildlife Service noted that eggs were being stranded by receding floodwaters. The eggs, clinging to submerged vegetation, were collected and transported to UAPB. The eggs were incubated in tanks and larvae were transferred to the acrylic tanks used in previous studies at ~3 dph.

Results
Using culture techniques developed during this project we raised fish to an average length of 246 mm TL. Eighty fish were tagged with passive integrated transponders, fin-clipped for genetic determination of parentage and filial relationships, picked up by an Arkansas Game and Fish Commission, and re-stocked into the Fouche La Fave River by a team of biologists representing the Arkansas Natural Heritage Commission, the U.S. Fish and Wildlife Service, the Arkansas

Game and Fish Commission, and two Arkansas universities. This was the first instance of hatchery alligator gar being re-introduced to their natural habitat in the state of Arkansas.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

Outcome #8

1. Outcome Measures

Improved Management and Marketing Options to Improve Catfish Production Efficiencies and Lower Costs

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The cost associated with raising catfish have continued to rise, making it more difficult for catfish producers to consistently make a profit. Competition from foreign imports has continued to increase at an alarming rate. New production techniques are needed that improve production efficiency and reduce cost to make catfish farmers more competitive.

What has been done
UAPB is continuing to be a leader in the industry with development of alternative culture technologies and production techniques such as split-pond production systems. Valuable commercial level production data is being collected through UAPB's research verification program. Split-pond production systems divide a traditional pond into two sections, a fish confinement zone (~20% of the pond) and a waste treatment zone (~80% of the pond). Split-pond systems allow the farmer to raise more fish per acre and are easier to harvest, aerate, feed, and treat for diseases.

Results
The Lonoke Laboratory provided support in the management of water quality and fish diseases for farmers using split-pond systems. In addition, extension personnel supported the catfish research verification program by providing assistance with sampling and management recommendations to farmers raising fish in these alternative production systems. Farmers

seeking to convert existing catfish acreage to alternative systems were provided recommendations specific to their farm operations either with farm visits or over the phone.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

Outcome #9

1. Outcome Measures

Development of channel Catfish Farming Models for Improved Management

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Production, marketing, and pond environment constraints in catfish farming combine and interact in a variety of ways that affect the profitability of catfish farming. Detailed, comprehensive models were needed to address the complex management issues faced by catfish farmers. This project developed a series of catfish farm models and verified them with on-farm catfish verification data.

What has been done
More than 20 different models of catfish farming practices were developed and used to evaluate the most profitable management strategies for catfish farms.

Results
The models have been used to identify best feeding strategies for catfish farms of sizes that range from the smallest to the largest farm sizes over multiple years and for different catfish farming business models. Farmers have relied on the model results, especially of the optimal feeding strategies, to survive recent years of very high feed prices. The catfish industry appears to have stabilized, in spite of continued high feed prices, preserving jobs, and continuing to contribute to the rural economies of the Mississippi Delta region.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

Outcome #10

1. Outcome Measures

Design-build Extension Delivery: A New, Integrated Model for Rapid, Cost-Effective Technology Transfer

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
U.S. farmers have relied on increasing productivity through adoption of the latest research technologies and advances to remain competitive. While large agri-business corporations rely on internal research and development to improve economic performance, small- and limited-resource farmers depend on land-grant universities is to seek new ways to respond effectively and rapidly to clientele needs, but with shrinking budgets. More innovative, less expensive, and more rapid extension methodologies are needed.

What has been done
Design-build extension delivery teams have been developed in two states (Arkansas and Kentucky) and have implemented on-farm Research & Development projects of two new production system technologies (split ponds in Arkansas and conversation of decommissioned reclaimed water plants for urban aquaculture in Kentucky). A survey was conducted of both adopters and non adopters of new catfish farming technologies in Alabama, Arkansas, and Mississippi.

Results
More than 75% of all catfish farmers surveyed use e-mail for communication and more than (53%) have smart phones. More than half (57%) of all farmers surveyed indicated that they preferred to receive research findings by e-mail while only 17% preferred to receive newsletters, and even fewer (12%) desired hard copy mail outs. Adoption of new technologies was significantly greater among those who used newer technologies, with more than half of adopters based on the new, emerging communication technologies. It clearly will be important to assist other farmers to adapt to the new, changing communications structures. Use of new

communication technologies has enabled the farmer participants to make on-farm adjustments to the new production systems installed on their farms in a more timely manner due to real-time access to project data and resources.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

Outcome #11

1. Outcome Measures

Catfish Split-Pond Engineering

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Since the early 1970s, efforts to intensify pond aquaculture have enhanced productivity of pond culture and sustained its business feasibility. In the US, rising production costs and competition with foreign countries have negatively impacted business revenues and total water surface area for production has declined substantially since 2008. As a result of these challenges, demand for innovations to improve production efficiency in pond aquaculture has increased. Due to a relatively modest construction investment, convenience in retrofitting existing earthen ponds and ease of operation, the SPS is being recognized by commercial catfish farmers as an alternative culture method to maximize production of fish while allowing for better culture management in ponds. Currently, there are over 550 ha of split pond production systems (SPS) in Mississippi, Arkansas, and Alabama devoted exclusively to catfish culture, primarily hybrid catfish. With the success experienced by many farmers utilizing the SPS it is gaining popularity and more traditional ponds are being modified into SPS. However, there is still little information available regarding the performance efficiency of paddlewheel type circulators. The primary benefits of the SPS compared to traditional earthen ponds are from water circulation and mixing. Most circulators developed have been designed with insufficient engineering information and the performance of circulators in SPS has not been examined systematically in applied field trials on commercial fish farms. The performance and efficiency of circulators varies according to operational parameters such as rotational speed, and submergence depth of paddles. Optimizing the terms of power

consumption and water flow rate would minimize the energy cost of pond circulation and mechanical failure and maximize water pumping efficiency. Practical design criteria of paddlewheel circulator are in demand to firther success of SPS.

What has been done
The drag force equation was used to established working models for sizing paddlewheel type pumps to various culture conditions, regarding power consumption and water flow rate. Engineering parameters involved in establishing the models were the rotational speed and wetted surface area of paddle. Also, intensive field data (power consumption and water flow rate in relation to the engineering parameters) was collected from 12 SPSs (1.8-4.5 ha split pond systems) on two commercial catfish farms in Arkansas to validate the models.

Results
The power requirement and the water flow rate by the circulators increased as the rotational speed and water depth in the culvert increased. The rotational speed increased the power requirement exponentially and the water flow rate linearly, while the water depth, which was determined the wetted surface area of paddles, increased both linearly. Increasing the rotational speed decreased relative pumping efficiency relative to power used. Under the given field operational conditions, the predicted power requirement appropriately corresponded with the measured power requirement and the predicted values were within 95% of measured values. Good agreement was also noted between measured and predicted water flow rates, and the predicted values were 91.4% of the measured values.
Based on the models developed, it was projected that increasing the wetted surface area of paddles is more energy efficient than increasing the rotational speed and minimizes mechanical failure failure due to high torque. However, the power requirement was also projected to increase with increasing wetted surface area at a certain threshold, as attempts to decrease the rotational speed were made to achieve a target water flow rate.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

Outcome #12

1. Outcome Measures

Improving Management Techniques for Baitfish

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual

2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Fish farmers in Arkansas reported large losses of fish in the winter of 2012/2013. The largest losses were observed by farmers raising fathead minnows, golden shiners, and bream. In June of 20163, the Aquaculture/Fisheries Center at UAPB developed a questionnaire for producers to document losses and to examine different theories regarding the winter loss of fish. The questionnaire revealed fathead minnows were most severely affected by winter fish losses with a reported loss of 3,242 water acres. Golden shiners and bream were second and third with reported losses of 2,543 acres and 1,168 acres, respectively. The survey revealed that farmers believed in a combination of extreme temperatures fluctuations, reduced feeding, and a higher incidence of predatory diving ducks (Lesser scaup) were probably all in part responsible for the losses.

What has been done
A research program has been developed to systematically investigate winter fish losses. The effect of different feed rates on growth, survival, respiration, and lipid levels of fish (fathead minnows, hybrid bluegill, native bluegill, redear sunfish, and hybrid crappie) held at a constant low temperature was investigated in 2014 using recirculating systems equipped with chillers. To address the duck predation issue, scientific collection permits were secured were secured and 120 lesser scaup were collected over the winter (February and March 2014) to identify and quantify fish consumed. The duck study is being conducted in a collaborative effort with USDA Wildlife Services.

Results
Data generated from these studies will help provide farmers with winter feeding strategies as well as strategies to cope with temperature extremes. Trials from this past winter revealed that fathead minnow weight can be maintained or slightly increased if offered feed once or twice per week in the winter. In contrast, all species of centrarchids examined in this study lost weight regardless of feeding regime. Whole fish and fish parts (bones, otoliths) were identified in lesser scaup collected in the duck study. This preliminary data was used by USDA Wildlife Services to add 25 lesser scqup to existing depredation permits for fish farmers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

Outcome #13

1. Outcome Measures

Baitfish Split-Pond Engineering

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Arkansas exports more than 6 billion baitfish nationwide each year and it leads the nation by producing 80 percent of all the baitfish raised in the US. However, the baitfish farmers in Arkansas have been suffering from a reduction of productivity due to serious fish losses that have resulted from interminable predation and extensive inventory control in a traditional pond. In recent years, unprecedented bird predation and current unknown factors, possibly due to climate change and extensive management, have dimished the population of baitfish in the ponds. Since the SPS has been proposed as an alternative pond system in the catfish industry, interest in applying the system to other species has increased among baitfish farmers to cope with the confronted issues.

What has been done
A cooperative research/extensive project project was implemented with a local baitfish farmer to develop a proof-concept system in a commercial size. Some preliminary studies with prototype split-pond systems for baitfish have been conducted at UAPB in order to scrutinize the feasibility of using the SPS to retain small fish, and the results of those studies have shown that those systems were technically feasible. Fundamental data produced from the preliminary study was provided to educate the farmers for biological and practical aspect of baitfish culture using split-pond systems. As the construction was implemented, engineering advice was provided for constructing key components such as paddlewheels and fish barriers. Also, design drawings including all dimensions to fabricate those devices were provided. One of the major obstacles to split-ponds on a commercial scale is to develop an efficient method of screening a sluicway for retaining small baitfish within the fish unit, and allowing for appropriate water flow rate at the same time. Given this, a model fish barrier was built in UAPB and transferred to the farmer for replication. Upon completion of a split-pond system, production will be conducted.

Results
Once this proof-concept barrier generates practical information, the data will be used for a useful extension tool in order to train and educate baitfish farmers who is interested in implementing split-pond systems.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

Outcome #14

1. Outcome Measures

Largemouth Indoor Production

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The largemouth bass is the most sought-after sport fish in the US. While largemouth bass production has primarily focused on sport fish markets, there is increasing interest in food-fish production. As demands for live and fresh fish increase, particularly with heightened consumer awareness for healthy products, food-fish production of largemouth bass could potentially emerge as a promising aquaculture business sector in the US. The state of Arkansas is the largest producer of required to shorten the overall culture period in order to economically produce food-fish and make this enterprise more profitable for farmers. The implications of this change in production strategy are significant. Ponds that are currently needed for producing fingerlings through the summer would be available for growing food-fish, allowing us to increase overall food-fish production. Young bass that are particularly susceptible to winter bird predation and other harsh environmental factors in open ponds would be cultured indoors until early spring. The overall time required to reach market size could presumably be decreased by 6 months or more, if raceway rearing is successful. Also, this new production strategy would better utilize facilities and labor that are currently underutilized during the winter months.

What has been done
A cooperative research/extension project was implemented with a local largemouth bass farmer to develop practical hatchery and nursery production regimes in indoor semi-recirculating systems. Artificial spawning techniques for the production of largemouth bass fry and fingerlings ere implemented in a commercial setting using raceways. Equipment, processes, and protocols have been implemented in a commercial setting using raceways. Equipment, processes and protocols have been successfully developed and adapted for raceway spawning of largemouth bass. In addition, equipment and methods for temperature and photoperiod control have been developed and implemented in the hatchery. There have been a number of studies on stocking density for a variety of fish species in various aquaculture systems, such as ponds, raceways, cages, and recirculating systems. Largemouth bass production has primarily focused on sport fish

markets, and studies have been conducted in ponds. However, there is no indoor study of largemouth bass fingerlings production in relation to stocking density. Thus, appropriate stocking densities and related management regimes applicable at the commercial scale should be developed. Effects of stocking density on growth performance and size variation of largemouth bass fingerlings were investigated in order to find out practical culture regimes as to stocking strategy in indoor overwintering systems.

Results

In the commercial setting, fingerlings (1-2") were sucessfully produced in indoor raceway systems only with live feeds (rotifers and artemia). Using the new method, the process to transfer fry to nursery ponds to feed them on natural zooplankton could be eliminated and production efficiency became greater, resulting in a total of 2 million of fingerlings. Also, the fingerling production study in overwintering semi-recirculating systems demonstrated that largemouth bass fingerlings can be raised at high biomass densities in a semi-closed recirculating system without serious mortality, size variability, or growth retardation. Based on the results obtained in this study, a biomass density of 100 kg/m^3 may be acceptable for largemouth bass (an initial weight of 9 g) reared in a semi-closed recirculating system up to 30 g in weight. For larger stockers (an initial weight of 36 g), it was estimated that largemouth bass fingerlings should be stocked in a range of 18-36 kgm^-3 initially and maximum yeild should not exceed 70 kg m^-3 (an final wight of 70g) in order to maximize growth rate while also minimizing size dispersion.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

Outcome #15

1. Outcome Measures

Number of clientele using improved fish farming best management practices

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	110

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

Outcome #16

1. Outcome Measures

Number of producers using improved biosecurity practices

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	74

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

Outcome #17

1. Outcome Measures

Number of fish samples submitted for disease testing

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	19874

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

Outcome #18

1. Outcome Measures

Number of fish samples submitted for disease-free certification

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	503

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

Outcome #19

1. Outcome Measures

Development of alternative culture technologies for largemouth bass

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Largemouth bass food fish production is profitable alternative for Arkansas fish farmers seeking to diversify. Markets that were recently closed, such as New York City, are now open to purchasing largemouth bass. Demand far exceeds supply and there is a scarcity of product available for the market. The production costs of raising largemouth bass are quite high, thus, new techniques need to be developed to increase efficiencies and reduce cost. Overwinter survival of small largemouth bass is also low.

What has been done
Alternative culture technologies are being used by aquaculture producers that raise largemouth bass. Research and extension support is being provided to farmers to develop out of season spawning of largemouth bass and to further refine modified partitioned aquaculture systems. Research and extension personnel assisted two largemouth bass producers with submission of USDA small Business Innovation Research proposals to investigate new innovative culture technologies.

Results
Two successful trials were completed in 2014 by UAPB research and extension personnel that evaluated different stocking densities of juvenile largemouth bass in recirculating systems. This data will be valuable to largemouth bass producers that are exploring culture techniques that involve maintaining juvenile fish in temperature controlled recirculating systems over the winter months to get a jump start on production in the spring. Several producers have begun to adopt alternative culture techniques that appear very promising for increasing food fish production of largemouth bass.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

A survey of catfish farmers has documented an increase of 15% in the number of acres devoted to split pond production of catfish. Yields reported were 75% greater than those reported in traditional ponds with production costs reduced by $0.03 to $0.051/ lb. One minnow farm has begun to install a split-pond system on their farms.
A survey of baitfish farms in Arkansas has demonstrated that greater than 90% of the baitfish produced in the state is grown on farms that have implemented formal biosecurity plans.
Results of the bird depredation studies on baitfish and sportfish farms show that lesser

scaup do consume fish from farms. The data generated from this study led to a decision by the U.S. Fish & Wildlife Service to allow fish farmers to add lesser scaup to their depredation permits to reduce these fish-eating birds.

Key Items of Evaluation

The continued adoption of split-pond technologies for catfish and baitfish is expected to continue to generate impacts for many years to come. The rates of use of biosecurity plans in the Arkansas baitfish industry is expected to contribute to fish health on farms.

VI. National Outcomes and Indicators

1. NIFA Selected Outcomes and Indicators

Childhood Obesity (Outcome 1, Indicator 1.c)	
0	Number of children and youth who reported eating more of healthy foods.
Climate Change (Outcome 1, Indicator 4)	
0	Number of new crop varieties, animal breeds, and genotypes whit climate adaptive traits.
Global Food Security and Hunger (Outcome 1, Indicator 4.a)	
0	Number of participants adopting best practices and technologies resulting in increased yield, reduced inputs, increased efficiency, increased economic return, and/or conservation of resources.
Global Food Security and Hunger (Outcome 2, Indicator 1)	
0	Number of new or improved innovations developed for food enterprises.
Food Safety (Outcome 1, Indicator 1)	
0	Number of viable technologies developed or modified for the detection and
Sustainable Energy (Outcome 3, Indicator 2)	
0	Number of farmers who adopted a dedicated bioenergy crop
Sustainable Energy (Outcome 3, Indicator 4)	
0	Tons of feedstocks delivered.