2012 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 the 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. Federal, state and private funds of approximately 11.3 million supported sixty-73 ongoing projects with most of the research projects conducted at the UAPB campus site, with some activities occurring at the UAPB Lonoke and Marianna farm sites. Additional studies were conducted on cooperating farm sites in Jefferson, Lee, St. Francis, Monroe and Phillips counties and with other institutions such as the Felsenthal National Wildlife Refuge.

Faculty submitted external grant proposals which resulted in 15 newly funded projects that added $3.76 million in funding to support Research and Extension activities. Two new Evans-Allen research projects were approved and two Evans-Allen projects were completed. The knowledge gained by these research activities were 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 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. A new project is currently being developed in the textiles program which includes the development of new end use applications for biomaterials including traditional fibers and new modified regenerated proteins like spider silk and cellulosic fibers in relation to aspects of sustainability of materials.

The Agriculture and Human Science components of the 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: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	23.5	0.0	21.3
Actual	0.0	15.8	0.0	14.3

II. Merit Review Process

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

- Internal University Panel
- 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 Merit Review Process in SAFHS resulted in review of over 32 published papers and 19 manuscripts accepted for publication. The University has also been granted permission by the Arkansas Higher Education Coordinating Board to offer a Ph.D. in Aquaculture/Fisheries. The Ph.D. program received its final accreditation review by the Higher Learning Commission during fall 2011. The new Ph.D. program accepted its first student for enrollment in January 2012. The program currently has three Ph.D. students enrolled. The UAPB Aquaculture/Fisheries Center of Excellence is a key partner of the aquaculture industry and natural resource managers in Arkansas.

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, is scheduled for external review in the fall of 2013.

The Department of Human Sciences has 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 during the Spring 2012 semester. 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 for accreditation for the Didactic Program in Dietetics Education was completed in 2011. Accreditation for the program is pending, contingent upon two students graduating the program on or before the end of 2014; at least four students are scheduled to graduate the program before the end of this time period. 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 Research Director/Dean of the School of Agriculture, Fisheries and Human Sciences was made permanent in September 2012. The Director used 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 evaluated the makeup of these two stakeholder groups for effectiveness in the input process. Both stakeholder groups are providing meaningful suggestions for programmatic improvements. The Agriculture Research and Extension Council has met twice since its reorganization in 2010. It is scheduled to meet again summer of 2013.

The UAPB Aquaculture/Fisheries Center (AFC) receives input and interacts with stakeholders on an almost daily 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)

The AREAC was originally organized in 2003 to add structure to the stakeholder input process for Research and Extension programs in agriculture. The Council formally meets once a year, but members have recently requested at least two meetings each year. Members are also in continuous contact with research and Extension faculty and administrators on a less formal basis. The AREAC was re-organized in 2010 with only slight changes in the membership structure that would allow the

Council to be more responsive to the research and Extension needs of the Agriculture and Human Sciences Departments. 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.) two (2) current and retired Extension professionals (one from 1890 and one from 1862) 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. At the 2011 Advisory Committee meeting, recommendations included continued work on new feed formulations, marketing structures, cash flow and financial management, diseases, new chemicals approved for non-food fish, new hatchery techniques for public stocking programs, and more training for AGFC biologists. The Chicot County Extension programs derive their input from this committee's advice. Lonoke County gain stakeholder input into program development from these meetings. The Lonoke County Agricultural Office, operating as part of the 1862 State Extension Service 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.

In addition to the National Fisheries Advisory Council, there are a number of advisory subcommittees that specialize in specific areas and meet regularly to contribute towards the Aquaculture/Fisheries Center's program planning and development. These include the UAPB Facilities Subcommittee, the Catfish Subcommittee, and the Lonoke Aquaculture Subcommittee. Members of the Facilities Subcommittee meet on a regular basis to plan UAPB Aquaculture/Fisheries Center facility expansion and develop resources for new facilities. The Catfish Subcommittee meets twice a year and the Lonoke Aquaculture Subcommittee meets once a year to plan the annual UAPB Lonoke Aquaculture workshop, which is primarily focused on bait and ornamental fish aquaculture.

The Young Scholars Advisory Committee Structure

A Young Scholars Task Force, including some of the children and parents enrolled in the program, oversees the planning, implementation and evaluation of the program in both counties. One of the children serves as chair of the task force while another child serves as secretary. In addition to program parents and children, membership includes representatives of partnering agencies, governmental, officials, and state legislators. Our specialists in agriculture, family and community programs work with 1862 county agents, as requested, to organize clientele groups through community-based organizations, schools and the faith-based community. 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. An example of input from a structured committee currently being implemented is an evaluation of fall green planting dates initiative in 2011 and plans to develop and install a commercial kitchen for evaluation of value added processing of vegetables and fruit. The commercial kitchen is currently under construction and will be available for use by mid-summer 2013.

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 growing 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. This year the Committee focused on the continued development of the Ph.D. program in Aquaculture-Fisheries and the economic plight of producers in the region. The Committee strongly supported the development of this graduate program because of the direct impact it would have on the research and Extension.

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	1850681	0	2252073

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	0	1834731	0	2245999
Actual Matching	0	1638528	0	1661162
Actual All Other	0	0	0	0
Total Actual Expended	0	3473259	0	3907161

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

V. Planned Program Table of Content

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%		100%
806	Youth Development		55%		0%
	Total		100%		100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	1.2	0.0	0.4
Actual Paid Professional	0.0	1.0	0.0	0.4
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	278512	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	271720	0	28837
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 programs were addressed in the families, youth and communities area.These included the AG Adventure and Awareness Program, the Young Scholars Program and Teens on the Go.The AG Adventure and Awareness Program cosisted of field days, camps, exhibits, displays, and workshops. The program tqargets students in elementary through high school with hands-on activities. ***Teens on the Go*** is a newsletter that students received 7-12. 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 economic-and self-sufficiency skills. Data from the research project, **Predictors of Quality in Licensed Early Childhood Education Program,** were analyzed and an observation was conducted in those centers indicating an interest in national accreditation.

2. Brief description of the target audience

The target audiences for these programs included students in grades elementary through the 12th grade, low-income, minority children and their families who live in a housing project; family homes, Head Start and daycare directors, their staff, enrolled children, and parents in Southeast Arkansas.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	90	160	633	10780

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

Patent Applications Submitted

Year: 2012

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	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
2012	11663

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	To increase performance in school, help students develop decision-making skills, help families gain economic security, and improve quality in early childhood education programs.

Outcome #1

1. Outcome Measures

To increase performance in school, help students develop decision-making skills, help families gain economic security, and improve quality in early childhood education programs.

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	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
802	Human Development and Family Well-Being
806	Youth Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

The changing economy affected the Youn Scholars Program. As families lost jobs many had to move from the housing projects to other locations.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The AG Adventures and Awareness Program is seeing and increase in the number of students declaring a major in asgriculture. Findiings in the research projected indicated that parents are better able to select quality care for their children. In the Young Scholars Program, 94 perecnt of families have food at the end of the month.

Key Items of Evaluation

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		25%		25%
502	New and Improved Food Products		25%		25%
503	Quality Maintenance in Storing and Marketing Food Products		25%		25%
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins		25%		25%
	Total		100%		100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.3	0.0	0.7
Actual Paid Professional	0.0	0.4	0.0	0.8
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	74608	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	45263
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

Studies focused on effects of edible coatings including chitosan or hydroxypropyl methylcellulose and sanitizers including sodium hypochlorite or peroxyacetic/octanoic acid mixture on microbiological quality of fresh-cut sweet potatoes at refrigeration storage under modified atmosphere packaging.

2. Brief description of the target audience

Local farmers and limited resource farmers

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	20	10	0	0

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

Patent Applications Submitted

Year:	2012
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	0	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
2012	2

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Increase number of small farmers and producers who adopt UAPB's Fresh-Cut Processing Technology and utilize it for market development of their fresh-cut produce.

Outcome #1

1. Outcome Measures

Increase number of small farmers and producers who adopt UAPB's Fresh-Cut Processing Technology and utilize it for market development of their fresh-cut produce.

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

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

Weather conditions may affect production of sweet potatoes needed for the research.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Sweet potatoes (Ipomoea batatas) were obtained from the University of Arkansas at Pine Bluff Research Demonstration Farm (Lonoke, AR). Sweet potatoes were washed, peeled, and sliced. Fresh-cut sweet potatoes were coated with edible coating or treated with sanitizers to evaluate shelf life extension and preservation quality. Edible coating solutions include 1% of hydroxypropyl methylcellulose (HPMC) solution and 1% of chitosan (CTS) solution. Sanitizer solutions include 100 ppm of sodium hypochlorite (SHC) solution and 40 ppm of peroxyacetic/octanoic acid mixture (POA). Fresh-cut sweet potatoes were dipped into edible coating solutions or sanitizer solutions. Treated samples were packaged under modified atmosphere packaging (MAP) in low O_2permeability bags and flushed with gas composed of 2% O_2 and 5% CO_2or under air packaging in high O_2permeability bags. Packaged samples were stored for 14 days at 4°C. Samples were taken from the refrigerator at 0, 4, 7, 11, and 14 day of storage. The headspace of $O_2$and CO_2 were measured. Aerobic plate counts and yeast and mold counts were determined.

The average of initial aerobic plate counts of control (uncoated), HPMC, CTS, SHC, POA in both air packaging and MAP were 2.8 log CFU/g on day 0. The average of aerobic plate counts of control (uncoated), HPMC, CTS, SHC, POA in both air packaging and MAP were 7.1 log CFU/g on day 14. Aerobic plate counts of CTS coated and SHC treated samples were 0.5 log lower than control samples after 14 days of storage regardless of packaging method. The average of initial yeast and mold counts of control (uncoated), HPMC, CTS, SHC, POA in both air packaging and MAP were 1.5 log CFU/g on day 0. The average of yeast and mold counts of control (uncoated), HPMC, CTS, SHC, POA in both air packaging and MAP were 4.5 log CFU/g on day 14. Yeast and mold counts of CTS coated and SHC treated samples in MAP and air and POA treated sample in MAP were 0.5 - 1.0 log lower than control samples after 14 days of storage. From the study results, either chitosan coating or sodium hypochlorite sanitizer showed inhibitory effect on both aerobic plate counts and yeast and mold counts regardless of packaging method. Peroxyacetic/octanoic acid mixture showed inhibitory effect against yeast and mold counts under modified atmosphere packaging.

Hunter color L*, a*, b* values did not show any significant difference throughout storage.

Initial O_2concentrations in MAP and in air packaging were 2 and 20%, respectively. After 14 days of storage, O_2concentrations in MAP increased to 8-10%, whereas those in air packaging decreased to 12-14%. Initial CO_2concentrations in MAP and in air packaging were 4.5 and 0.5%, respectively. After 14 days of storage, CO_2 concentrations in MAP increased to 8-10%, whereas those in air packaging decreased to 12-14%.

Sweet potatoes treated with chitosan coating or sanitizer, sodium hypochlorite, had slightly lower bacterial counts compared to those with other treatments during storage. Microbiological quality of fresh cut sweet potatoes could be maintained up to 11 days at 4°C regardless of gas composition in packaging bags. Overall, no significant beneficial effect of modified atmosphere packaging was observed on microbiological

quality characteristics of fresh-cut sweet potatoes.

Key Items of Evaluation

Sweet potatoes treated with chitosan coating or sodium hypochlorite treatment had slightly lower aerobic plate counts compared to those with other treatments during storage. Modified atmosphere packaging of 2% O_2 and 5% CO_2 showed no significant effect on shelf life extension.

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
111	Conservation and Efficient Use of Water		20%		20%
112	Watershed Protection and Management		20%		15%
133	Pollution Prevention and Mitigation		15%		20%
134	Outdoor Recreation		10%		10%
204	Plant Product Quality and Utility (Preharvest)		20%		15%
403	Waste Disposal, Recycling, and Reuse		15%		20%
	Total		100%		100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.5	0.0	0.5
Actual Paid Professional	0.0	1.6	0.0	1.1
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	209300	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	61461	0	155944
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

There are several activities involved. Two statewide new articles concerning improved fishing were written. Those articles included fertilization and toxic algae presence and potential problems with toxic algae. Also a recreational fisheries management workshop was held (Hot Spring County Cattleman's Association), with 30 attending. Over 60 samples from agents, consultants, and farm pond owners were submitted to the lab.

Additionally, three sites were evaluated for individual want to build recreational fisheries. Two of the individual had sites which could be used. The other individual was advised not to construct the pond due to improper soil conditions.

Also conducted fishing derbies for youth at Ashley County Youth Day and UAPB Aquatic Sciences day.

Demonstration of ornamental pond construction methodologies

A major component is the identification of aquatic weeds for pond owners and then determining the appropriate methods to control the nuisance plants. This was done over 100 times. Often this was done in conjunction with county agents. Frequently we were able to identify the plant using digital photographs sent by email, but ponds in various counties were visited with county agents. After determining the plant ID, a course of action involving mechanical, physical, biological and/or chemical control methods was devised.

Arkansas has over 127,000 farm ponds that serve as important sources of water and recreation. In addition, ponds provide important ecosystem services by capturing sediment and sequestering carbon. Many of these water bodies are old, and have experienced sedimentation and nutrient enrichment, resulting in increased aquatic vegetation problems. Warmer weather has increased the northern range of several problematic aquatic weeds. Information on managing these resources was 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, newsletter articles and presentations at meetings and workshops. News articles reached a wider audience across rural Arkansas. 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.

This phase of the Arkansas River largemouth bass study was designed to 1) generate updated population parameters for largemouth bass, 2) examine possible relationships between bass growth and river hydrology, 3) assess the suitability of the current 381-mm (15-in), and 4) generate additional estimates of largemouth bass angler effort, catch, and harvest for other pools of the Arkansas River. 5)An evaluation of this research was conducted in September 2012 and completed in October. The 20-question survey (actually a census) used a scaled-response answer scheme (i.e., 5=strongly disagree to 3=neutral to 1=strongly agree) and contained two sections of questions. The first 14 questions pertained directly to the research, whereas the last six questions concerned broader, program-level items.

The long-term water quality associated with the effectiveness of a swine waste treatment lagoon was assessed by monitoring the water quality of the treatment lagoon on a weekly basis during the spring and

summer months. The mean phosphorus concentration at the lagoon surface was measured along with the total nitrogen, nitrate, nitrite and ammonia levels. Personnel associated with this program were able to present the research and demonstration findings at several conferences and at the UAPB Farm Field day where over 200 individuals received abstracts and a short presentation. Those in attendance at the most recent field day responded that the project or some aspect of it most interested them during visit. Over 90 elementary school children toured the facility and were exposed to farm animals and dealing with animal waste. The literature developed as part of this project was utilized by a student who placed first in their division and overall best of fair at the University of Arkansas at Pine Bluff Regional Science Fair Exposition. In 2012 a master's level student graduated and completed a thesis based on the swine waste treatment project.

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 first the farm pond owners who want to improve fishing opportunity and quality on their own property. Additionally, consultants and Extension agents are targets to a lesser degree.

Arkansas has over 300,000 ponds. The owners and managers of these water bodies is the target audience for this program. Because of the convergence of water, nutrients and plants, at some time, every pond will have a nuisance aquatic plant problem. Most control methods can be upwards of $100 per acre*ft. Any mistakes in control method selection can lead to wasted effort, wasted money and rendering the pond unusable for the desired activity due to weeds. The goal is to determine the most effective, in terms of control and cost, methods to remedy the weed problem.

The target audience is county Extension faculty. We also directly reach some 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 fisheries biologists and managers, Tournament largemouth bass anglers, Recreational anglers of Arkansas

3. How was eXtension used?

eXtension made pond owners aware that the services were available through UAPB personnel.

Various documents and identification resources are available.

General information on farm pond management is available through the Freshwater Aquaculture Community of Practice. Our main focus is supporting county agents with their farm pond educational efforts, and most agent requests for specialist assistance are for help with specific situations and problems, rather than for general information.

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	1142	61444	1055	11000

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

Patent Applications Submitted

Year:	2012
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	1	2	3

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Complete one peer reviewed research article every two years.

Year	Actual
2012	2

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
2012	3

Output #3

Output Measure

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

Year	Actual
2012	0

Output #4

Output Measure

- Number of project annual and final reports

Year	Actual
2012	0

Output #5

Output Measure

- Number of presenations and scientific meetings

Year	Actual
2012	3

Output #6

Output Measure

- Number of abstracts published

Year	Actual
2012	3

Output #7

Output Measure

- Number of refereed journal articles

Year	Actual
2012	0

Output #8

Output Measure

- Number of research reports submitted to stakeholders

Year	Actual
2012	0

Output #9

Output Measure

- Number of non-peer reviewed pubications

Year	Actual
2012	0

Output #10

Output Measure

- Number of presentations at both local community meetings and national scientific meetings

Year	Actual
2012	5

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	Number of research recommendations transferred to AGFC staff
4	Increase in ponds that are designed, stocked, and managed correctly
5	The percent of AGFC fisheries biologists and managers that are informed about use of retenone samples for scientific research topics through scientific meetings and conferences
6	Percent of AGFC fisheries biologists and managers who use the study results to solve management issues
7	Number of recreational anglers that learned what we know
8	Number of non-agency fisheries biologists that use what we know
9	Percent reduction in complaints to the AGFC regarding largemouth bass in the Arkansas River
10	Percent increase in largemouth bass tournaments on the Arkansas River
11	Number of AGFC personnel that learned what we know
12	Number of non-agency fisheries biologists that learned what we know
13	Number of AGFC personnel that use what we know
14	Number of tournament largemouth bass anglers that learned what we know
15	Proper fertilization programs drastically increase fish production in farm ponds
16	Determining effect control plan as early as possible will reduce the amount of time, effort and money required to bring an aquatic plant problem under control
17	Reduce number in pond problems

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
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Both small swine farmers and their neighbors care about water quality and odors near their property. Degraded water quality is of concern, especially if the water is contaminated with swine manure. High levels of nitrogen, phosphorus and colifom bacteria are of particular concern.

What has been done
Water quality measurements have been collected analyzed and published. A Field day has been held and a calendar was published and disseminated. Information in fact-sheets have been developed and shared with the target community.

Results
Interest has been expressed regarding swine waste treatment and the knowledge of the participants has been expanded by the conservation practices that were shared. The water quality of the swine waste treatment system was greatly improved by the treatment lagoon and the constructed wetland. The field day generated a great deal of interest in the swine wastetreatment system among the participants.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management

133	Pollution Prevention and Mitigation
204	Plant Product Quality and Utility (Preharvest)
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
2012	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Agricultural and natural resource professionals as well as landowners and livestock farmers care deeply about this issue. They are concerned about the resource both as a means of livelihood for producers and as an inheritance.

What has been done
Both the swine waste treatment system has been demonstrated and related information has been shared at field days and tour groups.

Results
Interest has been expressed and a desire for additional information (knowledge) has been expressed regarding conservation practices. It would be helpful if Federal incentive policies existed to help give financial encouragement to farmers to use these demonstrated best management practices.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation

204	Plant Product Quality and Utility (Preharvest)
403	Waste Disposal, Recycling, and Reuse

Outcome #3

1. Outcome Measures

Number of research recommendations transferred to AGFC staff

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The Arkansas Game and Fish Commission (AGFC) became concerned about bass fishing in the Arkansas River during the early 2000s. Concerns focused on perceived declines in the fishery (mostly a reduction in size) being reported by some anglers, and a large increase in the effort required to catch a 5-lb bass being reported by bass tournaments. This decline in the abundance of larger bass was largely believed to be related to an outbreak of largemouth bass virus that was first detected in the river around 2000. A few years following the outbreak, angler perception about the fishery improved. However, angler perception had changed again by 2008 in that fishery had declined in quality and contained few large fish of harvestable size. It was generally believed that abnormally high flows that occurred in the Arkansas River during 2007-2009 might have been the causal agent, though little data existed.

Largemouth bass Micropterus salmoides are among the most popular sport fishes in the United States. The AGFC largemouth bass stocking program is based mostly on zooplankton-reared bass. However, some pellet-reared fish are used for stocking. Advanced-fingerling largemouth bass are commonly reared using commercially available feed to reduce hatchery expense. However, they demonstrate poorer survival than largemouth bass reared on live forage when stocked into natural systems.

What has been done
UAPB addressed the issue by characterizing two important components of the fishery for which little information existed ? the biological aspects of the largemouth bass population and its population of anglers. During the period 2004-2010, UAPB conducted extensive stock assessments of largemouth bass and spotted bass populations throughout the Arkansas portion

of the Arkansas River. Additionally, a series of 12-month creel surveys done in conjunction with tag-reward studies were completed during 2007-2010 in several Arkansas River pools. Intensive simulation modeling also was conducted to compare the likely effectiveness of the current 381-mm TL minimum-length (MLL) regulation for largemouth bass against several alternative MLL regulations, including one that simulated no length limit. These studies have been reported in detail in previous year?s reports.

We investigated the effects of pellet-reared advanced-fingerling largemouth bass prestocking exposure to live forage on competitive ability using pairwise competitions with wild largemouth bass in a hatchery setting.

Results

The largemouth bass assessment completed in the Arkansas River during 2010 indicated that the current population exhibited lower overall abundance (CPUE only 55% of previous estimates) and slower growth (decreased lengths at age 3) compared to 2004-2005. Growth models indicated the population in 2010 needed one full year longer to attain 381-mm total length, which is the legal minimum length for harvest, compared to the population in 2004-2005. Strong indications existed that the size and growth declines in the largemouth bass population had occurred between 2005 and 2010. Hydrologic extremes occurring in the Arkansas River during 2007-2009 were strongly suspected as having negatively affected recent growth of largemouth bass. Indications were that largemouth bass were significantly smaller than average in recent years, which was consistent with angler perceptions about the state of the fishery (as of 2010).

Simulation modeling conducted that assessed the current 381-mm minimum-length limit (MLL) regulation was done in comparison to several alternative MLLs (255 mm, 330 mm, and 430 mm). Using the Fishery Analyses and Simulation Tools (FAST), the yield-per-recruit model predicted that at the relatively low levels of fishing mortality (μ~0.12) and moderate levels of natural mortality (cm~30%) present in the Arkansas River, fishery yield would be improved with a lower or no MLL. Conversely, the current 381-mm MLL and larger 430-mm MLL had equal potential to produce preferred-size fish and similar potential to increase mean size of harvested fish. Under present fishery conditions, the current 381-mm MLL regulation appeared to be the most appropriate management strategy for the Arkansas River largemouth bass fishery. This MLL was predicted to provide the best overall balance among fishery yield and population size structure. Alternatively, a 330-mm or 356-mm MLL might be acceptable to accommodate competitive tournament anglers that are only interested in weighing in more fish during tournaments and not additional harvest.

Pellet-reared largemouth bass without exposure to live forage did not compete well ($P < 0.05$) against wild fish. Pellet-reared largemouth bass with exposure to live forage before competitions did not significantly differ from wild largemouth bass in competitive ability. Regression analysis predicted pellet-reared largemouth bass with 9 d of prestocking live forage exposure would have a similar ability to compete for food as wild largemouth bass. Providing pellet-reared largemouth bass with live forage for 9 d before stocking may provide the benefits of both pellet and live-forage rearing.

Although competition for food resources can be a factor affecting poststocking mortality, other biotic interactions warrant consideration. Conditioning hatchery fish to structurally complex habitat and predators could improve overall competitive ability. Stocking program managers should consider fitness of the hatchery fish being stocked as well as interactions between stocked fish and native biota.

4. Associated Knowledge Areas

KA Code	Knowledge Area
134	Outdoor Recreation

Outcome #4

1. Outcome Measures

Increase in ponds that are designed, stocked, and managed correctly

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Persons interested in ornamental and farm ponds need training in pond construction and management to avoid costly mistakes and improve aesthetics and fishing opportunities.

What has been done
A demonstration pond has been developed to give interested persons a hands-on learning tool that allows participants to build an actual pond.

Results
Participants learn pond construction and proper management of ornamental ponds.

4. Associated Knowledge Areas

KA Code	Knowledge Area
134	Outdoor Recreation

Outcome #5

1. Outcome Measures

The percent of AGFC fisheries biologists and managers that are informed about use of retenone samples for scientific research topics through scientific meetings and conferences

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The Arkansas Game and Fish Commission (AGFC) became concerned about bass fishing in the Arkansas River during the early 2000s. Concerns focused on perceived declines in the fishery (mostly a reduction in size) being reported by some anglers, and a large increase in the effort required to catch a 5-lb bass being reported by bass tournaments. This decline in the abundance of larger bass was largely believed to be related to an outbreak of largemouth bass virus that was first detected in the river around 2000. A few years following the outbreak, angler perception about the fishery improved. However, angler perception had changed again by 2008 in that fishery had declined in quality and contained few large fish of harvestable size. It was generally believed that abnormally high flows that occurred in the Arkansas River during 2007-2009 might have been the causal agent, though little data existed.

Largemouth bass Micropterus salmoides are among the most popular sport fishes in the United States. The AGFC largemouth bass stocking program is based mostly on zooplankton-reared bass. However, some pellet-reared fish are used for stocking. Advanced-fingerling largemouth bass are commonly reared using commercially available feed to reduce hatchery expense. However, they demonstrate poorer survival than largemouth bass reared on live forage when stocked into natural systems.

What has been done
UAPB addressed the issue by characterizing two important components of the fishery for which little information existed ? the biological aspects of the largemouth bass population and its population of anglers. During the period 2004-2010, UAPB conducted extensive stock assessments of largemouth bass and spotted bass populations throughout the Arkansas portion of the Arkansas River. Additionally, a series of 12-month creel surveys done in conjunction with tag-reward studies were completed during 2007-2010 in several Arkansas River pools. Intensive

simulation modeling also was conducted to compare the likely effectiveness of the current 381-mm TL minimum-length (MLL) regulation for largemouth bass against several alternative MLL regulations, including one that simulated no length limit. These studies have been reported in detail in previous year?s reports.

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Although competition for food resources can be a factor affecting poststocking mortality, other biotic interactions warrant consideration. Conditioning hatchery fish to structurally complex habitat and predators could improve overall competitive ability. Stocking program managers should consider fitness of the hatchery fish being stocked as well as interactions between stocked fish and native biota.

4. Associated Knowledge Areas

KA Code	Knowledge Area
134	Outdoor Recreation

Outcome #6

1. Outcome Measures

Percent of AGFC fisheries biologists and managers who use the study results to solve management issues

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

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4. Associated Knowledge Areas

KA Code	Knowledge Area
134	Outdoor Recreation

Outcome #7

1. Outcome Measures

Number of recreational anglers that learned what we know

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

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4. Associated Knowledge Areas

KA Code	Knowledge Area
134	Outdoor Recreation

Outcome #8

1. Outcome Measures

Number of non-agency fisheries biologists that use what we know

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The Arkansas Game and Fish Commission (AGFC) became concerned about bass fishing in the Arkansas River during the early 2000s. Concerns focused on perceived declines in the fishery (mostly a reduction in size) being reported by some anglers, and a large increase in the effort required to catch a 5-lb bass being reported by bass tournaments. This decline in the abundance of larger bass was largely believed to be related to an outbreak of largemouth bass virus that was first detected in the river around 2000. A few years following the outbreak, angler perception about the fishery improved. However, angler perception had changed again by 2008 in that fishery had declined in quality and contained few large fish of harvestable size. It was generally believed that abnormally high flows that occurred in the Arkansas River during 2007-2009 might have been the causal agent, though little data existed.

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Simulation modeling conducted that assessed the current 381-mm minimum-length limit (MLL) regulation was done in comparison to several alternative MLLs (255 mm, 330 mm, and 430 mm). Using the Fishery Analyses and Simulation Tools (FAST), the yield-per-recruit model predicted that at the relatively low levels of fishing mortality (μ~0.12) and moderate levels of natural mortality (cm~30%) present in the Arkansas River, fishery yield would be improved with a lower or no MLL. Conversely, the current 381-mm MLL and larger 430-mm MLL had equal potential to produce preferred-size fish and similar potential to increase mean size of harvested fish. Under present fishery conditions, the current 381-mm MLL regulation appeared to be the most appropriate management strategy for the Arkansas River largemouth bass fishery. This MLL was predicted to provide the best overall balance among fishery yield and population size structure. Alternatively, a 330-mm or 356-mm MLL might be acceptable to accommodate competitive tournament anglers that are only interested in weighing in more fish during tournaments and not additional harvest.

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Although competition for food resources can be a factor affecting poststocking mortality, other biotic interactions warrant consideration. Conditioning hatchery fish to structurally complex habitat and predators could improve overall competitive ability. Stocking program managers should consider fitness of the hatchery fish being stocked as well as interactions between stocked fish and native biota.

4. Associated Knowledge Areas

KA Code	Knowledge Area
134	Outdoor Recreation

Outcome #9

1. Outcome Measures

Percent reduction in complaints to the AGFC regarding largemouth bass in the Arkansas River

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The Arkansas Game and Fish Commission (AGFC) became concerned about bass fishing in the Arkansas River during the early 2000s. Concerns focused on perceived declines in the fishery (mostly a reduction in size) being reported by some anglers, and a large increase in the effort required to catch a 5-lb bass being reported by bass tournaments. This decline in the abundance of larger bass was largely believed to be related to an outbreak of largemouth bass virus that was first detected in the river around 2000. A few years following the outbreak, angler perception about the fishery improved. However, angler perception had changed again by 2008 in that fishery had declined in quality and contained few large fish of harvestable size. It was generally believed that abnormally high flows that occurred in the Arkansas River during 2007-2009 might have been the causal agent, though little data existed.

Largemouth bass Micropterus salmoides are among the most popular sport fishes in the United States. The AGFC largemouth bass stocking program is based mostly on zooplankton-reared bass. However, some pellet-reared fish are used for stocking. Advanced-fingerling largemouth bass are commonly reared using commercially available feed to reduce hatchery expense.

However, they demonstrate poorer survival than largemouth bass reared on live forage when stocked into natural systems.

What has been done

UAPB addressed the issue by characterizing two important components of the fishery for which little information existed ? the biological aspects of the largemouth bass population and its population of anglers. During the period 2004-2010, UAPB conducted extensive stock assessments of largemouth bass and spotted bass populations throughout the Arkansas portion of the Arkansas River. Additionally, a series of 12-month creel surveys done in conjunction with tag-reward studies were completed during 2007-2010 in several Arkansas River pools. Intensive simulation modeling also was conducted to compare the likely effectiveness of the current 381-mm TL minimum-length (MLL) regulation for largemouth bass against several alternative MLL regulations, including one that simulated no length limit. These studies have been reported in detail in previous year?s reports.

We investigated the effects of pellet-reared advanced-fingerling largemouth bass prestocking exposure to live forage on competitive ability using pairwise competitions with wild largemouth bass in a hatchery setting.

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4. Associated Knowledge Areas

KA Code	Knowledge Area
134	Outdoor Recreation

Outcome #10

1. Outcome Measures

Percent increase in largemouth bass tournaments on the Arkansas River

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
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4. Associated Knowledge Areas

KA Code	Knowledge Area
134	Outdoor Recreation

Outcome #11

1. Outcome Measures

Number of AGFC personnel that learned what we know

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The Arkansas Game and Fish Commission (AGFC) became concerned about bass fishing in the Arkansas River during the early 2000s. Concerns focused on perceived declines in the fishery (mostly a reduction in size) being reported by some anglers, and a large increase in the effort required to catch a 5-lb bass being reported by bass tournaments. This decline in the abundance of larger bass was largely believed to be related to an outbreak of largemouth bass virus that was first detected in the river around 2000. A few years following the outbreak, angler perception about the fishery improved. However, angler perception had changed again by 2008 in that fishery had declined in quality and contained few large fish of harvestable size. It was generally believed that abnormally high flows that occurred in the Arkansas River during 2007-2009 might

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4. Associated Knowledge Areas

KA Code	Knowledge Area
134	Outdoor Recreation

Outcome #12

1. Outcome Measures

Number of non-agency fisheries biologists that learned what we know

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The Arkansas Game and Fish Commission (AGFC) became concerned about bass fishing in the Arkansas River during the early 2000s. Concerns focused on perceived declines in the fishery (mostly a reduction in size) being reported by some anglers, and a large increase in the effort required to catch a 5-lb bass being reported by bass tournaments. This decline in the abundance of larger bass was largely believed to be related to an outbreak of largemouth bass virus that was first detected in the river around 2000. A few years following the outbreak, angler perception

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4. Associated Knowledge Areas

KA Code	Knowledge Area
134	Outdoor Recreation

Outcome #13

1. Outcome Measures

Number of AGFC personnel that use what we know

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
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4. Associated Knowledge Areas

KA Code	Knowledge Area
134	Outdoor Recreation

Outcome #14

1. Outcome Measures

Number of tournament largemouth bass anglers that learned what we know

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

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Pellet-reared largemouth bass without exposure to live forage did not compete well ($P < 0.05$) against wild fish. Pellet-reared largemouth bass with exposure to live forage before competitions did not significantly differ from wild largemouth bass in competitive ability. Regression analysis predicted pellet-reared largemouth bass with 9 d of prestocking live forage exposure would have a similar ability to compete for food as wild largemouth bass. Providing pellet-reared largemouth bass with live forage for 9 d before stocking may provide the benefits of both pellet and live-forage rearing.

Although competition for food resources can be a factor affecting poststocking mortality, other biotic interactions warrant consideration. Conditioning hatchery fish to structurally complex habitat and predators could improve overall competitive ability. Stocking program managers should consider fitness of the hatchery fish being stocked as well as interactions between stocked fish and native biota.

4. Associated Knowledge Areas

KA Code	Knowledge Area
134	Outdoor Recreation

Outcome #15

1. Outcome Measures

Proper fertilization programs drastically 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
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Pond owners care because recreation and family time spent fishing are invaluable

What has been done
Some 60 water samples from pond owners and consultants were submitted to the laboratory to determine fertilization program would be beneficial, two new articles and one workshop on the subject

Results
Improved fishing environment in recreational pond

4. Associated Knowledge Areas

KA Code	Knowledge Area
134	Outdoor Recreation

Outcome #16

1. Outcome Measures

Determining effect control plan as early as possible will reduce the amount of time, effort and money required to bring an aquatic plant problem under control

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
A pond with a weed problem might be unusable for boating, fishing, swimming, irrigation, livestock watering or any other use to the pond owner or manager. Eliminating can be expensive and time consuming. Mistakes in determining a plan can make control even more expensive.

What has been done
Multiple trips to ponds state-wide; updating the aquatic herbicide section of the cooperative extension publication; MP44 Recommended Chemicals for Weed and Brush Control; an annual

in-service for Aquatic Plants and Ponds for county extension agents; testing water samples; answering emails and calls from pond owners.

Results
Increased calls from county agents indicate that they are becoming comfortable with referring problems to use. Positive feedback from stakeholders.

4. Associated Knowledge Areas

KA Code	Knowledge Area
134	Outdoor Recreation

Outcome #17

1. Outcome Measures

Reduce number in pond problems

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Educational programs on proper pond management techniques provide pond owners with the knowledge to enhance both their quality of life and the environmental benefits of farm ponds.

What has been done
County agents are our primary audience, as they reach many pond owners. In-service training was provided on farm pond management, and specialists responded to individual inquiries from agents and the general public. News releases were disseminated on the effects of both drought and heavy rains on farm ponds. Farm pond presentations were made to diverse audiences. A book chapter on managing the pond environment was published. Planning for a revision of our joint farm pond management bulletin was conducted in collaboration with the Arkansas Game and Fish Commission.

Results
As county agents are our major target audience, results of 1890 specialist support for farm pond programs are integrated within county agent accomplishments as reported through the 1862

Cooperative Extension Service.

4. Associated Knowledge Areas

KA Code	Knowledge Area
134	Outdoor Recreation

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

Increased prices of inputs may have producer debating if the treatment is economically justified. Each household has only so many dollars that can be spent.

Herbicide prices continue to be high, with little prospect of reductions. Difficult economic times limit the willingness of pond owners to pay for expensive treatments.

Drought resulted in reduced water volume in many farm ponds, and some dried up altogether. Weed growth was exacerbated by increased area of shallow water. Then, heavy rains were forecast together with the potential for dam failure from neglected spillway structures. Program content was modified to include information on coping with these events, and news releases addressed these two weather extremes.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Continued number of samples that come in from pond owners, agent, and consultants

Participants gained knowledge and confidence in the methods of pond construction and management

In-services continue to be at capacity. Positive results on surveys sent to county agents. Feedback from stakeholders favorable

Evaluations of our 2012 Aquatic Weed and Farm Pond Management In-Service Training were done both internally by the 1890 Extension Program and by 1862 Cooperative Extension Service. On the CES evaluation, the overall value of the training was rated as 9.6 out of 10 (with 10 being the best) and on recommending others to take this in-service, 9.9 out of 10. On our internal evaluation, the overall usefulness of our presentations was rated at 9.5 out of 10.

Key Items of Evaluation

We need to look at the number of pond owners who will continually submit the samples to the lab for analysis.

Surveys and feedback from county agents is very important for evaluation.

Our indirect target audience for this program is scattered across the state, and program delivery is primarily through our target audience, county extension faculty. A key item in evaluating the program is whether we are meeting county agent needs. Evaluations indicate that agents find our training useful and of value, and would recommend it to other agents.

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Global Food Security and Hunger

☑ 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		5%		13%
202	Plant Genetic Resources		5%		13%
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants		14%		10%
205	Plant Management Systems		15%		7%
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		12%		7%
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%
	Total		100%		100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	5.0	0.0	6.5
Actual Paid Professional	0.0	12.8	0.0	10.8
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	1223640	0	2067051
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	1260304	0	1340229
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 activity for the policy part of the program consisted of surveying a representative sample of the 250-300 farmers that are served by the UAPB 2501 Small Farm Project; conducting workshops and training sessions to educate farmers and others who attend. Pamphlets, fact sheets etc. were distributed during one-on-one conferences as well as during informational meetings. Small farm management assistance was provided by Extension Associates through direct one-on-one assistance, group training on record keeping and financial planning. Personnel also apprised farmers about programs offered through the Natural Resources Conservation Service, Farm Service Agency, Risk Management Agency and Heifer International. Training was provided to county extension staff, master gardeners, small-scale and limited-resource farmers, and youth. Research wasdone on alternative low cost feed sources that may be used to formulate rations for swine, goats and beef cattle.Farmers were taught how to use FAMACHA scoring and proper use of chemical dewormers to reduce the cost of treating animals for gastrointestinal parasites. Research was conducted on vegetables crop rotations that are suitable for the Arkansas Delta and Southwestern Arkansas; also, screening of alternative insecticides and ornamental plant trials were conducted. A protocol for successful production of virus-free sweet potato plants through shoot meristem culture was developed to aid the sweet potato industry in Arkansas.Gladiolus corms were evaluated for morphological and physiological characteristics that influence cut flower production. Pre-test and post-test were developed for students to determine their knowledge of biomaterial sustainability.

Assisted with the development of a mobile nursery system to feed hybrid striped bass and crappie

Methods to produce hybrid and triploid hybrid crappie were tested. Triploid crappie were produced using pressure shocks of 6000 psi for 7 min applied 3 minutes post-fertilization. Hybrid crosses using black females and white males were also successfully produced.

Moringaand Leucaena leaf meals (native to Africa) were tested in Nile tilapia diets as alternative protein sources relative to a diet with soybean meal as the main protein source. General effects were reported previously (there were few diet differences). Whole-body proximate composition and fatty acid data were generated this period. A feeding trial with sunshine bass using diets with fish oil or flaxseed oil with or without a dairy-yeast prebiotic was completed. Production and health data were reported previously. Proximate and fatty acid analysis are currently in progress, and remaining live fish are being conditioned to undergo a bacterial challenge to reveal additional health effects of the diets. Nutrigenomics work on lipid metabolism in largemouth bass was completed.

We receive requests for information and have updated the cooperative extension fact sheet Alterative Aquaculture Species for Arkansas. I have worked with the Arkansas turtle farmers on trying to address their needs.

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 conducted. 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, and presentations. Water quality and fish health services were provided to support educational programs. 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). Results of research studies and extension programs were also shared with peers across the country at national meetings and in journals and other publications.

Monitoring water quality and fish production in different catfish production systems in Arkansas

Determined market trends for southern aquaculture products using retail-level scanner databases.

Analyzed demand for frozen and chilled seafood in the United States using retail-level scanner data.

Analyzed regional and seasonal variations in demand for catfish and its substitutes in the United State.

Analyzed the price transmission relationship and asymmetry in price transmission along the catfish value chain in the US.

Conducted survey of crawfish retailers and restaurant managers, and identified determinants for development of live Market grading standards for crawfish. We identified number of grades desired and potential size or weight limits (or other factors) for each grade.

Analyzed the feasibility of using internet search query trends (Google trends) in forecasting the demand for seafood products in the United States.

Made projection for fish production, consumption, trade, and market prices by product categories and countries. The projections were made for the period up to 2030.

There are three major areas for activity here.

(1). Provide producers and lenders with inventory maintenance assistance. This involves fish crop inventory appraisals, projections, and development of enterprise budgets.

(2). Water quality maintenance -toxic algae screening program, a proactive means to prevent devastating fish losses due to toxic algae.

(3). Educational opportunities for county Extension agents and vocational agri instructors through workshops offered. Two workshops concerning water quality were offered at UAPB last summer.

Three activities were conducted:

1. Pond production study of stockers 5-inch and 7-inch hybrid catfish in single or multiple-size
2. Assistance to develop long-term business plans
3. 2-year model to evaluate feeding strategies on catfish farms under a variety of economic conditions

I have visited channel and hybrid catfish farms and strived to gather information and facts related to catfish culturestatusand issued problems, in order to develop possible research topics helping the catfish production improved

New diet ingredients or novel combinations of ingredients were tested in feeding trials with stocker catfish in large tanks. One study was conducted to determine whether diets enriched with higher levels (4 or 6%) of CLA-enriched soybean oil can improve the fatty acid composition of farmed channel catfish for human health relative to a diet with traditional soybean oil, while maintaining or improving gcatfish growth, health, and product quality. A second study was conducted to determine growth, survival, feed conversion, processing traits, and proximate composition of the fillet in catfish fed diets with 28 or 32% protein and 20% corn gluten feed (CGF) or solvent-extracted distillers dried grains with soluble (SE-DDGS). Nutrigenomics work on lipid metabolism in channel catfish was completed.

Verification study on alternative production techniques including split-pond and intensive aeration systems for catfish culture.

To sell channel catfish for stocking as part of some states fishing programs, the state agencies sometimes require health inspections of individual lots of fish prior to live hauling. These inspections are to ensure that the fish are in good general health. These are conducted as requested by the farmer.

Research was conducted to develop a standard sampling plan in Aquaculture and guide research design and to estimate the number of samples necessary to achieve a high probability of detecting

biologically significant effects.

Activity involves maintaining the fish disease and water quality diagnostic laboratory services. Annually 800 to 2,000 diagnostic samples are submitted to the laboratory. The breakdown is 200 fish disease cases, 1,000 water samples for general analysis, and 800 algal samples from ponds with histories of toxic algal episodes. In one on one visits with producers, bio-security is an issue that is constantly stressed and how important it is to contain the spread of the virulent Aeromanas strain that is now in Southeast and Southwest Arkansas.

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.

I have communicated with research and extension scientists at UAPB,and strived to gather information and facts related to baitfish culture status and issued problems, in order to develop possible research topics helping the baitfish productionand disease preventionimproved.

The baitfish production cycle involves stocking fish fry into freshly filled ponds. The ponds are fertilized to stimulate phytoplankton and zooplankton populations that the fry feed upon. Unfortunately, submersed aquatic weeds can growth up from the bottom. This prevents zooplankton growth and makes pond harvest difficult. This leads to reduced fish growth and poor health, or sometimes complete crop failure. Current herbicides are often more expensive to use than the crop that might be produced. Methods to economically reduce or limit this nuisance plant growth have been explored.

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.

Developed oxygen saturation and heat exchanging technologies for hybrid catfish and largemouth bass hatcheries.

We evaluated effects of abrupt changes of pH on survival of major baitfish species

Golden shiners were stocked in outdoor tanks (3.3 m^2) at either 100,000 fish/acre or 300,000 fish/acre and fed pelleted diets with 22 or 28% protein for 9 weeks. One diet was also offered in a meal form to fish at the two densities in two additional treatments. Non-traditional ingredients (corn DDGS and corn gluten feed) were used in two of the lower-protein diets, while soybean meal was the main protein source in the 28% diet (control) and one of the 22% diets.At harvest, performance variables were measured. After harvest, a subset of shiners was subjected to swimming speed trials to assess fish stamina.

Identification of compounds that will destick goldfish eggs from spawning substrate

Aquaculture in Arkansas creates economic activity and jobs. To support family fish farmers, potential producers, and the general public, integrated research and extension programs were conducted. 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, and presentations. Water quality and fish health services were provided to support educational programs. Program planning was conducted through discussions with individual farmers and with the Arkansas Bait and Ornamental Fish growers Association. Results of research studies and extension programs were also shared with peers across the country at national meetings and in journals and other publications.

2. Brief description of the target audience

The primary audience for this program consists of Small and Socially Disadvantaged Farmers (SSDFs). Small Farms as defined by the National Commission on Small Farms are those farms with $250,000 in gross sales or less while 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. However, UAPB does not discriminate against any individual and services are provided to all who request it.

County Extension faculty, existing fish farmers and potential farmers.
Youth
The target audience will be catfish and baitfish farmers and researchers of these production systems and associated water quality. Extension personnel will be also targeted to provide suggestions on analyses and presentation/dissemination of results to farmers.
Aquaculture producers

Commercial producers of aquatic animals in Arkansas, private pond owners, county Extension agents, state agencies.

Fish producers, feed manufacturers, researchers, seafood consumers

Fish farmers looking for alternative crops , people interested in getting into fish farming

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.
Catfish farmers in Arkansas
Catfish/aquaculture producers
Catfish/aquaculture processors
Catfish/seafood markets
State and Federal-level policy makers
Other seafood researchers
The audience is aquaculture producers and those interested in aquaculture such as county Extension agents or vocational agriculture instructors.
catfish farmers and producers
Primary target audiences are local channeland hybrid catfish farmers who need to improve the catfish production with alternative culture systems (split pond systems) and management regimes in the culture systems.
Fish producers, feed manufacturers, researchers, seafood consumers
Target audience is catfish farmers in the southeast United States.
Catfish farmers, farm managers, state agencies
The target audience are researchers in Aquaculture and Fisheries department as well as the catfish farmers in Arkansas.
The audience is fish producers, pond owners, county Extension agents, and consulting service individuals.

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.

Primary target audiences are local baitfish farmers who need improved baitfish culture regime and systems in terms of productivity and disease prevention. Local baitfish and live fish market shops requiring an efficient and cost-effective indoor system for holding fish for sale are also important target

audiences. The addressed problem with existinglive fishholding systems is that they use expensive city water in flow through systems or experienceunstable water quality in recirculating systems due to variable fish loading rates, which often result in afinancial burden and achronic disease problem.

Baitfish farmers

The direct target audience for this program includes commercial hatcheries and fish producers and public entities involved with the production and transportation of fish.

Aquaculture producers

baitfish farmers of Arkansas
Fish producers, feed manufacturers, researchers, recreational fishers
Commercial baitfish and ornamental fish producers in Arkansas, county Extension agents, state agencies
Program activities were targeted towards baitfish producers, forage fish producers, and potential producers. 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.

3. How was eXtension used?

eXtension allows access to fact sheets for alternative species and contact of extension specialist for more detailed answers

General information on aquaculture alternatives is available through the eXtension Freshwater Community of Practice. However, this program stresses alternatives that are specifically suited to the resources, climate, and regulatory environment in Arkansas. As such, our clientele requires state-specific assistance, rather than general information.
We worked with the local extension specialists to connect with the farmers
I have communicated with research and extension scientists at UAPB and developed a basic engineering model of water circulators for catfish split pond systems. The model is used for extension specialists and farmers to optimize the performance of their water circulators.
Some baitfish farmers are currently planning to adopt the split pond systems (SPS)commercially. However, one of the major obstacles to the SPS on a commercial scale is to develop an efficient method of screening a sluiceway for retaining small baitfish within the fishunit, and allowing for appropriate water flowrateat the same time. A basic concept ofsluiceway screensfortheSPS hasbeen developed. Theconcept may be used forthecommercialSPSthrough a proof-concept study in research ponds units.
eXtension was used to research herbicide labels and identify unknown plants
General information on baitfish culture submitted by UAPB personnel is available through the eXtension Freshwater Aquaculture Community of Practice. However, established commercial baitfish farmers, the target audience for this program, obtain information directly from baitfish experts at the university, through personal contacts, a newsletter, meetings, and a field day.

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	21544	25000	1009	0

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

Patent Applications Submitted

Year:	2012
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	9	17	26

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- The number of research studies and demonstrations conducted

Year	Actual
2012	25

Output #2

Output Measure

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

Year	Actual
2012	362

Output #3

Output Measure

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

Year	Actual

2012	4276

Output #4

Output Measure

- The number of newspaper articles published

Year	Actual
2012	35

Output #5

Output Measure

- The number of field days held

Year	Actual
2012	1

Output #6

Output Measure

- Number of presentations made

Year	Actual
2012	37

Output #7

Output Measure

- The number of workshops and training sessions conducted

Year	Actual
2012	39

Output #8

Output Measure

- Number of refereed journal articles

Year	Actual
2012	10

Output #9

Output Measure

- Number of abstracts

Year	Actual
2012	9

Output #10

Output Measure

- Number of presentations

Year	Actual
2012	55

Output #11

Output Measure

- Number of trade magazine articles

Year	Actual
2012	0

Output #12

Output Measure

- Number of factsheets and newsletters

Year	Actual
2012	0

Output #13

Output Measure

- Number of peer reviewed journal articles

Year	Actual
2012	0

Output #14

Output Measure

- Number of publications

Year	Actual
2012	19

Output #15

Output Measure

- Number of research reports submitted to stakeholders

Year	Actual
2012	58

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	Number of Arkansans gaining access to catfish management information
5	Number of producers responding to research results
6	Number of producers willing to test successful ingredients of feeding strategies on a commercial scale
7	Number of fingerling producers that learned what we know
8	Number of scientists that learned what we know
9	Number of fingerling producers that use what we know
10	Number of Arkansans gaining access to hybrid catfish information
11	Number of Arkansans adopting hybrid catfish production
12	Number of producers who learn project results
13	Number of researchers that will cite results
14	Number of producers that will modify feeding and management
15	Percent cool weather plankton-related problems that will decrease
16	Percent warm weather plankton-related problems that will decrease
17	Enhanced crop diversity on SSDF to increase profitability

18	Increase the number of SSDF that adopt one or more Best Management Practices for livestock production
19	Information on species other than baitfish and channel catfish is available to current or potential fish farmers
20	Properly managed biosecurity programs prevent the spread of virulent diseases on fish farms.
21	Number of stakeholders gaining new knowledge about diets and feeding strategies for baitfish
22	Improving pasture and livestock efficiency

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
2012	11

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Small, limited-resource, and socially disadvantaged farmers often rely on small ruminant production to supplement or completely provide farm income, especially on marginal lands. In the southern US, small ruminants face high exposure to Haemonchus contortus, a blood-sucking gastrointestinal parasite that frequently kills its host. Young kids and pregnant and lactating females are particularly susceptible to Haemonchus infection. Chemical dewormers are becoming less effective in controlling Haemonchus infections. Small ruminant producers need more effective methods of controlling Haemonchus on their farms to reduce economic losses.

What has been done
Four gastrointestinal parasite management workshops were conducted in different areas of the state. These workshops were designed to educate producers about the use of FAMACHA scoring and proper use of chemical dewormers to reduce the development of resistance, reduce the cost

of medicine and reduce death losses due to gastrointestinal parasites.

Results
As a result of the program, one goat producer in Arkansas County reduced death losses due to parasite infection in his herd from over 18% to less than 2%, an estimated savings of $3,780. Ten goat producers reduced the frequency with which they deworm their goats, reducing their costs by an estimated $230 and slowing the rate of development of parasite resistance to anthelminthics.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal 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
2012	50

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
According to the data from Extension Associates, SSDPs have yields that are lower than the county averages. These lower yields make it difficult for these producers to be profitable. Using Best Management Practices could help these producers become more profitable.

What has been done
Extension Associates provided one-on-one production information and educational materials to SSDPs while encouraging them to attend local county extension service production meetings.

Results
Thirty SSDPs adopted soil testing, extension variety selection and weed control recommendations on their crops. As a result of adopting these practices, producers have

increased their yields significantly and reduced their herbicide cost. Income on these farms increased by approximately 20 percent as a result of using best management practices.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
213	Weeds Affecting Plants
601	Economics of Agricultural Production and Farm Management

Outcome #3

1. Outcome Measures

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

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Most small and socially disadvantaged producers do not have estate plans. Therefore, when these producers die, their land becomes heir property. The heir property is difficult to operate because it is owned by multiple individuals thus making it difficult to operate.

What has been done
Four estate planning workshops were conducted. Approximately 200 individuals attended the workshops. The workshops were conducted in areas with high populations of socially disadvantaged individuals. An attorney from the National Law Center in Fayetteville conducted the workshops.

Results
Approximately 200 individuals received knowledge on estate planning and succession planning.

Thirty individuals began contacting heirs and family members to develop an estate plan. Ten individuals developed estate plans.

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
610	Domestic Policy Analysis

Outcome #4

1. Outcome Measures

Number of Arkansans gaining access to catfish management information

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	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
601	Economics of Agricultural Production and Farm Management

Outcome #5

1. Outcome Measures

Number of producers responding to research results

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Aquaculture producers need to improve survival of fry at pond stocking

Although hybrid and triploid hybrid crappie are raised for stocking as fingerlings in small impoundments, little research has been done to examine the growth, survival and triploid induction in crappie. Due to high feed cost for channel catfish, the production of alternative species for commercial food fish production would benefit current producers. Faster growth rates are generally observed in hybrid and triploid individuals. Triploid induction in hybrids has resulted in increased survival rates in many species of animals. This may be observed along with improved feed efficiency in hybrid and triploid crappie.

Commercial production techniques for alternative species vary considerably relative to those for major aquaculture species. Often, lack of standardized production procedures stems from lack of specific scientific knowledge on alternative species. Producers want species-specific diets to improve the profitability of their industries. Human consumers are interested in products that taste good and are beneficial for health. Tilapia are omnivores that can be sustained on all-plant diets without reduced performance during growout. However, the cost of soybean meal has become cost-prohibitive recently. Therefore, plant ingredients that can replace soybean meal, at least partially, might facilitate the sustainability and profitability of tilapia cultured in different regions. Carnivorous fish such as hybrid striped bass (HSB) and largemouth bass have additional diet constraints. Marine fish oil (source of essential fatty acids) should be reduced to lower diet cost, but performance must be maintained. The partial substitution of plant oils rich in n-3 fatty acids, in combination with other feed additives such as prebiotics, may support good production and product quality with minimal use of fish oil.

Many people are looking at various aquaculture enterprises as a way to start a new business or

provide food for their families. Arkansas is a prime location for the development of aquaculture farms. Objective, research-based information enables clientele to make wise decisions about investing in aquaculture, reducing economic losses and increasing the chances for a successful outcome.

Disease issues in aquaculture and natural fisheries settings can create catastrophic losses. Additionally other states and countries want to prevent the introduction of unwanted diseases or organisms. As a result, UAPB provides a service to inspect and conduct disease testing on fish destined for export to other states or countries. These disease tests enable the producer to market their fish and provides evidence to the receiver that the fish are free of diseases and pathogens.
Baitfish farmers need answers to this problem. It has a huge negative impact on the farm?s economic viability and consistently ranks among the top five problems when farmers are surveyed.

Catfish producers in the state of Arkansas are interested in producing hybrid catfish. This practice requires a novel approach to spawning catfish and the integration of experimental data into practical approaches for the farmer.

Aquaculture producers

What has been done
Developed a mobile nursery system that concentrates live prey organisms from a pond and feeds the fry in a controlled environment

Hybrid crappie have been produced by crossing the white crappie female with the black crappie male. Triploid induction was conducted on eggs by subjecting them to pressure shocks at 6,000, 7,000 and 8,000 psi for 1, 2, 3, or 4 minutes duration at 5, 6, 7, and 8 minutes post-fertilization. Triploid verification was conducted using a flow cytometer.

Moringa and Leucaena leaf meals (native to Africa) were tested in Nile tilapia diets as alternative protein sources relative to a diet with soybean meal as the main protein source. General effects were reported previously (there were few diet differences). Whole-body proximate composition and fatty acid data were generated this period. A feeding trial with sunshine bass using diets with fish oil or flaxseed oil with or without a dairy-yeast prebiotic was completed. Production and health data were reported previously. Proximate and fatty acid analysis are currently in progress, and remaining live fish are being conditioned to undergo a bacterial challenge to reveal additional health effects of the diets. Nutrigenomics work on lipid metabolism in largemouth bass was completed.

A fact sheet on aquaculture alternatives was revised to update the information. Presentations were made on a new pond bank culture system for hybrid striped bass fry, and on rearing largemouth bass for the fillet market. Impediments to the competitiveness of U.S. aquaculture were identified and presented.

UAPB operates four regional Fish Disease Diagnostic Laboratories that provide water quality analysis, pathogen testing, and disease prevention and management advice. These services are supported by a research program that emphasizes the development of diagnostic assays, the detection of emerging diseases, and methods to control or eradicate disease organisms. Demonstration projects have been conducted for the past three summers into using low rates of an aquatic herbicide added at the time of first filling and applying pre-emergent herbicides to dried

pond bottoms prior to filling.

On going collaborations with Baxter Land Company have tested various forms of spawning aides Catfish pituitary, Carp pituitary, and two forms of LHRHa to induce artificial spawning to produce hybrid catfish. Examinations of a system of passive grading of female catfish broodstock have led to efficient means to sample fish artificial spawning in a research settings. UAPB researchers act as a conduit for reporting of data describing the use of spawning aids to the INAD permit holder, the USFWS.

Equipment designed to reduce liquid oxygen consumption and propane gas usage was demonstrated at two aquaculture operations.

Results

Fry survival early in the season and late in the season was improved, with no improvement seen during the normal fry production season

Triploid induction rates were highest at 6000 psi for 3 minutes when pressure was initiated 7 minutes post-fertilization. Survival rates for triploid hybrids were significantly higher than survival of hybrids.

Whole-body protein, dry matter and ash were similar in tilapia among diets. Whole-body lipid was higher in fish fed the soy control diet than those fed diets with 30% of the soy protein replaced by leaf meals. Tilapia fed diets with the highest level of leaf meals in place of soy had significantly higher amounts of n-3 fatty acids, including highly unsaturated fatty acids (20:5n-3 and 22:6n-3). This could increase their value to health-conscious consumers. Soy meal costs at least 25% more than the leaf meals, and the potential to increase the profitability of tilapia production by partially replacing soybean meal with the leaf meals seems high. Sunshine bass grew well on diets with fish oil, and the effect was enhanced by a prebiotic. Nutrigenomics studies revealed comparative information on a key lipid enzyme in largemouth bass that can help guide diet development. The results of these studies were presented at the World Aquaculture Society meeting in Nashville (2013), The Striped Bass Growers Association meeting in Nashville (2013), and the UAPB Research Forum (2013). Written publications are in preparation.

Producers and potential producers were supplied with research-based information to support wise decisions regarding culture of new and alternative aquaculture species and systems.

About $1million of disease losses were prevented by our services.
Low rates of fluridone have proven effective, but resistant plant strains becoming dominant are a fear for the future. The initial use of pre-emergent herbicides has had promising results but work needs to be continued before anything definitive can be concluded.

Baxter Land Company has developed into a self sustaining producer of hybrid fingerlings. UAPB scientists still act in support of this operation through oversight of the use of spawning aides to induce ovulation in female catfish.

Technologies were adopted and installed on these hatchery operations resulting in more efficient production of hybrid catfish and largemouth bass fingerlings.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
307	Animal Management Systems
311	Animal Diseases

Outcome #6

1. Outcome Measures

Number of producers willing to test successful ingredients of feeding strategies on a commercial scale

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	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 #7

1. Outcome Measures

Number of fingerling producers that learned what we know

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	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
301	Reproductive Performance of Animals

Outcome #8

1. Outcome Measures

Number of scientists that learned what we know

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	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 #9

1. Outcome Measures

Number of fingerling producers that use what we know

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	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 #10

1. Outcome Measures

Number of Arkansans gaining access to hybrid catfish information

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	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 #11

1. Outcome Measures

Number of Arkansans adopting hybrid catfish production

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	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 #12

1. Outcome Measures

Number of producers who learn project results

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	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 #13

1. Outcome Measures

Number of researchers that will cite results

Not Reporting on this Outcome Measure

Outcome #14

1. Outcome Measures

Number of producers that will modify feeding and management

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
302	Nutrient Utilization in Animals

Outcome #15

1. **Outcome Measures**

Percent cool weather plankton-related problems that will decrease

Not Reporting on this Outcome Measure

Outcome #16

1. **Outcome Measures**

Percent warm weather plankton-related problems that will decrease

Not Reporting on this Outcome Measure

Outcome #17

1. **Outcome Measures**

Enhanced crop diversity on SSDF to increase profitability

2. **Associated Institution Types**

- 1890 Extension
- 1890 Research

3a. **Outcome Type:**

Change in Action Outcome Measure

3b. **Quantitative Outcome**

Year	Actual
2012	45

3c. **Qualitative Outcome or Impact Statement**

Issue (Who cares and Why)
The small acreage of most small and socially disadvantaged farms (SSDFs) makes them suitable for crops with high profit margins such as fruits and vegetables. However, many of these producers in Eastern Arkansas are row crop (soybeans, wheat corn, etc.) producers. Row crops farmers generally operate many acres (average size of 1000 acres) due to the smaller profit margins of their crops.

What has been done

Extension associates visited with many SSDPs and explained the economic suitability of fruit and vegetables for small farms. The importance of identifying markets and dependable labor was highly stressed. Three potential markets were discussed with participants: the Wal-Mart Southern Pea Market, several different direct markets, and East Arkansas Enterprise Community (EAEC).

Results
Twelve producers increased their profitability approximately 25 percent by growing and selling southern peas through the new Wal-Mart Buy Local Initiative. Five producers grew and marketed sweet potatoes to increase their income by approximately 20 percent. Twenty producers grew mixed vegetables and marketed them directly to consumers to increase their incomes by 20 percent.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
213	Weeds Affecting Plants
601	Economics of Agricultural Production and Farm Management
603	Market Economics

Outcome #18

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 Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Small and limited-resource livestock farmers are faced with rising feed costs and are seeking long

term solutions to solve this and other management problems in order to stay and be competitive in the livestock business. Livestock farmers have to deal with rising feed costs by either downscaling their livestock operations or getting out of business altogether.

What has been done
During the year under review (2012), two research trials on the suitability of brewers rice replacing all corn or milo in diets for pigs were completed on the University of Arkansas Pine Bluff Farm. Brewer rice is a product of rice milling that is abundantly available in southeast Arkansas and is cheaper than corn or milo. Research-based recommendations were disseminated to the target audience via producer workshop (8 participants were reached), farm visits (20 were made) and phone (15 were reached).

Results
Six swine producers and four goat producers are putting into use some of the feed mixing and feeding techniques recommended. The swine and goat producers adopting our recommendations have had a substantial reduction (20%) in feed costs and overall production efficiency i.e. pigs finished on brewers rice diets used less feed to gain a pound of body weight compared to corn diets.

4. Associated Knowledge Areas

KA Code	Knowledge Area
302	Nutrient Utilization in Animals
307	Animal Management Systems
601	Economics of Agricultural Production and Farm Management

Outcome #19

1. Outcome Measures

Information on species other than baitfish and channel catfish is available to current or potential fish farmers

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Arkansas fish farmers, land owners interested in alternative species

What has been done
A cooperative extension fact sheet has been update and published on alternative aquaculture species. Requests for information are answered.

Results
I have had 37 request for information on alternative species.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

Outcome #20

1. Outcome Measures

Properly managed biosecurity programs prevent the spread of virulent diseases on fish farms.

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Fish producers and natural resource managers care. Fish farmers have a financial stake in this matter. Resource managers are obligated to protect the fish and wildlife resources of this country.

What has been done
On farm biosecurity programs have been established. Producers in Southwest Arkansas normally share equipment, facilities, and labor and it is easy to spread diseases from farm to farm. Now there is dedicated equipment that is used solely on the farm originally had the Aeromonas, no equipment on the farm is used on any other farm.

Results
The disease spread has been stopped.

4. Associated Knowledge Areas

KA Code	Knowledge Area
311	Animal Diseases

Outcome #21

1. Outcome Measures

Number of stakeholders gaining new knowledge about diets and feeding strategies for baitfish

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Commercial production of baitfish is relatively inefficient. Feed comprises a major part of production costs. Baitfish production using lower-cost supplemental diets with alternative ingredients might be profitable due to their reliance on natural foods. However, density also has a major effect on growth of baitfish, so it is useful to compare diets under low- and high-density scenarios. Baitfish are marketed as live products, so hardiness and resilience must be considered in designing diets and feeding strategies for them.

What has been done
Golden shiners were stocked in outdoor tanks (3.3 m2) at either 100,000 fish/acre or 300,000 fish/acre and fed pelleted diets with 22 or 28% protein for 9 weeks. One diet was also offered in a meal form to fish at the two densities in two additional treatments. Non-traditional ingredients (corn DDGS and corn gluten feed) were used in two of the lower-protein diets, while soybean meal was the main protein source in the 28% diet (control) and one of the 22% diets. Fish were fed to satiation twice daily on weekdays and once daily on weekends. Subsamples of fish in each tank were weighed every 3 weeks to track growth and adjust feed weights. Chlorophyll a was measured twice during the study, and zooplankton was identified and enumerated on a similar schedule to estimate the abundance of natural foods. After harvest, a subset of shiners was subjected to swimming speed trials to determine u-crits (a measure of stamina).

Results
Weight gain was higher in fish at the low density regardless of diet. Weight gain was also higher in fish fed the diet with 28% protein than other diets at either density. Survival was better at the

high density (but was >90% in all treatments), and there were no diet effects on survival. Net yield was higher at the high density and in fish fed the 28% soy diet. A partial budget analysis will be conducted to enable economic comparisons among diets and stocking densities. The results of this study were presented at the Arkansas Bait and Ornamental Fish Growers Association meeting (2013), World Aquaculture Society meeting in Nashville (2013), and the UAPB Research Forum (2013). Written publications are in preparation.

4. Associated Knowledge Areas

KA Code	Knowledge Area
302	Nutrient Utilization in Animals

Outcome #22

1. Outcome Measures

Improving pasture and livestock efficiency

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	11

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Small, limited-resource, and socially disadvantaged farmers often rely on small ruminant production to supplement or completely provide farm income, especially on marginal lands. In the southern US, small ruminants face high exposure to Haemonchus contortus, a blood-sucking gastrointestinal parasite that frequently kills its host. Young kids and pregnant and lactating females are particularly susceptible to Haemonchus infection. Chemical dewormers are becoming less effective in controlling Haemonchus infections. Small ruminant producers need more effective methods of controlling Haemonchus on their farms to reduce economic losses.

What has been done
Four gastrointestinal parasite management workshops were conducted in different areas of the state. These workshops were designed to educate producers about the use of FAMACHA scoring and proper use of chemical dewormers to reduce the development of resistance, reduce the cost of medicine and reduce death losses due to gastrointestinal parasites.

Results

As a result of the program, one goat producer in Arkansas County reduced death losses due to parasite infection in his herd from over 18% to less than 2%, an estimated savings of $3,780. Ten goat producers reduced the frequency with which they deworm their goats, reducing their costs by an estimated $230 and slowing the rate of development of parasite resistance to anthelminthics.

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

Changes in the economic conditions in the state lead some farmers to look for alternative species and may prevent some farmers from exploring new opportunities.

Calcium is important for the development and survival of many freshwater species. The water in hatcheries throughout the state vary widely in alkalinity and hardness values. Studies conducted at UAPB in low calcium water had high mortality rates. When calcium was supplemented survival rates significantly increased.

Animal feed ingredients are very costly, forcing some fish producers to use ingredients that are not as nutritious as standard ingredients used previously in large amounts (fish meal and oil, soybean meal). The weak economy has also reduced the available funding (especially federal funds) for research on nutrition/diet development for food animals.

Regulations and government oversight are necessary and desired by U.S. citizens. However, an overly cumbersome and restrictive regulatory environment can stifle and constrain economic activity.

The stringency of the regulatory environment in the U.S. has increased in recent years in terms of both the number and complexity of regulations that affect U.S. aquaculture. The overall cumulative effect has been continued increases in the regulatory costs and risk faced by aquaculture growers in the U.S. Given the regulatory burden, fish farmers are reluctant to invest in production of alternative species. In addition, the economy has had a negative impact on aquaculture production given the dramatic increase in the price of fish feed ingredients.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

This work demonstrated to aquaculture producers a method for improving fry survival early in the season before pond conditions are optimal.

Significance was determined statistically at an alpha level of 0.05

Producers and researchers were interested in the results of our studies, based on feedback received in response to written reports and presentations at meetings.

Program evaluation was conducted through informal conversations with producers regarding new species and culture systems. Two producers indicated that they were planning to test split-pond production systems on their farm.

Key Items of Evaluation

Obtaining fish populations that were 90% triploid

Relevance, novelty, and potential economic feasibility of implementing the results.

Evaluation of this program will require a long-term and informal approach. Information provided to farmers may not impact their decision-making until some years in the future, when they are ready to invest in alternative species and/or culture systems.

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
701	Nutrient Composition of Food		0%		10%
702	Requirements and Function of Nutrients and Other Food Components		0%		10%
703	Nutrition Education and Behavior		0%		80%
	Total		0%		100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	0.0	1.7
Actual Paid Professional	0.0	0.0	0.0	1.2
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	178948
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	0	90889
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

Microbiological testing - selection of yogurt containing effective probiotics to reduce lactose intolerance; Recruitment of participants to the feeding study; Survey on self-reporting symptoms of lactose intolerance; Testing urine galactose; feeding study; Reporting of lactose symptoms during the feeding study; workshops on efficacy of yogurts containing probiotics to reduce lactose intolerance and control weight gain; Acceptability study (sensory evaluation sessions); Development of nutrition education program (nutrition lessons, nutrition messages, program identifiers); Workshops on nutrient-dense dairy products and health benefits of yogurts containing probiotics in adults (Media announcements, Sampling of yogurts, Shopping education).

Fifteen African American students enrolled in the University of Arkansas at Pine Bluff who had been either clinically diagnosed or self-diagnosed as lactose intolerant participated in two, one hour education sessions on the benefits of consuming dairy products. At the beginning of the first session, the group was asked to recall all foods consumed the previous 24hours. After, the group was given information on ways to incorporate dairy products into their diets. At the end, participants tasted dairy products they could tolerate such as probiotic yogurt and fresh strawberry parfaits. During the second session, returning participants (13) tasted cheddar cheese with crackers and calcium fortified orange juice. They were informed about the advantages of consuming a diet balanced in calcium and were given a list of dairy products they could tolerate (low in lactose). At the end of the session, they were asked through a survey if they planned to include more dairy products in their diets.

2. Brief description of the target audience

UAPB students (18-30 years old) made up of 50% males and 50% females who have not reached their menopause. Participants will be recruited through advertisement on campus using bulletin boards, internet and announcements on UAPB radio and television.

Fifteen (15) African American students enrolled in the University of Arkansas at Pine Bluff (UAPB); 8 females and 7 males.

3. How was eXtension used?

Flyers were posted on campus buildings to recruit participants to the research activity.

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	15	0	0	0

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

Year:	2012
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of research publications

Year	Actual
2012	0

Output #2

Output Measure

- # of promising crop lines identified

Not reporting on this Output for this Annual Report

Output #3

Output Measure

- # of successful food recipes

Not reporting on this Output for this Annual Report

Output #4

Output Measure

- 1. number of yogurts to be microbiologically tested

Not reporting on this Output for this Annual Report

Output #5

Output Measure

- 2. number of participants to be recruited for the feeding study

Not reporting on this Output for this Annual Report

Output #6

Output Measure

- 3. number of participants in the feeding study
  Not reporting on this Output for this Annual Report

Output #7

Output Measure

- 4. number of participants in workshop on yogurt containing probiotics
  Not reporting on this Output for this Annual Report

Output #8

Output Measure

- 5. number of panelists for the acceptability study
  Not reporting on this Output for this Annual Report

Output #9

Output Measure

- 6. number of participants in workshop on increased consumption of dairy products

Year	Actual
2012	0

Output #10

Output Measure

- Number of education session

Year	Actual
2012	2

Output #11

Output Measure

- Number of participants in education sessions

Year	Actual
2012	15

Output #12

Output Measure

- Increase dairy products consumption in cups

Year	Actual

2012	1

Output #13

Output Measure

- Increase calcium intake in mg

Year	Actual
2012	300

Output #14

Output Measure

- Increase vitamin D intake in micrograms

Year	Actual
2012	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	1. Increased consumption of yogurt containing effective probiotics by at least one serving among participants
2	2.Reduced symptoms of lactose intolerance among participants
3	3.Increased calcium intake among participants
4	4.Reduced weight gain among participants
5	5.Increased awareness of health benefits of yogurts and dairy products containing probiotics to the public
6	6.Increased consumption of at least one serving of a nutrient-dense dairy product by the public
7	# of people accept/like the new crop varieties
8	# of people have knowledge about the new crop varieties
9	# of people use and benefit from the new crop varieties and new food sources & recipes
10	Increased dairy products consumption
11	Increased vitamin D intake

Outcome #1

1. Outcome Measures

1. Increased consumption of yogurt containing effective probiotics by at least one serving among participants

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	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
703	Nutrition Education and Behavior

Outcome #2

1. Outcome Measures

2.Reduced symptoms of lactose intolerance among participants

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	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
703	Nutrition Education and Behavior

Outcome #3

1. Outcome Measures

3.Increased calcium intake among participants

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Calcium and vitamin D contribute to building dense bones. Deficiency in calcium and vitamin D may predispose individuals to loss of bone mineral density, rickets in children, and later osteoporosis in postmenopausal women. Dairy products are good sources of calcium and vitamin D. A large number of African Americans (60-80%) are lactose intolerant, avoid consuming dairy products, and are likely to develop deficiency in calcium.

What has been done
Two (2) one hour education sessions on the benefits of consuming dairy products were conducted. 24 hour-recalls collected at the first session and and 24 hour-recalls collected six weeks after the second session were compared using USDA SuperTracker software.

Results
Participants increased their calcium intake from 500 mg to 800 mg per day six weeks later.

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.Reduced weight gain among participants

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	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
703	Nutrition Education and Behavior

Outcome #5

1. Outcome Measures

5.Increased awareness of health benefits of yogurts and dairy products containing probiotics to the public

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	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
703	Nutrition Education and Behavior

Outcome #6

1. Outcome Measures

6.Increased consumption of at least one serving of a nutrient-dense dairy product by the public

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	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
703	Nutrition Education and Behavior

Outcome #7

1. Outcome Measures

# of people accept/like the new crop varieties

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	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
701	Nutrient Composition of Food

Outcome #8

1. Outcome Measures

# of people have knowledge about the new crop varieties

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	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
701	Nutrient Composition of Food

Outcome #9

1. Outcome Measures

# of people use and benefit from the new crop varieties and new food sources & recipes

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	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
701	Nutrient Composition of Food
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior

Outcome #10

1. Outcome Measures

Increased dairy products consumption

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Calcium and vitamin D contribute to building dense bones. Deficiency in calcium and vitamin D may predispose individuals to loss of bone mineral density, rickets in children, and later osteoporosis in postmenopausal women. Dairy products are good sources of calcium and vitamin D.

What has been done
Two (2) one hour education sessions on the benefits of consuming dairy products were conducted. 24 hour-recalls collected at the first session and and 24 hour-recalls collected six weeks after the second session were compared using USDA SuperTracker software.

Results
Participants (10) increased their dairy products consumption from 0.7 cup to 1.85 cups per day.

4. Associated Knowledge Areas

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

Outcome #11

1. Outcome Measures

Increased vitamin D intake

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Calcium and vitamin D contribute to building dense bones. Deficiency in calcium and vitamin D may predispose individuals to loss of bone mineral density, rickets in children, and later osteoporosis in postmenopausal women. Dairy products are good sources of calcium and vitamin D. A large number of African Americans (60-80%) are lactose intolerant, avoid consuming dairy

products, and are likely to develop deficiency in calcium.

What has been done
Two (2) one hour education sessions on the benefits of consuming dairy products were conducted. 24 hour-recalls collected at the first session and and 24 hour-recalls collected six weeks after the second session were compared using USDA SuperTracker software.

Results
Participants (10) increased their vitamin D intake from 1.3 micrograms to 2.5 micrograms.

4. Associated Knowledge Areas

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

V(H). Planned Program (External Factors)

External factors which affected outcomes
- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)
- Other (limitations; students dropout)

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Fifteen African American students enrolled in the University of Arkansas at Pine Bluff who had been either clinically diagnosed or self-diagnosed as lactose intolerant participated in two, one hour education, sessions on the benefits of consuming dairy products. At the beginning of the first session, the group was asked to recall all foods consumed the previous 24hours. After, the group was given information on ways to incorporate dairy products into their diets. At the end, participants tasted dairy products they could tolerate such as probiotic yogurt and fresh strawberry parfaits. During the second session, returning participants (13) tasted cheddar cheese with crackers and calcium fortified orange juice. They were informed about the advantages of consuming a

diet balanced in calcium and were given a list of dairy products they could tolerate (low in lactose). At the end of the session, they were asked through a survey if they planned to include more dairy products in their diets. Twelve of the 13 students said they would. Reasons for inclusion of more dairy products varied from "having strong bones to prevent osteoporosis" to "being made aware of the importance of calcium in the diet". Six weeks later, ten of the participants submitted a second 24 hour recall. Recalls from the first session and those completed six week after the second session of the 10 participants were analyzed and compared using the USDA SuperTracker. Results showed an increase from 0.7 cup to 1.85 cup of dairy productsper 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. We recommend a large study to confirm results of this study.

Key Items of Evaluation

Results showed an increase from 0.7 cup to 1.85 cup of dairy productsper 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.

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: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.2	0.0	0.0
Actual Paid Professional	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	48671	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	45043	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

Work with the vulnerability panel and focus groups to help develop guidelines for the inspection process.

Provide technical assistance to USDA-FSIS.
Provide written documents and powerpoint presentations.
Two separate briefings to inform how the catish industry is structured and how it operates.
Numerous phone calls, conference calls and emails about the U.S., Vietnam, and China's catfish industry
Assist with the role assessment process
Conference calls, emails, and meetings in Washington, D.C.
Preliminary meetings with processors and farmers in Little Rock, AR about food defense plans
Active extension program with processors and farmers throughout the industry
Monitoring inspection and food defense

2. Brief description of the target audience

There are three target audiences for this program: 1) USDA-FSIS personnel who need assistance in understanding catfish farming adn processing; 2) catfish farmers who will need to adopt new monitoring and record-keeping practices; and 3) catfish processors who will need to adopt new monitoring and record-keeping practices.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	135	1500	0	0

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

Patent Applications Submitted

Year: 2012
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Briefings to catfish farmers and catfish processors

Year	Actual
2012	2

Output #2

Output Measure

- Number of presentations to catfish farmers and processors

Year	Actual
2012	2

Output #3

Output Measure

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

Year	Actual
2012	4

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	We will provide technical assistance to USDA-FSIS by continuing to serve on panels and focus groups with FSIS
2	Number of contacts with catfish farmers and processors related to the new catfish inspection program
3	Access to best-available science by USDA-FSIS personnel
4	Increased understanding of food safety issues in imported catfish and catfish-like products of agencies, the aquaculture industry, and the general public

Outcome #1

1. **Outcome Measures**

We will provide technical assistance to USDA-FSIS by continuing to serve on panels and focus groups with FSIS

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

Number of contacts with catfish farmers and processors related to the new catfish inspection program

Not Reporting on this Outcome Measure

Outcome #3

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
2012	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Consumers in the U.S. have become more concerned with food safety in recent years. One manifestation of this has been growing concern over the safety of imported aquaculture products, particularly catfish. The 2008 Farm Bill moved inspection of catfish from FDA to USDA-FSIS, into the same inspection program as beef and poultry, so that safety standards for imported product would be equivalent to those for domestic product. However, the USDA-FSIS Catfish Inspection Rule has not yet been implemented.

What has been done

Continued technical assistance has been provided to various groups related to data and reviews of relevant analyses related to seafood safety.

Results
While the Catfish Inspection rule has not yet been implemented, greater numbers of individuals have an increased understanding of the discrepancy in food safety standards of imported versus domestic product.

4. Associated Knowledge Areas

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

Outcome #4

1. Outcome Measures

Increased understanding of food safety issues in imported catfish and catfish-like products of 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
2012	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
U.S. catfish producers and processors were not familiar with USDA-FSIS practices.

What has been done
A series of consultations and contacts with catfish producers and processors were done to provide pertinent information to industry

Results
While the Catfish Inspection Rule has been held up in the inter-agency review process, the U.S. industry has a more clear understanding of its requirements.

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

- Other (Political)

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

While the Catfish Inspection Rule has yet to be enacted, FDA has come out with other initiatives to attempt to address deficiencies highlighted in a GAO study.

Key Items of Evaluation

The key item in the short-term evaluation of this program is the on-going monitoring of the progress of developing the FSIS Catfish Inspection Rule and other, parallel regulatory issues.

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: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	0.0	0.1
Actual Paid Professional	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

- Developed gene silencing vectors for the genes expressed during lignin pathway
- Performed rice transformation

- Performed preliminary molecular analyses of putative transgenic plants.

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

2012	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:	2012
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- - Two peer reviewed publications - Two abstracts in conference

Year	Actual
2012	1

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
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Rice, the world?s third largest crop, holds great potential for biofuel production. Currently, rice farmers leave rice straw in the fields, burn it or thrown away. But, if it is converted into a biofuel, it could provide an affordable, renewable energy resource.

What has been done
Gene silencing vectors for lignin biosynthetic genes, cinnamate 4-hydroxylase (C4H), hydroxycinnamoyl CoA: shikimate hydroxycinnamoyl transferase (HCT) and coumarate 3-hydroxylase (C3'H), were developed. These vectors were used for generating transgenic lines in rice.

Results
Several PCR-positive transgenic lines containing cinnamate 4-hydroxylase (C4H), hydroxycinnamoyl CoA: shikimate hydroxycinnamoyl transferase (HCT) and coumarate 3-hydroxylase (C3'H)genes were identified.

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

V(I). Planned Program (Evaluation Studies)

Evaluation Results

- Developed gene vectors for transformation
- Developed PCR-positive putative transgenic rice lines.

Key Items of Evaluation

- Developed 4 terminator-less (TL) constructs for down-regulation of lignin biosynthetic genes in rice
- Generated at least 8-10 PCR positive putative transgenic lines of lignin biosynthetic genes, cinnamate 4-hydroxylase (C4H), hydroxycinnamoyl CoA: shikimate hydroxycinnamoyl transferase (HCT) and coumarate 3-hydroxylase (C3'H) to decrease lignin content in rice.