

**IMPLEMENTATION OF 5-YEAR PLANS OF WORK (POW) 2005-2006 UNDER THE  
AGRICULTURAL RESEARCH, EXTENSION, AND EDUCATION REFORM ACT OF  
1998 (AREERA)**

**2006 ANNUAL REPORT OF ACCOMPLISHMENTS AND RESULTS**

**Contact Person  
Jacquelyn W. McCray, Ph.D.  
Dean/Director  
School of Agriculture, Fisheries and Human Sciences  
1890 Research and Extension Programs  
University of Arkansas at Pine Bluff  
Pine Bluff, Arkansas**

**March 31, 2007**

## TABLE OF CONTENTS

<b>Introduction</b> .....	4
<b>Stakeholder Input</b> .....	4
<b>Program Review Process</b> .....	5
<b>Overview of Research and Extension Programs Reported in the 2005 – 2006 Plan of Work By GPRA Goals</b> .....	7
<b>Annual Report of Accomplishments and Results – POW October 1, 2005 – September 30, 2006 Executive Summary</b> .....	8
<b>Goal 1 – An agricultural system that is highly competitive in the global economy</b>	
1890 Research Programs	
1. Crop protection system.....	10
2. Alternative crop production .....	11
3. Minimally processed value-added products.....	13
4. Efficiency and profitability of hog farms .....	14
5. Engineering insect resistance in cowpea through gene transfer.....	15
1890 Extension Programs	
1. Adoption of new best management practices.....	16
2. Beef herd improvement.....	18
Integrated 1890 Research and Extension Programs	
1. Sustainable vegetable production.....	19
2. Catfish production and management.....	21
3. Baitfish production and management.....	25
<b>Goal 2 – A safe and secure food and fiber system.</b>	
1890 Extension Programs	
1. Nutrition education and wellness system (Food Safety) .....	30
2. HACCP training and education.....	32
<b>Goal 3 – A healthy, well-nourished population.</b>	
1890 Research Programs	
1. Herbs and vegetable production .....	33
2. Health benefits of probiotic bacteria .....	34
1890 Extension Program	
1. Nutrition education and wellness system (Diet and Health) .....	35
<b>Goal 4 – An agricultural system which protects natural resources and the environment.</b>	
1890 Research Program	
1. Small ruminant nutrition/management.....	37
Integrated 1890 Research and Extension Program	
1. Water quality monitoring .....	38

**Goal 5 – Enhanced economic opportunity and quality of life for Americans**

1890 Research Programs  
11. Predictors of quality child care programs ----- 39

1890 Extension Programs  
6. Family and youth ----- 40  
7. Agricultural awareness ----- 41  
9. Youth livestock management ----- 43  
10. Small farm management ----- 44

Integrated Research and Extension Programs  
5. Recreational fishing in the Delta -----46

**Summary of Resource Allocations ----- 50**

**IMPLEMENTATION OF 5-YEAR PLANS OF WORK (POW) 2005-2006 UNDER THE AGRICULTURAL RESEARCH, EXTENSION, AND EDUCATION REFORM ACT OF 1998 (AREERA)**

**2006 ANNUAL REPORT OF ACCOMPLISHMENTS AND RESULTS**

**INTRODUCTION**

The 1890 Research and Extension programs are administered by the School of Agriculture, Fisheries and Human Science at the University of Arkansas at Pine Bluff. The School consists of three academic departments, Agriculture, Fisheries and Human Science. Federal, state and private funds supported seventy seven 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, the Felsenthal National Wildlife Refuge, Arkansas River, and abroad in eight countries: Benin, Kenya, Togo, Tanzania, Nigeria, South Africa, Guyana, and Puerto Rico.

Faculty submitted forty one proposals for external funding to support Research and Extension activities. Faculty limited the scope of project proposals to meet the personnel available to do the work since the faculty is relatively small and several large projects were continuing from the previous year. Therefore \$682,000 was the amount of new external funds for FY06' received from these proposals. The total value of external funds supporting Research and Extension programs during the year was \$2,007,082 (included funded on-going projects) in support of program initiatives related to problems of importance to the citizens of Arkansas, the nation and the world. 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.

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.

**Stakeholder input process**

The 1890 Research and Extension programs at the University of Arkansas at Pine Bluff continue to require Extension and Research personnel to develop their own stakeholder input mechanism. This input will differ depending on the structure of the program. Stakeholder input is obtained from one-on-one contact and evaluations conducted on site. Extension and Research personnel seek additional stakeholder input at producer meetings, professional meetings, workshop and focus groups.

The Agriculture Research and Extension Advisory Council a means of obtaining formal stakeholder input was organized in 2004 and continues to be an effective means of gaining input. The Council met during February of 2006. Membership on the council will change with the need of Research and Extension programs as determined by 1890 administration and council recommendations. Other stakeholder input is facilitated through producer meetings and various partnership ventures. The Small Farm Management Program offers an additional avenue for stakeholder input through producers involved in the program.

The nutrition program designed to help food stamp recipients and other low-income families select and prepare meals consistent with their cultural traditions while improving their family's overall health utilizes county coalitions for stake holder input. These eight county coalitions are located in the delta region of the state and represent a cross section of the impacted clientele and community members. The

coalitions assist in identifying target areas and program participants, implementation and evaluation strategies.

The UAPB Aquaculture/Fisheries Center (AFC) prides itself on the level, scope, and effectiveness of its interactions with stakeholders. Input and interaction with stakeholders occurs 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.

Formal input is obtained from the National Fisheries Advisory Council. At the 2005 meeting of the National Fisheries Advisory Council, each designated group of stakeholders brought Research and Extension needs to the meeting.

Additional input is obtained from the annual conventions and meetings of the two major trade associations in the state: Catfish Farmers of Arkansas and the Arkansas Bait and Ornamental Fish Growers Association.

The active involvement of our Extension group throughout the eastern and southwest portions of the state also provides constant opportunity for input into the research programs

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 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. In 2005, the AFC Center Director was asked to chair a task force for AGFC. While the task force focused on its specific charge, the frequent meetings throughout the year at the AGFC headquarters and the AGFC representatives on the task force resulted in much valuable exchange of information and input into directions for Research and Extension programs. The AFC Center organized two workshops for AGFC personnel, both hosted at UAPB in 2006. More than 45 individuals from AGFC attended each workshop.

### **Program review process**

The School of Agriculture, Fisheries and Human Sciences Research and Cooperative Extension Programs at the University of Arkansas in Pine Bluff underwent a comprehensive review conducted by the Cooperative State Research, Education and Extension Service in May 2006 at the request of the Dean/Director. The five year plan of work from 2000 – 2004 identified external reviews as an element in the merit review process for the institution. The recommendations for Research and Cooperative Extension are being reviewed and implemented as appropriate. Two initiatives are in the early stages of development (1) greater coordination between Family and Consumer Sciences Extension focus and the administrator and faculty of the Human Sciences Department, and (2) implementation of Research and Extension programs that cut across all program areas in the school.

Our Research and Extension programs are monitored annually through a performance appraisal system that assures adherence to goals planned. 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.

The Aquaculture/Fisheries Center conducted an external review in 1999 to comply with the Merit Review Process mandated in the five-year POW. In November 1999, Drs. Robert P. Romaine, Louisiana State University, Bill Simco, University of Memphis, Jimmy Avery, Mississippi State University, and Robert Durborow, Kentucky State University were invited to review the research and extension activities as a component to the Merit and Peer Review process of the Plan of Work of the Cooperative State Research, Education, and Extension Service (CSREES). Drs. Romaine and Simco were responsible for reviewing the research and teaching programs and activities in the Aquaculture/Fisheries Center.

In 2003, to provide for more continuous merit review by university colleagues, Drs. Romaine and William Shelton were added to the National Fisheries Advisory Council. Along with Dr. Simco, a long-time member, there are now three university scientists who meet annually to review and recommend new directions for the UAPB Aquaculture/Fisheries Center.

Moreover, the Strategic Plan for the AFC Center is in the process of being updated for the next 5-year period, 2007-2011. The new draft of the 2007-2011 Strategic Plan will be reviewed by the UAPB National Fisheries Advisory Council that includes peer Researchers and Extension specialists.

**OVERVIEW OF RESEARCH AND EXTENSION PROGRAMS REPORTED IN THE  
2005 – 2006 PLAN OF WORK BY GPRA GOALS**

<b>Function</b>	<b>Goal 1</b>	<b>Goal 2</b>	<b>Goal 3</b>	<b>Goal 4</b>	<b>Goal 5</b>
1890 Research Program	1.Crop protection systems (C) 2. Alternative crop production (C) 3.Minimally processed value-added products (N) 4.Efficiency and profitability of hog farms (N) 5.Engineering insect resistance in cowpea through gene transfer (N)		6. Vegetable and herb production (C) 7. Health benefits of probiotic bacteria (C)	8. Small ruminant nutrient/management (C)	9. Socioeconomic impact of agricultural policy on minority and limited-resource farmers (N) 11. Predictors of quality child care programs (N)
1890 Extension Program	1.Adoption of new best management practices (N) 2. Beef herd improvement (M)	3.Nutrition education and wellness system (Food Safety) (C) 4.HACCP training and education (N)	5.Nutrition education and wellness system (Diet and Health) (C)		6.Family and youth programs (M) 7.Agriculture awareness (N) 8.Youth livestock program (N) 9.Small farm management (N)
Integrated 1890 Research and Extension Programs	1. Catfish production and management (C) 2. Baitfish production and management (C) 3. Sustainable vegetable production (C)			4. Water quality monitoring	5.Recreational fishing in the Delta (C)

(C) – Continuing from 2000 – 2004 POW

(N) – New to 2005 -2006 POW

(M) – Modified in the 2005 – 2006 (POW)

**ANNUAL REPORT OF ACCOMPLISHMENTS AND RESULTS – POW**  
**October 1, 2005 – September 30, 2007**

**Executive Summary**

**Goal 1 – An agricultural system that is highly competitive in the global economy.**

Research faculty in the Agriculture Department developed five (5) Research programs and one integrated Extension and Research program under Goal 1. All of these programs are designed to assist small and limited-resource farmers by investigating production practices applicable to small-farm systems. Research programs 1 (Crop Protection System) and 5 (Engineering Insect Resistance in Cow Pea) will reduce insecticide applications, reducing cost of production. Research programs 2 and 3 address both sustainable production practices and marketing of vegetables. Research program 4 (Efficiency and Profitability of Hog Farms) is centered on both the production system and feed selection for hog production.

The integrated Extension and Research program (program 3) is focused on cultivar selection and production practices for a variety of crops for a small-farm system. Field research plots and demonstrations are utilized to assist farmers with sustainable fruit and vegetable production.

The one Extension program (Beef Herd Improvement) supported under Goal 1 is designed to improve beef herd health and overall performance. Increased herd quality and market value are expected outcomes.

The U.S. aquaculture industry is facing increasing competition from lower-priced imports. This competition is relatively recent, occurring primarily over the last five years. In a relatively short period of time, U.S. aquaculture has moved from a position in which its primary competitor was wild-caught fish to a position in which it must compete with other farm-raised fish imported from developing countries at lower prices. There are two fundamental strategies for competing in the marketplace. The first is to compete strictly on price. The second strategy for competing with lower-priced imports is to differentiate products to capture a higher price from those market segments willing and able to pay for the more desirable attributes of the differentiated product. Identification of these market segments and their characteristics through preference studies is essential to identification of the specific types of attributes that will be most successful to emphasize in differentiated products. Program initiatives at the UAPB Aquaculture/Fisheries Center are actively addressing both of these fundamental strategies for the catfish industry.

Aquaculture in Arkansas can roughly be divided into two broad segments, the catfish industry, and the bait and ornamental fish industry. Each of these segments has its own trade association. The UAPB Aquaculture/Fisheries Center divides its aquaculture Research and Extension resources into programs designed to address and meet needs and issues of each of these two industry segments. Thus, there are two major priority program areas for Research and Extension programs within the Aquaculture/Fisheries Center: Catfish Production and Management and Baitfish Production and Management.

In 2006, the UAPB Aquaculture/Fisheries Center focused its Research and Extension efforts on various components of the two strategies described above to enhance competitiveness of Arkansas aquaculture. Within the Catfish Production and Management program area, the UAPB Aquaculture/Fisheries Center focused on: 1) Market Preferences for Farm-raised Catfish; 2) Improved Management Options to Improve Efficiencies and Lower Costs; 3) Catfish Disease Diagnosis and Prevention; 4) Increasing Catfish Production Efficiency; 5) Processing Plant Data Collection and Record Keeping; 6) Fish Farm Data Collection and Record Keeping; 7) Electrical Costs of Aeration; 8) Impacts of Drift of Herbicide on Fish Pond Water Quality; 9) Nutrition and Feeding Strategies to Improve Production Efficiency and Product Quality of Catfish; 10) Development of Methodology to Assess Broodstock Diets for Channel Catfish; 11) Improving Catfish Pond Sampling to Improve Inventory Management; and 12) Improving Spawning Practices for Channel Catfish.



Within the Baitfish Production and Management program area, Research and Extension efforts were focused in the following specific areas: 1) Bait, Ornamental, and Sport Fish Disease Diagnosis and Prevention; 2) Fish Health Inspection and Certification; 3) Detection and Characterization of Aquareoviruses from Cyprinids; 4) Rapid Diagnosis of Viral Diseases in Cyprinids; 5) Developing Hatchery Methods for Baitfish; 6) Nutrient Management in Commercial Baitfish Ponds; 7) Fish Farm Data Collection and Record Keeping; 8) Baitfish Research Verification; 9) Identification of Key Nutrients in Baitfish Broodstock Diets to Improve Egg and Larval Quality; 10) Baitfish Production and Water Quality; 11) Live Fish Transport and Retail Handling; 12) Aquatic Plant Management; and 13) Impacts of Herbicide Drift on Fish Pond Water Quality.

### **Goal 2 – A safe and secure food and fiber system.**

The Agriculture Department supports one Extension program [Hazard Analysis and Critical Control Points (HACCP) Training and Education] under Goal 2. This Extension program established HACCP training for small meat and poultry processors in Southeast Arkansas.

The Families First – Nutrition Education and Wellness System (FF-NEWS) Extension Program is a comprehensive, culturally sensitive nutrition education intervention program for food stamp recipients and conducted under this goal.

### **Goal 3 – A healthy, well-nourished population.**

One research program (Vegetable and Herb Production) supported by the Agriculture Department, one research program supported by the Human Sciences Department and one Extension program are conducted under Goal 3. Each of these programs are aimed at increasing the nutritional diets of individuals while recognizing changing production practices and eating habits.

### **Goal 4 – An agricultural system which protects natural resources and the environment.**

One animal research program and one integrated Extension and Research program were supported by the Agriculture Department under Goal 4. The small-ruminant management program is centered on goat production as an alternative to cattle, in both a pasture and confined system, as a more environmentally friendly animal production operation.

The integrated Extension and research program combined swine waste utilization with ornamental cut-flower production. Industrial waste (coal fly-ash) was also utilized in the construction of the wet-land area designated for flower production.

### **Goal 5 – Enhanced economic opportunity and quality of life for Americans.**

Two agricultural Extension programs, one research program in Human Sciences and five 1890 Extension programs were conducted under Goal 5. The Extension programs include two in agriculture, one in aquaculture and fisheries and one in human sciences. The Extension program recreational fishing in the Delta conducted by the Aquaculture/Fisheries Center is an integrated Research and Extension program including eight different projects related to the overall theme.

**Goal 1 - An Agricultural System That Is Highly Competitive in the Global Economy  
Research Program 1 – Crop Protection System**

**Key Themes: Agricultural Profitability, Innovative Farming Techniques  
Focus Areas: Improves Pest Control and Food Quality and Protection**

- a. Brief description of activities** – Different colored mulches, black, silver, red, and green were evaluated in the production of seeded bush beans and sweet corn, and zucchini, yellow straight neck squash, and cucumbers which were seeded and transplanted. Plots were picked twice weekly for seven weeks. In 2005 and 2006, weed growth under red mulch was considerably more than the other colored mulches which may have impacted yields.

Alternative insecticides (Bio Neem, neem oil; BotaniGard, *Beauveria bassiana*; Conserve, spinosad; Garlic oil, M-Pede, potassium salts of fatty acids; Safer Soap, potassium salts of fatty acids; Ultra fine Oil, paraffinic oil), a synthetic organic insecticide (Asana), were evaluated for the control of potato aphid in tomatoes. A prespray estimate of aphid density, 0 = none, to 5 = 50% of plant leaves with aphids, and post spray estimates were used to evaluate insecticides. Individual plants with potato aphids were followed from pre-spray counts to harvest. Alternative insecticide treatments were assigned to plots based on number of plants with aphids, the insecticides which reduced aphid numbers the most in 2005 tests were sprayed on plots with the highest number of infested plants.

- b. Impact(s)** – Efficacy of alternative insecticide can vary depending on the insect pest but generally considered more environmentally friendly than synthetic organic insecticides. Potato aphid numbers were reduced by alternative insecticides but not at the same levels as for the “restricted use” insecticide, Asana. However, results of past tests have not been consistent with this years test.

Vegetable yields were higher using dark colored mulches such as black, green and silver when compared to red or no mulch. Transplanted vegetables produced yields 1 to 2 weeks earlier than when seeded. Transplanted cucumbers, yellow squash, and zucchini yielded 79, 52, and 24%, respectively, more than plants grown from seed. The differences in yield can be weighed against the costs of transplants with the highest returns in cucumbers and lowest in zucchini. The cost of production can be limiting when utilizing transplants. Cucumbers would return the most for the increased investment.

- c. Scope of Impact** – National
- d. Funding** –
- |                 |           |
|-----------------|-----------|
| Federal Funding | \$100,301 |
| State Matching  | \$ 65,508 |
| Other           |           |
| Total           | \$165,809 |

**Contact Information:**

Name: Yong I. Park  
Title: Assistant Professor  
Affiliation: University of Arkansas at Pine Bluff  
Department of Agriculture  
1200 North University Drive, Mail slot 4913  
Pine Bluff, AR 71601  
Phone: (870) 575-7245  
Fax: (870) 575-4629  
Email: parky@uapb.edu

## **Goal 1 - An Agricultural System That Is Highly Competitive in the Global Economy Research Program 2 –Alternative Crop Production**

### **Key Themes: Agriculture Profitability and Small Farm Viability**

#### **Focus Areas: Plants and Plant Products**

**a. Brief description of activities** - A Field plot study that evaluated the effect of herbicide use on southern pea yield was conducted. The test was replicated 4 times and arranged in a split plot design with varieties as main plot and weed control treatments as subplots. Both fresh pods and dry peas were hand harvested for yield determination. Enterprise budgets were developed that can be used to measure the increased profit potential of using herbicide for weed control in southern peas. Southern pea variety tests were conducted at three locations in Eastern Arkansas. An irrigation study comparing furrow irrigation vs. no irrigation on southern pea yield was conducted at the Lonoke site. Previously tested cultivars and breeding lines were evaluated for yield, and growth traits at two locations (Pine Bluff and Lonoke). In the 2006 trials eight advanced local southern pea cultivars were selected and evaluated for fresh pea production in the Pine Bluff area. Another set of eight advanced varieties were added to the original eight varieties and evaluated at the Pine Bluff and Lonoke locations for dry pea production. The trials were planted on June 7, 2006 at Lonoke and June 15, 2006 at Pine Bluff. A randomized complete block (RCB) design with four replicated was used. Data were collected on Dates of flowering, Fresh pod yield, Biomass, and Dry-mature seed yield. Data collected were analyzed using the Analysis of Variance (ANOVA). Pearson correlations ( r ) between selected traits were also calculated.

**b. Impact(s)** - Yields of peas (fresh pod) were increased from 5 to 35% (average increase 20%) following the use of Treflan and Pursuit herbicides for weed control. On a per acre basis yield increases ranged from 5.9 to 44.1 bu/A (average increase 25.0 bu/A). The level of response to herbicide use was also related to weed pressure in the test plots. Test plots in 2006 were somewhat heavily infested with broadleaves (morning glory, cutleaf ground cherry, prickly sida) and as a result Treflan produced only 5.9 bu/A yield increase above the weedy check, or 4.7% increase. Pursuit herbicide treatment plots produced an average of 38.2 bu/a increase in fresh pod peas than Treflan treated plots. This was attributed to significantly better broad leaf weed control of Pursuit.

Enterprise budgets were developed for southern peas (fresh market). Fresh pod yield for LA purple hull peas (quick pick variety) (with Treflan) was 123 bushels per acre. The returns above total specified expenses were \$907.95 per acre. Results suggested that any time southern peas can be sold for more than \$6.62 per bushel when yields are 123 bushels per acre, a profit is being made. A yield of 58.15 bushels per acre is needed to cover all costs at an output price of \$14.00 per bushel. A yield of 100 bushels per acre (a good yield for limited resource farms) would produce a profit of \$585.95 per acre. Yield averages across years and varieties were 111.8, 128.3, and 155.2 bu/a for Check; no weed control, Treflan, and Pursuit, respectively. The returns above total specified expenses for Check, Treflan, and Pursuit use were \$756.75, \$982.15 and \$1,343.35 per acre, respectively. Thus, using Treflan and Pursuit herbicide would return \$225.40 and \$586.60 per acre above the Check, respectively. Other small farms in the Lower Mississippi Delta region should be able to reap similar per acre benefits from the use of herbicides.

Dry shelled pea yields averaged (16 varieties) 1280.8, 1305.0 and 974.3 lbs/A at Pine Bluff, Marianna and Lonoke locations, respectively. Irrigation increased dry pea yield by 72.2 Bu/A or 10.0 % over no irrigation. Yield increases from irrigation varied with pea variety from 42.0 % (Ark. Blackeye to 0% Top Pick). Yield increases from irrigation are more likely to be received when peas are planted in late June and early July, in the Lonoke area due to normal rainfall patterns.

Some pea varieties were found to be well adapted for the Pine Bluff environments while others would perform better at Lonoke. The Top Pick variety performed well at Pine Bluff and Lonoke for dry peas and at Pine Bluff for fresh peas. There was no significant difference between dry pea yields at both sites. Top Pick is also an excellent variety for fresh pea production at Pine Bluff, with average fresh pea yield of 1271lbs/A. The variety, “Early Scarlet” could be developed specifically for fresh pea productions at Pine Bluff, with an average fresh pea yield of 1492 lb/A. With respect to dry pea production, the trials indicate the Lonoke conditions may not be suitable for “Early Scarlet” variety. Dry pea yield was significantly lower in Lonoke (210.6 lb/Ac) than in Pine Bluff (578.5lb/A). The Cultivar PS88S 203B is apparently not favored by the Pine Bluff and Lonoke conditions. Yields of 47.8lb/Ac and 147.3lb/A respectively, ranked lowest at both sites. No significant correlation existed between combined Biomass, Dry pea yield and flowering dates of pea varieties at both Pine Bluff and Lonoke sites. However, a strong positive correlation (0.67) exists between fresh pea and dry pea yields at Pine Bluff. This suggests that the variety which produces high fresh peas at Pine Bluff will likely produce high dry pea yield as well. There are negative significant correlations between flowering date and fresh pea (-0.47) and dry pea (-0.43) yields, suggesting that early flowering may not necessarily result in high yields among entries.

- c. Scope of Impact -** State and Regional—Small, limited-resource farmers in Arkansas and the lower Mississippi region
- d. Funding -**
- |                 |           |
|-----------------|-----------|
| Federal Funding | \$157,308 |
| State Matching  | \$102,740 |
| Other           |           |
| Total           | \$260,048 |

**Contact Information:**

Name: Tracy Dunbar  
 Title: Associate Professor  
 Affiliation: University of Arkansas at Pine Bluff  
 Department of Agriculture  
 1200 North University Drive Mail slot 4913  
 Pine Bluff, AR 71601  
 Phone Number: (870) 575-7142  
 E-Mail: [dunbart@uapb.edu](mailto:dunbart@uapb.edu)

**Goal 1 – An Agricultural System That Is Highly Competitive in the Global Economy  
Research Program 3 – Minimally processed value-added products**

**Key Theme: Adding Value to Agricultural Products**

**Focus Areas: Quality and safety of fresh-cut fruit and vegetable products**

- a. Brief description of activities** – A survey questionnaire was mailed to local farmers/growers to determine which fruits and vegetables they have an interest for developing fresh-cut products. Development of minimally processed/value-added products from fruits and vegetables is a new research program. The project focuses on post harvest quality and safety of fresh-cut sweet potato products as the initial area of study. Literature reviews were completed in the area of effects of anti-browning agents, antimicrobial agents, sanitizers and edible films under modified atmosphere packaging, and post harvest treatment and packaging on the survival and growth of pathogens including *Listeria monocytogenes* and *Escherichia coli* O157:H7 on fresh-cut produce. A preliminary experiment, using Hunter color measurements was performed to determine the effects of several anti-browning agents on sliced or shredded sweet potatoes. However, the instrument was faulty and was sent for repair. This experiment will be repeated.
- b. Impact(s)** – This study will expand to various fruits and vegetables available in Arkansas. Fresh-cut fruits and vegetables have been successful in the marketplace because of the value added to the product through its preparation and delivery in a ready-to-eat condition. Success of the project will help local farmers/growers seek out and expand alternative value-added market for better quality fresh-cut fruits and vegetables.
- c. Scope of Impact** – Region
- d. Funding** -
- |                 |          |
|-----------------|----------|
| Federal Funding | \$44,119 |
| State Matching  | \$52,746 |
| Other           |          |
| Total           | \$96,865 |

**Contact Information**

Name: Jaheon Koo  
Title: Assistant Professor  
Affiliation: University of Arkansas at Pine Bluff  
Department of Agriculture  
1200 North University Drive  
Mail Slot 4913  
Pine Bluff, AR 71601  
Phone: (870) 575-7139  
Fax: 870-575-4629  
Email: [kooj@uapb.edu](mailto:kooj@uapb.edu)

**Goal 1- An Agricultural System That Is Highly Competitive in the Global Economy  
 Research Program 4 – Efficiency and Profitability of Hog Farms – Production Techniques to  
 Improve Efficiency and Profitability of Hog Farms in Southeast Arkansas**

**Key Theme: Animal and Animal Products**

**Focus Area: Sustainable Agriculture**

- a. Brief description of activities** – Work with small independent hog producers is continually requested by members of the Agriculture Advisory Committee. This project was designed to meet that request. Facilities and equipment needed for the research component of this project were finalized and five sows were bred late in 2006 and piglets (experimental animals) expected early in 2007, in time for the start of the experiment at the UAPB Farm. However, a change in PI slowed down the pace of implementation for this project. The new PI and team charged with the implementation of this project have worked on the design and source of animals, and feeds to be tested at the UAPB Farm. Animals are now in the experimental pens and data collection is being done in a timely manner.
- b. Impact(s)** – The project is in the initial phase and no results are available. However, the project is expected to identify a number of issues of concern related to management practices for small and limited resource hog producers. Constraints related to hog production will be addressed. The project is expected to develop cost-effective production strategies and the best alternatives for efficient and sustainable hog production. The project will develop market surveys and enterprise budgets that fit the small and limited resource farm situation, identifying best hog enterprise combinations that maximize net returns for a fixed amount of land, capital and management resources. Experimental results and recommendations will be disseminated to producers and other stake holders by March 2008 through publications and educational meetings.
- c. Scope of Impact** – State and Regional
- d. Funding -**
- |                 |           |
|-----------------|-----------|
| Federal Funding | \$ 74,563 |
| State Matching  | \$ 48,698 |
| Other           |           |
| Total           | \$123,261 |

**Contact Information:**

Name: Ondieki James Gekara  
 Title: Assistant professor of Animal Science  
 Affiliation: University of Arkansas at Pine Bluff  
 Department of Agriculture  
 1200 North University Drive  
 Mail Slot 4913  
 Pine Bluff, AR 71601  
 Phone Number: (870) 575-7253  
 Fax Number: (870) 575-4629  
 E-Mail: gekarao@uapb.edu

## Goal 1 – An Agricultural System That Is Highly Competitive in the Global Economy Research Program 5- Engineering Insect Resistance in Cowpea

### Key Theme: Plant Breeding, Genetics

### Focus Areas: Biotechnology

- a. Brief description of activities** - Cowpea is a highly recalcitrant nutrient-rich leguminous vegetable crop. Efforts to genetically transform cowpea with insect resistant genes remains a challenging task due to lack of an efficient regeneration system. We have screened four cultivars for the regeneration response to various growth regulators using explants such as cotyledons, embryonal axes and shoot meristems. No shoots were regenerated from the cotyledon explants while embryonal axes produced only 2-17% of plantlets on Murashige and Skoog (MS) medium containing 4.4 – 22.2  $\mu\text{M}$  benzylaminopurine (BA) and zeatin (2.3  $\mu\text{M}$ ). However, shoot meristems were an excellent source for efficient regeneration of plants in cowpea. Shoot meristems were isolated from embryos that were precultured for 3-5 days on MS medium containing 8.9  $\mu\text{M}$  BA. The isolated shoot meristems were cultured on MS medium containing 0.89  $\mu\text{M}$  BA. After 3-4 wks, multiple shoots were separated from the explant and cultured on half-strength MS medium for elongation and rooting. More than 90% of the regenerants formed roots. The rooted plantlets were transferred first to peat pellets and subsequently to the greenhouse. The plants were allowed to flower and fruit. No phenotypic and genotypic abnormalities were observed. The efficiency of regeneration in all four cultivars ranged from 76-87% demonstrating a significant improvement over the published protocols (1-32%). At least 6-7 plantlets were obtained from each meristem. The protocol using shoot meristems is simple, efficient, rapid and genotype-independent and is currently being used to produce transgenic plants particle bombardment.
- b. Impact(s)** - The efficiency of plant regeneration in four varieties of cowpea (Early Scarlet, Quick Pick, Coronet and AR87-435-68) ranged from 76-87% demonstrating a significant improvement over the published protocols (1-32%). Higher frequency of regeneration will significantly improve our ability to obtain insect resistant transgenic cowpea plants.
- c. Scope of Impact** - Cowpeas that resist various insects will greatly benefit limited-resource, small acreage cowpea farmers in Arkansas. The results from this project will also benefit cowpea farmers from other states in southern US.
- d. Funding** -
- |                 |           |
|-----------------|-----------|
| Federal Funding | \$ 91,414 |
| State Matching  | \$ 59,704 |
| Other           |           |
| Total           | \$151,118 |

### Contact Information:

Name: Muthusamy Manoharan  
Title: Assistant Professor  
Affiliation: Department of Agriculture  
University of Arkansas at Pine Bluff  
Pine Bluff, AR 71601  
870-575-8543  
870-575-4629  
E-mail: manoharanm@uapb.edu

## Goal 1 – An Agricultural System That Is Highly Competitive in the Global Economy Extension Program 1 – Adoption of New Best Management Practices

### Key Themes: Innovative Farming Technologies, Precision Agriculture

### Focus Areas: Improved Production Practices for Limited Resource Producers

- a. **Brief description of activities** – In a stakeholders meeting during 2004, participants said “the lack of rapid adoption of new best management practices” is one of the factors likely to affect their row crop operations in the future. Demonstrations were designed to document best management practices and to assist farmers in adopting new practices.

The Conventional versus Round-up Ready soybean demonstration was moved from fields 6A and 6B (2005 crop) to 11D (7.2 acres) and 11E (6.8 acres) on a Calloway silt loam soil (Fine-silty, mixed, active, thermic Aquic Fraglossudalfs). Both fields were furrow irrigated two (2) times during the growing season. Field 11D was planted in Round-up Ready (RR) soybeans (Delta G row 5830). The production cost per acre (seed - \$30.34 + herbicides - \$8.76 + fertilizer - \$25.40 + harvesting - \$35.00 + cultural practices - \$91.53 – disk harrow 2X, harrow, plant, cultivated, spraying, irrigation) was \$156.03. The average yield was about 9 bushels/acre less than in 2005 for RR soybeans (21 bushels/acre) and they sold for \$6.25/bushel or \$141.65/acre. This gave a loss of **\$14.28/acre** or **\$102.82** for the field. Field 11E was planted in conventional soybeans (Hutchinson). The production cost per acre (seed - \$14.12 + herbicides - \$9.68 + fertilizer - \$25.40 + harvesting - \$35.00 + \$91.53 – cultural practices – disk 2X, harrow, plant, cultivated, spraying, irrigation) was \$140.73. The average yield for conventional soybeans was about 25 bushels/acre (about 20 bushels/acre less than in 2005 and they sold for \$6.25/bushel or \$168.75/acre. This gave a net profit of \$28.02/acre or \$190.54 for the field. Yields were lower than last year and were probably affected by planting (June 13 RR & 14 Hutchinson) late due to a wet spring. Also, the area had a hot and dry summer and there may have been problems with nematodes, however, there was no visible sign of damage. Results were probably skewed because the weed pressures in these fields have been reduced due to rotations of rice and Round-up Ready soybeans over the years. Thus, the conventional beans probably benefited because additional and more costly herbicides were not required on Field 11E. Again, the RR soybeans yielded less than the conventional soybeans. We will monitor to see if this is a trend. Every attempt will be made to get Delta Grow 5830 and Hutchinson varieties for planting during the 2007 growing season.

A Conventional versus No-Till rice demonstration was conducted on two adjacent plots in Field 11F on a Calloway silt loam soil. The conventional rice was produced at a cost of \$489/acre and the no-till rice cost \$476/acre to produce. The cultural practices (disk 2X, land plane, harrow, drill @ 7” spacing, pull levees, flying service for herbicide, fertilizer, and insecticide) for the conventional rice cost was \$79/acre and \$74 for the no-till rice. The no-till plot did not require any disking or harrowing, but the cost was offset by using 2 applications of Roundup Ultra Max as a burn-down and renting a no-till drill for planting. The inputs (seed, herbicides, fertilizer, insecticides, and irrigation) and harvesting for conventional rice was \$410/acre and \$402/acre for the no-till rice. The yield on the conventional rice was 155 bushels/acre and the yield on the no-till plot was 174 bushels/acre. If we assume an estimated selling price of \$3.50/bushel, the income from the conventional rice would be \$544/acre and that of the no-till would be \$609/acre. This would give an increased income of \$65/acre for the no-till plot as compared to the conventionally produced rice. Additionally, the physical properties of the soil should be improved under the no-till system.

- b. **Impacts** – This is the second year of the study and some trends are emerging. The RR soybeans experienced lower yield less than the conventional beans during both years. More work will need to be done to see if the trend persists. Roundup ready technology has proven very effective in controlling weed infestations and it has been adopted by approximately 80% of the limited



resource farmers in the area according to the Director of the 2501 Small Farm Program. This is the first year for the rice demonstration and results look promising indicating an increased income of \$65/acre for the no-till plot as compared to the conventionally produced rice. These results will be included in the Farm Sense Newsletter that is published by the 2501 Program and other outlets that may become available.

**c. Scope of the Impact – Regionally**

<b>d. Funding -</b>	Federal Funding	\$ 63,586
	State Matching	\$261,983
	Other	
	Total	\$325,569

**Contact Information**

Name: Leslie J. Glover, Ph.D.  
Title: Associate Dean – Outreach and Technology Transfer  
Affiliation: School of Agriculture, Fisheries and Human Sciences  
1200 N. University Drive  
Mail Slot 4906  
Pine Bluff, AR. 71601  
E-Mail: [glover\\_l@uapb.edu](mailto:glover_l@uapb.edu)  
Phone Number: (870) 575-8822/8828  
Fax Number: (870) 575-4687

**Goal 1 – An Agricultural System That Is Highly Competitive in the Global Economy**  
**Extension Program 2 – Beef Herd Improvement**

**Key Theme: Agricultural Competitiveness**

**Focus Areas: Collaboration among agencies and other programs**

- a. Brief description of activities** – Collaborative efforts with Arkansas Land & Farm Development Corporation (ALFDC) in East Arkansas and the Silas H. Hunt Foundation, with the UAPB Small Farm Program in Southwest Arkansas are continuing.

During FY '06 three (3) production meetings were held at AL&FDC headquarters and one field day was conducted with their cattle group. During FY '05 and FY '06 four (4) trips were made to southwest Arkansas for office visits and farm visits with producers working with the Silas H. Hunt Foundation and the UAPB Small Farms Program. Plans are to continue working with both groups in FY '07 on educational programs and on-farm demonstration work. Activities also continued with other producers on cow herd performance test work and general herd management.

- b. Impact(s)** – The main impacts with these two groups (ALFDC and Silas H. Hunt Foundation/UAPB Small Farms) during FY '05 and '06 has been in the areas of conducting meetings, farm visits, providing counseling on herd and farm problems, providing educational materials, and developing partnerships.

Working with producers in these two areas of the state, the short term results have been aimed at developing an awareness and knowledge of animal management practices to improve their herds. Long range impacts starting in FY '07 are aimed at adoption of new and improved management practices along with more enlightened decision making with the end result being increased farm profits or at least being competitive in the livestock industry.

Work has continued with several other producers. One of these is on the cow herd performance test program. In FY '06 the herd average adjusted weaning weight was 569 pounds with the bulls averaging 589 pounds and the heifers averaging 557 pounds. During FY '06 this producer has sold five young bulls to other cattlemen for herd sires and has one bull listed in the Fall '06 Angus Sire Summary. He has adopted many management practices and has been able to stay in the cattle business.

- c. Scope of Impact** - State of Arkansas (eight counties in East Arkansas, six counties in Southwest Arkansas)

<b>d. Funding -</b>	Federal Funding	\$100,964
	State Matching	\$ 45,828
	Other	
	Total	\$146,792

**Contact Information:**

Name: Robert J. Felsman, Ph.D.  
Title: Extension Livestock Management Specialist  
Cooperative Extension Program  
Address: 1200 North University Drive, Mail Slot 4966, UAPB  
Pine Bluff, AR 71601  
Telephone: 870-5757214  
E-mail: [felsmanr@uapb.edu](mailto:felsmanr@uapb.edu)

## **Goal 1- An Agricultural System That Is Highly Competitive in the Global Economy Integrated Research and Extension Program 3 – Sustainable Vegetable Production**

### **Key Theme: Small Farms Viability, Agricultural Productivity**

#### **Focus Areas: Small Farms and their Contributions to Local Economics, Sustainability of Agriculture**

- a. Brief description of activities-** In Arkansas, growing conditions are favorable for optimal production of vegetables crops including sweet potatoes and small fruits. Small family farmers often grow sweet potatoes and small fruits for family consumption and plant additional acreage to enhance farm income. Therefore information on various aspects of the collected genotypes is essential in formulating an efficient selection and breeding program for yield increase in Arkansas.

Twelve sweet potato varieties/genotypes were studied at the University of Arkansas at Pine Bluff (UAPB) Agricultural Experiment Farm in 2005 and 2006. The varieties/genotypes differed significantly in almost all yield contributing parameters studied. Maximum U.S. #1 grade yield was observed in B 94-14, and NC 98-608, while minimum in MS-K39 and W-370. Highest Jumbo sized storage root was found in B 94-14 which was statistically similar to that in Georgia Jet and 94-96; while minimum in W-370 and MS-K39. Genotype B 94-14 gave maximum marketable yield which was significantly higher than other genotypes studied. The second highest marketable yield was recorded for genotypes NC 98-608 which was followed by Georgia Jet, 94-96, Beauregard, MS-152, Hernandez, Kubuki, Coronet and Jewel. The lowest marketable yields were produced by MS-K39, W-370 and Darby, respectively. From the two years data it may be concluded that the sweet potato varieties/genotypes B-94-14, NC 98-608, Georgia Jet, 94-96 and Beauregard were found promising in respect to marketable yield, U.S #1 grade yield and jumbo sized storage root.

Snap beans require a relatively low initial investment and equipment for land preparation, planting and harvesting. Many small-scale and limited resource farmers in Arkansas grow southern peas, one of the most popular vegetables consumed in the Southern United States. The cultural practices of southern peas are similar to those of snap beans allowing farmers to use the same equipment for both crops. Snap beans, therefore, provide an ideal vegetable cash crop alternative for these farmers. Snap beans also offer good net profit returns per acre thereby which can contribute to the economic vitality of small-scale and limited resource farmers.

Six bush type snap bean cultivars were evaluated at the University of Arkansas at Pine Bluff (UAPB) Agricultural Experiment Farm sites in 2006. 'Ambra', 'Contender' and 'Caprice' showed higher yields than 'Dusky', 'Provider' and 'Blue Lake'. High temperatures and dry weather set in early during this experimental period. Initial observations showed that 'Ambra' performed better from crop establishment through yield. This study will be repeated in 2007.

Blackberries are adapted to all regions in Arkansas and can be grown with fewer inputs than most other fruit crops. This makes them ideal as an alternative small fruit crop for small-scale and limited resource farmers. The increasing demand for fresh blackberries and blackberry products provides a growing potential and opportunity for farmers to increase their small farm profitability. Evaluation of blackberry cultivars for growth performance, yield, berry quality and disease resistance is necessary.

Ten blackberry cultivars, Apache, Ouachita, Kiowa, Chickasaw, Navaho, Prime-Jan, Prime-Jim, Brazos, Rosborough and Triple Crown were planted in 2006. Evaluation characteristics to be determined in 2007 will include growth habit, disease problems, and ripening date. Yield data will include total yield per cultivar, berry size, and storage potential.

- d. Impact(s)** – Twelve sweet potato varieties/genotypes were studied in 2005 and 2006. Data were collected on yield and grades of sweet potatoes. These results will provide Arkansas farmers with information for making informed decisions on which sweet potato variety/genotype to plant that will optimize profits. Advanced sweet potato lines will be released soon.

In 2006, snap bean production concept was introduced to the Horton Community Vegetable producers in St. Frances County, Arkansas and the Pastoria Youth and Community gardeners in Pastoria, Arkansas. Both communities reported success in their production using currently locally recommended cultivars, ‘Provider’ and ‘Contender’. An on-farm yield demonstration is scheduled for 2007 in which the new cultivars, ‘Ambra’ and ‘Caprice’ will be evaluated.

One small-scale farmer was recruited for blackberry production. An initial 20 blackberry plants were established in 2006. First yields are expected in 2007.

<b>d. Scope of Impact-</b>	Eastern Arkansas	
<b>e. Funding -</b>	Federal Funding	\$ 52,383
	State Matching	\$ 34,212
	Other	
	Total	\$ 86,595

**Contact Information:**

Name: Shahidul Islam, Ph.D./ Obadiah, Njue, Ph.D.  
 Title: Associate Professor/ Extension Horticulturist  
 Affiliation: Department of Agriculture  
 University of Arkansas at Pine Bluff  
 1200 North University Drive  
 Mail Slot 4913  
 Pine Bluff, AR 71601  
 Telephone: (870) 575-7239  
 Fax: (870) 575-4629  
 E-mail: [lislams@uapb.edu](mailto:lislams@uapb.edu)

## **Goal 1- Integrated Research and Extension Program 3 – Catfish Production and Management**

**Key Theme: Aquaculture Niche Markets, Productivity, Improved Management**

**Focus Areas: Profitability, Biotechnology,**

- a. **Brief description of activities** - Catfish is the leading segment of U.S. aquaculture, contributing over 46% of the value of aquaculture production in the United States. Arkansas is the second leading catfish-producing state in the U.S. In 2006, the UAPB Aquaculture/Fisheries Center:
1. Provided The Catfish Institute with information on catfish buying patterns in different cities to design and select more effective advertising and public relations programs
  2. Identified management practices that improve catfish farm profits by 1.2% to 2.5%
  3. Demonstrated how to reduce use of copper sulfate 20-fold
  4. Saved catfish farmers \$5 million through treatment recommendations resulting from the trematode survey
  5. Successfully encouraged two hybrid catfish fingerling producers to adopt state-of-the-art ultrasound technology to improve the efficiency of producing hybrid fry
  6. Improved operating efficiency of a processing plant by developing a new data collection and reporting system on plant operations
  7. Reduced electrical costs on farms by assisting farmers to make adjustments in the number of accounts and timing of electrical usage to reduce the overall bill.

There were twelve individual Research and Extension projects that addressed the various needs in improving the overall efficiency, productivity and profitability of the catfish industry for the state of Arkansas. The impacts of the individual research projects are highlighted below:

b. **Impact(s)**

**Market Preferences for Farm-Raised Catfish**

Preferences for a 6 – fillet pack or a resealable bag were quantified through surveys of consumer households in the following cities: Birmingham, Memphis, Chicago, Jackson, New Orleans, Baton Rouge, Little Rock, Oklahoma City, Dallas, Houston and San Antonio. The Catfish Institute has used these survey results in the selection design and advertising and public relations programs.

**Improved Management Options to Improve Efficiencies and Lower Costs**

Mathematical programming models were developed to identify the optimal proportions of fingerlings and stockers for growout catfish production. The results of this study showed that, as long as farms had ample operating capital, it was most profitable to stock a mix of stockers and fingerlings in catfish growout ponds. However, catfish farms with restricted access to operating capital would be more profitable by stocking only fingerlings and not stockers. The more precise management decisions provided by this model enabled catfish farmers to improve profits by 1.2% to 2.5%, in real terms.

**Catfish Disease Diagnosis and Prevention**

The UAPB Fish Diagnostic laboratories handle more than 1,000 catfish diagnostic cases per year that prevent estimated \$2,000,000/yr in fish losses. Trematode infestations can reduce net returns (profits) by 81% with only light infestations, thus treatment recommendations resulting from the trematode survey may have saved Arkansas catfish farmers almost \$5 million in the past year. New PCR tests to differentiate between common and exotic viral pathogens have been developed. Research and demonstrations have shown farmers how to reduce copper treatment costs by almost 20 fold by using crystalline copper sulfate rather than liquid forms.

### **Increasing Catfish Production Efficiency**

As a result of presentations at the Fish Farming Trade Show in Greenville, MS and the Aquaculture America 2006 Conference in Las Vegas concerning production methods being researched at UAPB, the following accomplishments have been realized:

1. Four on-farm demonstrations of fish grading technologies training five farm managers and 26 farm laborers
2. Two hybrid catfish fingerling producers adopting state of the art ultrasound technology to improve the efficiency of producing hybrid fry.
3. A proposal for an SBIR grant to further implement use of ultra sound technology

### **Processing Plant Data Collection & Record Keeping**

A fish processing plant database was modified and a user friendly program interface was created that would enable the catfish processing plant to generate specific analysis reports. Based on the system modifications the plan can now generate numerous new reports summarized on a weekly, monthly or annual basis for selected ponds, farms or for the entire processing facility. This improved plant efficiency will now be replicated in the company's other processing facilities located in Alabama.

### **Fish Farm Data Collection and Record Keeping**

Accurate size distribution estimates of fish inventories would help farm managers schedule fish harvest and manage cash flow. Research trials on commercial catfish farms have shown the catfish trawl as an inventory assessment tool easily captured large fish samples but results also suggest discrepancies between the trawl samples and other sampling methods. More research will be conducted in 2007 to test other aspects of the trawl.

### **Electrical Costs of Aeration**

Awareness of the numerous measures to control and reduce electric utility bills primarily from the costs of running paddlewheel aerators was created with local producers. A number of producers are adopting the recommendations and adjusting their pumping schedule to reduce the electric utility costs.

### **Herbicide Drift on Fish Pond Water Quality**

Farmers have long suspected drift produced problems in ponds but there was little data to substantiate their concerns. Studies have been conducted to determine the toxicity of common pesticides to catfish, baitfish, ornamental fish and shrimp. Studies have produced some preliminary results but studies are on going. Data collected from the studies can be used to demonstrate the safety of pesticides used in row crop agriculture related to aquaculture crops also grown in the area. Some exceptions may be disseminated to enable farmers to anticipate impacts and reduce adverse water quality. Increased public awareness of the safety of aerial application of these pesticides will allay environment concerns of the public.

### **Nutrition and Feeding Strategies to Improve Production Efficiency And Product Quality of Catfish**

Cuphea meal is a new, alternative feedstuff that has potential as a sustainable, economical replacement for wheat, rice, and corn ingredients in channel catfish diets. Data from research studies indicate that when standard ingredients in catfish diets such as wheat, rice or corn products become costly or limited, cuphea meal can be substituted at the indicated levels without reducing catfish performance. In addition, cuphea meal had a positive effect on body composition in fingerlings. If this effect carries through to market-size fish further impact could result from improved yield of edible product.

**Development of Methodology to Assess Broodstock Diets for Channel Catfish (Ictalurus Punctatus).**

Baseline data was gathered and protocols were developed to assess egg and fry production and quality from catfish fed a 32% protein commercial diet. Studies are on-going. Diets that maximize egg production and improve quality of fry could allow producers to reduce the number of broodstock now used to meet production demands. If diet increases the production of high-quality eggs per fish, then not only could the number of broodstock be reduced, but the associated feed costs would be reduced, and pond space could be reallocated for foodfish production.

**Improving Catfish Pond Sampling to Improve Inventory Management**

Computer simulations were conducted to answer questions in research projects related to fish sampling scenarios. The possible statistical tests were examined to compare the size distributions of fish samples. The statistical test of Kolmogorov-Smirnov was determined as the comparison method. Two abstracts were published to date and results were presented in scientific conferences. This project provides guidance for the field sampling methods and experimental designs for catfish inventory estimation studies conducted by the scientists as well as information helpful to the catfish producer.

**Improving Spawning Practices for Channel Catfish**

An indoor wet laboratory facility designed to house adult channel catfish was installed at the University of Arkansas at Pine Bluff Aquaculture Research Station. The first adult channel catfish were harvested from brood ponds and moved indoors to the new facility in February 2007. Spawning practices for catfish remain relatively uncontrolled and can be highly variable in producing fry and fingerlings. This research activity is designed to aide in optimizing artificial spawning techniques for the production of channel catfish fingerlings and hybrid catfish has potential impact throughout the community of Arkansas catfish farmers. Data from the first series of experiments have yet to be completed.

<b>c. Source of Funding</b>	<b>Research -</b>	Federal Funding	\$269,642
		State Matching	\$385,856
		Other	\$ 53,456
		<b>Total</b>	<b>\$708,954</b>
	<b>Extension -</b>	Federal Funding	\$255,205
		State Matching	\$306,610
		Other	
		<b>Total</b>	<b>\$561,815</b>

**d. Scope of Impact** Aquaculture industry in the south, catfish farmers in Arkansas

**Contact Information**

<b>Project Title</b>	<b>Contact Person</b>
Market Preferences for Farm-Raised Catfish  Improved Management Options to Improve Efficiencies and Lower Costs	<b>Name:</b> Carole Engle <b>Title:</b> Director <b>Affiliation:</b> Aquaculture/Fisheries Center <b>Address:</b> University of Arkansas at Pine Bluff 1200 N. University Dr. Mail Slot 4912 Pine Bluff, AR 71601 <b>E-mail:</b> <a href="mailto:cengle@uaex.edu">cengle@uaex.edu</a> <b>Telephone Number:</b> 1-870-575-8523 <b>FAX Number:</b> 1-870-575-4637
Catfish Disease Diagnosis and Prevention	<b>Name:</b> L. Dorman, A. Goodwin, J. Sadler, G. Selden <b>Title:</b> Extension Specialist <b>Affiliation:</b> Aquaculture/Fisheries Center <b>Address:</b> UAPB/Lake Village Fish Disease Lab 1652C Hwy 65 & 82 Lake Village, AR 71653 <b>E-mail:</b> <a href="mailto:ldorman@uaex.edu">ldorman@uaex.edu</a>

	<b>Telephone Number:</b> 1-870-265-5440 <b>FAX Number:</b> 1-870-265-2750
Increasing Catfish Production Efficiency	<b>Name:</b> David Heikes <b>Title:</b> Extension Specialist <b>Affiliation:</b> Aquaculture/Fisheries Center <b>Address:</b> University of Arkansas at Pine Bluff 1200 N. University Dr. Mail Slot 4912 Pine Bluff, AR 71601 <b>E-mail:</b> <a href="mailto:dheikes@uaex.edu">dheikes@uaex.edu</a> <b>Telephone Number:</b> 1-870-575-8143 <b>FAX Number:</b> 1-870-575-4638
Processing Plant Data Collection & Record Keeping  Fish Farm Data Collection and Record Keeping  Electrical Costs of Aeration	<b>Name:</b> Steeve Pomerleau <b>Title:</b> Extension Specialist <b>Affiliation:</b> Aquaculture/Fisheries Center <b>Address:</b> University of Arkansas at Pine Bluff 1200 N. University Dr. Mail Slot 4912 Pine Bluff, AR 71601 <b>E-mail:</b> <a href="mailto:spomerleau@uaex.edu">spomerleau@uaex.edu</a> <b>Telephone Number:</b> 1-870-692-3709 <b>FAX Number:</b> 1-870-575-4638
Herbicide Drift on Fish Pond Water Quality	<b>Name:</b> Peter Perschbacher <b>Title:</b> Associate Professor <b>Affiliation:</b> Aquaculture/Fisheries Center <b>Address:</b> University of Arkansas at Pine Bluff 1200 N. University Dr. Mail Slot 4912 Pine Bluff, AR 71601 <b>E-mail:</b> <a href="mailto:pperschbacher@uaex.edu">pperschbacher@uaex.edu</a> <b>Telephone Number:</b> 1-870-575-8145 <b>FAX Number:</b> 1-870-575-4637
Nutrition and Feeding Strategies to Improve Production Efficiency And Product Quality of Catfish  Development of Methodology to Assess Broodstock Diets for Channel Catfish ( <i>Ictalurus Punctatus</i> )	<b>Name:</b> Rebecca Lochmann <b>Title:</b> Professor <b>Affiliation:</b> Aquaculture/Fisheries Center <b>Address:</b> University of Arkansas at Pine Bluff 1200 N. University Dr. Mail Slot 4912 Pine Bluff, AR 71601 <b>E-mail:</b> <a href="mailto:rlochmann@uaex.edu">rlochmann@uaex.edu</a> <b>Telephone Number:</b> 1-870-575-8124 <b>FAX Number:</b> 1-870-575-4637
Improving Catfish Pond Sampling to Improve Inventory Management	<b>Name:</b> Yong-Woo Lee <b>Title:</b> Assistant Professor <b>Affiliation:</b> Aquaculture/Fisheries Center <b>Address:</b> University of Arkansas at Pine Bluff 1200 N. University Dr. Mail Slot 4912 Pine Bluff, AR 71601 <b>E-mail:</b> <a href="mailto:ylee@uaex.edu">ylee@uaex.edu</a> <b>Telephone Number:</b> 1-870-575-8157 <b>FAX Number:</b> 1-870-575-4637
Improving Spawning Practices for Channel Catfish	<b>Name:</b> Alf Haukenes <b>Title:</b> Assistant Professor <b>Affiliation:</b> Aquaculture/Fisheries Center <b>Address:</b> University of Arkansas at Pine Bluff 1200 N. University Dr. Mail Slot 4912 Pine Bluff, AR 71601 <b>E-mail:</b> <a href="mailto:ahaukenes@uaex.edu">ahaukenes@uaex.edu</a> <b>Telephone Number:</b> 1-870-575-8105 <b>FAX Number:</b> 1-870-575-4637



## **Goal 1- An Agricultural System That Is Highly Competitive in the Global Economy Integrated Research and Extension Program 3 – Baitfish Production and Management**

### **Key Theme: Aquaculture Niche Markets, Productivity, Improved Management**

### **Focus Areas: Profitability, Biotechnology, Improved Pest Control**

- a. **Brief description of activities** - The new hatchery technologies have helped farmers compete, but there are increasing concerns related to the potential for disease and aquatic nuisance species. In 2006, the UAPB Aquaculture/Fisheries Center:
1. Saved farmers 20% or more of their chemical costs through adoption of new, customized, biosecurity plans for their farms
  2. Generated an economic impact of \$350 million in fish exports from Arkansas that are allowed through the fish health inspection and certification program
  3. Improved farm management with handheld computer technology to improve record keeping
  4. Convinced a farmer, through the Baitfish Verification Program, to increase feeding and aeration rates to achieve higher and more profitable yields
  5. Identified less expensive diet options of vegetable meals and poultry fat for golden shiner broodstock diets
  6. Reduced costs and increased production through changes to bait and ornamental fish pond management through increased oxygen monitoring and management.

The impacts of the thirteen projects addressing Goal 1 an integrated Research and Extension program in Baitfish Production and Management are outlined below:

b. **Impact(s)**

#### **Bait, Ornamental and Sport Fish Disease Diagnosis and Prevention**

The UAPB laboratories handle more than 1,200 bait ornamental and sportfish diagnostic cases per year that prevent estimated \$3,000,000/yr in fish losses. Biosecurity publications and custom plans have helped farmers to safely acquire new broodfish and have prevented the occurrence of nationally important pathogens like KHV, SVCV, and VHS in Arkansas (pathogens responsible for millions in losses in other states). On farm demonstrations have shown which chemical treatment methods are most effective. These finding are likely to save farmers 20% or more of their chemical costs. For the first time, many Arkansas fish producers are disinfecting eggs with iodine (and formalin?) to prevent disease transmission. Research and regulatory assistance have led to the labeling of a new chemical compound for pond use. This compound kills invertebrate predators of fish, many of which also serve as intermediate hosts for fish pathogens.

#### **Fish Health Inspection and Certification**

Farmed fish must be shown to be free of diseases in order to move interstate or international. The majority of Arkansas fish exports travel under required inspection certificates provided only by the Aquaculture/Fisheries Center (more than 400 inspections per year). These exports have a farm gate value of over \$50,000,000 dollars per year and an economic impact in Arkansas of some \$350,000,000. More than 95% of all Arkansas bait and ornamental fish production acreage is working toward participation in the Certification Program. In FY 2006, the laboratories also assisted farmers in more that 23 other states.

#### **Detection and Characterization of Aquareoviruses from Cyprinids**

We have developed a PCR assay for the known member of this family and have identified, characterized, and developed assays for novel members discovered during this study. With these new assays, we are now able to determine the host range, prevalence, transmission, and pathogenicity of these viruses.

The host range of Golden Shiner Virus (GSV) has been extended to include 4 other fish species and is found in the wild. GSV is probably not important in golden shiners, but may cause losses in fathead minnows and grass carp. A newly discovered aquareovirus in this family causes serious losses in grass carp. There is yet no evidence that any of these viruses are important pathogens in golden shiners, but further studies are underway.

### **Rapid Diagnosis of Viral Diseases in Cyprinids**

We have developed and tested standard and quantitative PCR assays for KHV, GHV, FHMRV and have adapted and made quantitative an assay for SVCV. We can now test fish for these pathogens in 1 day. Rapid and effective testing of broodstock has helped to prevent the introduction of nationally important pathogens like KHV, SVCV, and VHS in Arkansas (pathogens responsible for millions in losses in other states). The GHV is now recognized as a serious pathogen and can be quickly detected in carriers and during active infections. Our assays are in use nationwide and in several other countries. We also provide the positive controls needed by other laboratories worldwide.

### **Developing Hatchery Methods for Baitfish**

A series of studies have been conducted to develop the various components of a new hatchery system for fathead minnows. The effect of broodstock density on egg production was examined, and it was determined that the equivalent of 500 kg /ha of fathead minnows could provide three million eggs every day, sufficient for stocking a 0.5 to 1.0-ha pond. Potential spawning substrate preference by male fathead minnows, egg adhesion to different substrates, and the effects of sodium sulfite exposure on fathead minnow eggs were also determined. Males did not exhibit substrate preference, but apparently preferred nests sites in well-aerated zones. A second trial found no nest location preference under uniformly favorable water quality conditions. Textured surfaces were found to retain 72 to 77 % of eggs, while over 60% of eggs did not stick to smooth nest materials. No significant difference was found in egg numbers between flat spawning substrates and substrates bent in a "C" shape. A 1.5% sodium sulfite solution was found to be equally effective in egg removal as a double-strength solution, and leaving eggs in the sulfite solution for up to 30 minutes did not significantly affect the hatching rate or percentage of deformed fry. Research results were disseminated through personal contacts, presentations at producer meetings, an Extension newsletter article, an article in an international hatchery newsletter, and a journal article.

### **Nutrient Management in Commercial Baitfish Ponds**

The majority of the \$38 million in farm-raised baitfish production within the United States occurs in Lonoke and Prairie Counties, Arkansas. A new line of research to determine appropriate nutrient applications for baitfish ponds was initiated this year. Pilot studies were conducted to develop protocols for nutrient limitation algal bioassays appropriate to commercial baitfish ponds and the laboratory. Bioassay experiments utilized natural phytoplankton assemblages. Factorial nutrient enrichment trials tested 3 levels each of nitrogen and phosphorus. Preliminary testing utilizing sodium nitrate and sodium phosphate as nutrient sources examined N concentrations of 0 – 2 mg/L and P concentrations ranging from 0 to 0.5 mg/L. The influence of initial concentration of natural algae (chlorophyll *a*) was examined (range of 0.1 to 4 micrograms/L). The relationship of chlorophyll *a* concentration as determined by chloroform-methanol extraction to fluorometer fluorescence readings was also determined. In the laboratory trials (23 C), algal bioassays required an incubation period of at least 96 hours. A prototype floating algal assay rack was developed and tested. Cooperating commercial baitfish producers have been identified and visited in preparation for the spring sampling period.

### **Fish Farm Data Collection & Record Keeping**

A database and computer software was developed to help the farm manager on an Arkansas baitfish farm collect data in the field with handheld computers and easily generate reports to assist with management decisions. The farm manager has been very excited about the

improvement in decision making with this use of technology and improved data collection. The project increased the awareness for a number of other farm managers related to the technology, and they have requested assistance to setup similar data acquisition systems. Work is on going to develop the proper programs for those new farms.

### **Baitfish Research Verification Program (BRVP)**

The objective of the Baitfish Research Verification was to verify the effect of the research based feeding recommendations on water quality, dissolved oxygen levels, and production of commercial golden shiner ponds utilizing full sized ponds rather than small research ponds. The BRVP increased the awareness of baitfish farmers of the fact that heavy algae blooms and critical dissolved oxygen levels can be observed in baitfish ponds even at low feeding rates. This information will benefit baitfish producers interested in improving their production and profitability.

The BRVP provided a unique insight into the baitfish industry that helped university researchers get a better understanding of current commercial practices and identify areas of golden shiner production that require further research. The BRVP convinced a farmer to increase feeding rates and aeration rates in a number of his baitfish ponds for the 2007 growing season.

### **Identification of Key Nutrients in Baitfish Broodstock Diets to Improve Egg and Larval Quality**

A series of feeding trials was conducted to develop diets to optimize spawning success in golden shiners and fathead minnows (FHM). There were no consistent diet effects on any of the parameters measured to indicate differential efficacy of the feedstuffs tested (animal or vegetable proteins, and poultry or fish oil) on production of eggs and fry of fathead minnow or golden shiner. Therefore, the least expensive options (vegetable meals and poultry fat) appear adequate for broodstock diets that support the desired egg and fry production of baitfish in ponds.

### **Baitfish Production and Water Quality**

In 2006, with our help, bait and ornamental fish producers reduced costs and increased production through changes to pond management and water quality management. The main continuing success in 2006 was the widespread increased understanding of the importance of oxygen management by our bait and ornamental fish producer clientele, and major capital investment by these same clients in aerators and monitoring equipment to manage early morning low oxygen conditions, and consequently to improve production.

### **Live Fish Transport and Retail Handling**

Lonoke is a hub for live fish transport and live fish leave there by air and by semi-truck. As a competitive marketing scheme, some Arkansas bait producers routinely replace fish that die in transit, up to the final point of sale at retail stores. This practice greatly reduces the incentive by middlemen to maintain optimum conditions. In 2006, in response to this problem the following was done:

- 50 individual consultations with commercial live-haulers were held related to maintaining acceptable water quality conditions on their trucks.

- The lab provided mail-in water quality diagnostics.

- Follow-up consulting services, to retail bait shop managers from across the continent regarding appropriate methods for holding live fish.

### **Aquatic Plant Management**

Approximately 200 individual consultations with county agriculture agents regarding aquatic plant identification and management were held. Additionally, advice on treatment of an additional 250 aquatic plant management cases was given. A series of field trials begun in 2005 to evaluate the use of gold fish in ponds for biological control of watermeal – one of the most persistent aquatic weeds in Arkansas farm ponds was continued. Preliminary results indicate that 35 lb/ac of

trotline goldfish are sufficient to provide long-term control of persistent, heavy infestations of watermeal on farm ponds in Arkansas.

<b>c.</b>	<b>Source of Funding</b>	<b>Research -</b>	Federal Funding	\$204,621
			State Matching	\$292,812
			Other	\$ 37,533
			<b>Total</b>	<b>\$534,966</b>
		<b>Extension -</b>	Federal Funding	\$228,113
			State Matching	\$274,061
			Other	
			<b>Total</b>	<b>\$502,174</b>

**d. Scope of Impact**                      Aquaculture industry in the south, baitfish farmers in Arkansas

**Contact Information**

<b>Project Title</b>	<b>Contact Person</b>
Bait, Ornamental, and Sport Fish Disease Diagnosis and Prevention  Fish Health Inspection and Certification	Name: J. Sadler , A. Goodwin, G. Selden Title: Extension Specialist Affiliation: Aquaculture/Fisheries Center Address:UAPB Fish Health Services 2001 Highway 70 East, P.O. Box 357 Lonoke, AR 72086 E-mail: jsadler@uaex.edu Telephone Number: 1-870-676-3124 FAX Number: 1-870-676-7847
Detection and Characterization of Aquareoviruses from Cyprinids  Rapid Diagnosis of Viral Diseases in Cyprinids	Name: Andrew Goodwin Title: Professor/Fish Pathologist/Assoc Dir Affiliation: Aquaculture/Fisheries Center Address:University of Arkansas at Pine Bluff 1200 N. University Dr. Mail Slot 4912 Pine Bluff, AR 71601 E-mail: <a href="mailto:agoodwin@uaex.edu">agoodwin@uaex.edu</a> Telephone Number: 1-870-575-8137 FAX Number: 1-870-575-4638
Developing Hatchery Methods for Baitfish  Nutrient management in commercial baitfish ponds	Name: Nathan Stone Title: Extension Specialist Affiliation: Aquaculture/Fisheries Center Address: University of Arkansas at Pine Bluff 1200 N. University Dr. Mail Slot 4912 Pine Bluff, AR 71601 E-mail: <a href="mailto:nstone@uaex.edu">nstone@uaex.edu</a> Telephone Number: 1-870-575-8138 FAX Number: 1-870-575-4638
Fish Farm Data Collection & Record Keeping  Baitfish Research Verification Program (BRVP)	Name: Steeve Pomerleau Title: Extension Specialist Affiliation: Aquaculture/Fisheries Center Address: University of Arkansas at Pine Bluff 1200 N. University Dr. Mail Slot 4912 Pine Bluff, AR 71601 E-mail: <a href="mailto:spomerleau@uaex.edu">spomerleau@uaex.edu</a> Telephone Number: 1-870-692-3709 FAX Number: 1-870-575-4638

<p>Identification of Key Nutrients in Baitfish Broodstock Diets to Improve Egg and Larval Quality</p>	<p>Name: Rebecca Lochmann Title: Professor Affiliation: Aquaculture/Fisheries Center Address: University of Arkansas at Pine Bluff 1200 N. University Dr. Mail Slot 4912 Pine Bluff, AR 71601 E-mail: <a href="mailto:rlochmann@uaex.edu">rlochmann@uaex.edu</a> Telephone Number: 1-870-575-8124 FAX Number: 1-870-575-4637</p>
<p>Baitfish Production and Water Quality  Live Fish Transport and Retail Handling Aquatic Plant Management</p>	<p>Name: H. Thomforde Title: Extension Specialist Affiliation: Aquaculture/Fisheries Center Address: UAPB Fish Health Services 2001 Highway 70 East, P.O. Box 357 Lonoke, AR 72086 E-mail: <a href="mailto:hthomforde@uaex.edu">hthomforde@uaex.edu</a> Telephone Number: 1-870-676-3124 FAX Number: 1-870-676-7847</p>
<p>Impacts of Drift of Herbicide on Fish Pond Water Quality</p>	<p>Name: Peter Perschbacher Title: Associate Professor Affiliation: Aquaculture/Fisheries Center Address: University of Arkansas at Pine Bluff 1200 N. University Dr. Mail Slot 4912 Pine Bluff, AR 71601 E-mail: <a href="mailto:pperschbacher@uaex.edu">pperschbacher@uaex.edu</a> Telephone Number: 1-870-575-8145 FAX Number: 1-870-575-4637</p>

**Goal 2 - A Safe and Secure Food and Fiber System Extension Program 4 --Families First-Nutrition Education and Wellness System (FF-NEWS) – Food Safety**

**Key Theme: Food Safety**

**Focus Area: Modifying Food Intake Behavior**

- a. **Brief description of activities**—The Families First – Nutrition Education and Wellness System (FF-NEWS) Program at the University of Arkansas at Pine Bluff is a comprehensive, culturally sensitive nutrition education intervention program for food stamp recipients. Food stamp recipients in 8 counties in the Delta Region of the state make up the target audience. The 56-week program encompasses four modules, with one focusing exclusively on food safety. This module includes instruction on food handling, storing and appropriate food preservation and preparation techniques.

FF-NEWS food safety education program emphasizes personal cleanliness, proper ways to handle foods, sanitation in food preparation and storage, and kitchen sanitation. All of these ways are essential in preventing food-borne illnesses. In FY2006, FF-NEWS staff made 1,082 contacts with local agencies for the purpose of developing partnerships, increasing client participation, and securing resources and technical experts to serve as guest speakers for the program. The program is in its 8<sup>th</sup> year of operation.

Coalitions are formed in each county. Stakeholders on the coalitions represent a cross section of the impacted clientele and communities, including food stamp participants. The coalitions assist in identifying target areas and program participants, implementation and evaluation strategies.

- b. **Impact(s)**  
A unique feature of the program is the partnership with the 1862 staff in the FF-NEWS counties. In these counties the 1862 family and consumer sciences agents also deliver nutrition education to food stamp recipients but report all of their efforts through the FF-NEWS Program. A primary outcome of the Food Safety phase of the program has been the issuance of certificates by the University’s Continuing Education Program. Some participants have used this certification for job advancement while others have used the certification to negotiate a higher beginning salary in food service establishments.

A major impact of the program has been increased understanding of food-borne illnesses and increased knowledge of appropriate food handling, storage, preparation and serving techniques. The staff conducted 592 educational sessions for food stamp recipients related to food safety and management practices; conducted 32 point-of-purchase demonstrations at grocery stores and farmers markets; used 476 educational exhibits at county fairs, commodity distribution centers; health departments, departments of human services; faith-based organization and medical clinics for program awareness. Multi-county agents conducted grocery store tours to teach participants how to keep food safe when shopping to avoid cross-contamination. Contacts from all food safety efforts were 9,895.

Summary evaluations of pre-and post-test suggest that the program has been highly effective in promoting safe food handling and storage practices among food stamp participants.

- c. **Scope of impact:** Arkansas

- d. **Funding**

Federal Funding	
State Matching	
Other	\$54,144
Total	\$54,144

**Contact Information:**

Name: Jacquelyn W. McCray, Ph.D.  
Title: Dean/Director  
Affiliation: School of Agriculture, Fisheries and Human Sciences  
Address: University of Arkansas at Pine Bluff  
1200 North University Drive, Mail Slot 4990  
Pine Bluff, AR 71601  
E-mail: mccrayj@uapb.edu  
Telephone Number: (870) 575-8529  
FAX Number: (870) 575-8033

Name: Irene K. Lee, Ph. D.  
Title: Associate Administrator-Programs  
Affiliation: School of Agriculture, Fisheries and Human Sciences  
Address: University of Arkansas at Pine Bluff  
1200 North University Drive  
Mail Slot 4966  
Pine Bluff, AR 71601  
Telephone: (870) 575-8530  
Fax: (870) 575-4679  
E-Mail: leei@uapb.edu

**Goal 2 – A Safe and Secure Food and Fiber System; Extension Program 4 – Hazard Analysis and Critical Control Point (HACCP) Training and Education**

**Key Theme: HACCP**

**Focus Areas: Food Safety, Food Quality**

- a. Brief description of activities** – A two-day basic HACCP workshop in conjunction with FoodProtech® (Stillwater, OK) has held on February 7 and 8, 2006 in the S.J. Parker 1890 Cooperative Extension Complex - S.A. Haley Auditorium at University of Arkansas with a grant supported by USDA/Food Safety and Inspection Service (FSIS). Targeted audiences included meat and poultry processors in South Arkansas and border areas of Louisiana and Mississippi. Online registration was open to the public through FoodProtech® website. Twenty two participants attended the workshop. Certificates were presented to participants following completion of the workshop. Training courses and materials accredited by the International HACCP Alliance meets USDA and FDA training requirements were used.
  
- b. Impact(s)** – This HACCP workshop established UAPB as a food safety and HACCP resource in Arkansas.

Workshop participants will be able to assist their companies with design and implementation of HACCP systems resulting in more wholesome and safer food products as well as provide training for their staff.

- c. Scope of Impact** – National

<b>d. Funding</b> -	Federal Funding	\$ 82,322
	State Matching	\$ 35,058
	Other	
	Total	\$117,380

**Contact Information:**

Name: Jaheon Koo  
Title: Assistant Professor  
Affiliation: University of Arkansas at Pine Bluff  
Department of Agriculture/Regulatory Science  
1200 North University Drive  
Mail Slot 4913  
Pine Bluff, AR 71601  
Phone: 870-575-7139  
Fax: 870-575-4629  
Email: [kooj@uapb.edu](mailto:kooj@uapb.edu)



### Goal 3 - A Healthy, Well- Nourished Population Research Program 6 – Herbs and Vegetable Production

#### Key Theme: Human Health, Human Nutrition, and Medicinal Plants

#### Focus Areas: Modifying Food Intake Behavior and Sustainability of Ag and Forestry

**a. Brief description of activities** – Nutritional intervention through introducing specialty vegetables and herbs in the diets for better health is the goal of this project. Research was designed to identify suitable varieties of bitter melon, bottle gourd, hot pepper and a few other exotic vegetables such as wax gourds and pumpkins. Several popular varieties and experimental lines of southern pea were analyzed for nutritional variability. Field and laboratory experiments were conducted to evaluate selected varieties for their production potential, nutritional qualities, and acceptability of the vegetables as cooked foods or salads. Four varieties of bitter melon were analyzed for protein qualities and functional properties. Phytochemical analyses were conducted at the Food Science Department of the University of Arkansas, Fayetteville. In a preliminary study, about fifty varieties/lines of hot pepper were analyzed for vitamins and antioxidant contents. Two varieties of bitter melon and two varieties of bottle gourd were used in cooking and taste testing experiments for the development of suitable recipes for consumer acceptance. Three recipes were re-evaluated for cooked bitter melons and bottle gourds. Samples from the campus population were used in the taste-testing of the cooked vegetables. In another set of experiments, selection for promising hot pepper varieties/lines for productivity and ornamental qualities were conducted in the variety development process.

**b. Impact(s)** – Two bottle gourd varieties and three bitter melon varieties are being utilized for further trials and demonstration. A remarkable range of variability of southern pea in minerals and amino acid components were identified that can be used in breeding programs. Proteins and phenolic compound analyses indicated that white varieties of bitter melon had relatively higher total proteins and phenolics in edible parts than green varieties, indicating that bitterness may not be associated with the color pigments. Selected varieties of hot pepper are available for outstation trials and demonstration. Preliminary analyses of the new hot pepper varieties/lines for vitamins and antioxidants revealed noticeable genetic variability exist in the populations. Bottle-gourd-chickpea soup and bitter-melon-beef stew were liked by 90% of the samplers for two consecutive years. A bottle gourd salad was liked by the samplers. One or two plants of bottle gourd and bitter melon can provide enough of this vegetable for a family. A number of tested recipes were identified for demonstration and food-intake nutritional studies using bitter melon and bottle gourd. Additional impact would include the economic benefit for small and limited resource farmers willing to plant the recommended varieties of bitter melon, bottle gourd, hot pepper, and improved varieties of southern pea. Moreover, these vegetables may increase health benefits for many of the target consumers especially minority elders.

**c. Scope of Impact** – Arkansas and the Southern United States

<b>d. Funding</b> –	Federal Funding	\$144,317
	State Matching	\$ 94,256
	Other	
	Total	\$238,573

#### Contact Information:

Name: Mohammad Jalaluddin, Ph.D.  
Title: Professor  
Affiliation: Department of Agriculture  
1200 North University Drive  
Mail Slot # 4913 – UAPB  
Phone Number: (870) 575-8117  
Fax Number: (870) 575-4629  
E-mail: [jalaluddinm@uapb.edu](mailto:jalaluddinm@uapb.edu)

### Goal 3 – A Healthy Well-Nourished Population; Research Program 7 – Health Benefits of Probiotic Bacteria

#### Key Themes: Human Nutrition, Human Health

#### Focus: Modifying Food Intake Behavior, Scientific Basis of Optimal Health

- a. **Brief description of activities** –Results from the questionnaire-survey were presented at the 1890 Annual Research Director Conference in 2006 and will be discussed at the 2007 annual meeting of the American Association of Family and Consumers Sciences. The questionnaire-survey estimates the rate of consumption of yogurt among participants and non-participants after the feeding study. Efforts are underway to reach more parents of preschoolers in Pine Bluff to educate them about the health benefits of yogurt containing probiotics.
- b. **Impact(s)** – This research results from a feeding study conducted in 2006 provided the following results:
- Exposure of children to yogurt during the feeding study resulted in a 63.7% increase (63.7% compared with 37%) of the number of children consuming at least one serving of yogurt per day and a tremendous increase (36.4% as compared with 7.4%) of children consuming 2 servings of yogurt per day.
  - Parents of the students who participated in the feeding study became more aware of the benefits of yogurts containing probiotics: 27.3% of these parents as compared to 3.7% considered the presence of probiotics as an important factor in their selection of yogurt in the grocery store.

While the study revealed that the exposure of children to yogurt may increase consumption of yogurt thus increasing calcium in their diet, price remains the most important factor in the parent selecting yogurt in the store. Thus, more effort is needed to educate parent on the nutritional benefits of yogurt containing probiotics.

Additional impacts from the project have been limited this year due to the appointment of researcher as acting chair of the department.

- c. **Scope of Impact** – Pine Bluff, Arkansas.
- d. **Funding -**
- |                 |           |
|-----------------|-----------|
| Federal Funding | \$103,599 |
| State Matching  | \$ 32,356 |
| Other           |           |
| Total           | \$135,955 |

#### Contact information:

Name: Makuba A. Lihono  
Title: Associate Professor  
Affiliation: Department of Human Sciences  
Address: UAPB  
1200 North University Drive  
Mail Slot 4971  
Pine Bluff, AR 71601  
E-Mail: [lihonom@uapb.edu](mailto:lihonom@uapb.edu)  
Phone Number: Telephone: 870-575-8812  
Fax Number: 870-575-4684

**Goal 3 - A Healthy Well-nourished Population; 1890 Extension Program 5 --Families First-Nutrition Education and Wellness System (FF-NEWS) – Diet and Health**

**Key Theme: Human Nutrition and Human Health**

**Focus Area: Modifying food intake behavior**

- a. **Brief description of activities**--The Families First – Nutrition Education and Wellness System (FF-NEWS) Program at the University of Arkansas at Pine Bluff is a comprehensive, culturally sensitive nutrition education intervention program for food stamp recipients. FF-NEWS is designed to help food stamp recipients and other low-income families select and prepare meals consistent with their cultural traditions while improving their family’s overall health. The program targets food stamp recipients in 8 counties In the Delta Region of the state. Coalitions are formed in each county. Stakeholders on the coalitions represent a cross section of the impacted clientele and communities. The coalitions assist in identifying target areas and program participants, implementation and evaluation strategies. This culturally sensitive nutrition education program pays specific attention to nutritional problems associated with southern, soul food, and Tex-Mex diets. The program encompasses four modules. The four modules include 56 lessons as well as demonstrations and tours. Lessons are taught to enhance participant’ understanding on food quality and basic food sanitation; nutrition, health and physical well-being; and resource management. A major focus of the program is the cooking schools that teach clients food preparation skills.

A unique feature of the program is the partnership with the 1862 staff in the FF-NEWS counties. In these counties the 1862 family and consumer sciences agents also deliver nutrition education to food stamp recipients but report all of their efforts through the FF-NEWS Program.

- b. **Impact(s)** -- A variety of evaluation methods were used to determine the knowledge and skill level of program participants. These included pre- and post- test and self-reporting by participants.

Nutrition education resulted in 186,232 contacts with program participants. Multi-county agents and 1862 staff conducted 1,840 educational sessions on diet and health with program participants. Total contacts for this effort were 8,123. Eight hundred fifty-five (855) requests were made by program participants for additional information on dietary quality.

As a result of this program, 3,500 program participants indicated the following changes to their diet/lifestyle.

*54% increased knowledge of resources to use for making healthful food choices*

*58% selected healthy food choices when eating out*

*53% reduced portion sizes*

*49% increased more fruits and vegetables in their diet*

*35% increased physical activity*

*52% selected foods low in salt and fat*

*87% practiced washing hands according to recommended procedures*

*56% buy fruits and vegetables when in season*

The comments below are typical of those received from program participants:

“I shop with a grocery list now .Before the class I did not.”

Ashley County

“I encourage my family members to practice good personal hygiene and sanitation.”

Jefferson County

“I wash my hands thoroughly after touching eggs, raw meat, fish, or poultry.”

Woodruff County

. “I wash dirty dishes and clean up spills before going on to the next task. When I am preparing foods, this keeps bacteria from spreading.

St. Francis County

“If I determine that a restaurant is not clean, I will not eat there.”

Drew County

“This class has taught me how to prepare and store foods properly.”

Desha County

“This class has taught me ways to save on my grocery bill.”

Jefferson County

“When Fruits and vegetables are in season I buy them. They cost less and the quality is good.”

Lincoln County

<b>c.</b>	<b>Scope of impact:</b>	Arkansas	
<b>d.</b>	<b>Funding</b>	Federal Funding	
		State Matching	
		Other	\$162,433
		Total	\$162,433

#### **Contact Information**

Name: Jacquelyn W. McCray, Ph.D.  
Title: Dean/Director  
Affiliation: School of Agriculture, Fisheries and Human Sciences  
Address: University of Arkansas at Pine Bluff  
1200 North University Drive, Mail Slot 4990  
Pine Bluff, AR 71601  
E-mail: mccrayj@uapb.edu  
Telephone Number: (870) 575-8529  
FAX Number: (870) 575-8033

Name: Irene K. Lee, Ph. D.  
Title: Associate Administrator-Programs  
Affiliation: School of Agriculture, Fisheries and Human Sciences  
Address: University of Arkansas at Pine Bluff  
1200 North University Drive  
Mail Slot 4966  
Pine Bluff, AR 71601  
Telephone: (870) 575-8530  
Fax: (870) 575-4679  
E-Mail: leei@uapb.edu

**Goal 4 – An Agricultural System Which Protects Natural Resources and the Environment  
Research Program 8 - Small Ruminant Nutrition/Management**

**Key Theme: Sustainable Agriculture**

**Focus Areas: Small Farms and Their Contributions to Local Economies, and  
Sustainability of Agriculture and Forestry**

- a. Brief description of activities** - In 2006, a free range styled browsing management system was used in estimating the effect of stocking density on browsing intensity and growth performance of mixed breeds and ages of goats. Two plots were used. Plot A was two acres which was stocked with 20 goats, including 5 mature goats (10 goats per acre) and plot B was five acres stocked with 30 goats, including 8 mature goats (6 goats per acre). The pastures were over-grown with Arkansas native (unseeded) grasses, shrubs and Forbes at advanced stages of maturity and late seed stage of maturity. The female and wethers were mature and juvenile crossbred Boer goats, and crossbred Spanish-Nubian-Dwarf (SND) goats. Total dried matter of forage in the two-acre pasture was estimated before the animals were stocked. The browsing trial lasted for The animals were stocked in the pasture for 77 days (September 28, 2006 to December 14, 2006. All animals received water and trace mineral salt ad-libitum. The animals received supplemental grain concentrate at the rate of one percent body weight. Growth Performance of animals for the difference stocking rates were compared. The result showed that both mature and juvenile animals in pastures with stocking rate of 6 goat per acre (plot B) had greater weight than those stocked at 10 goats per acre (plot A). Average total percent body weight gain for mature goats in plot B was 0.61% (or 0.09% per week) as compare to plot B with - 6.77% (or 0.97% per week). On the other hand, average total percent body weight gain for the juvenile goats in plot B was 74.62% (10.66% per week) as compared with plot. This study shows that well-grown pasture can provide maintenance level nutrients for mature goats while juvenile goats would require supplemental grain concentrates to enhance growth.
- b. Impact(s)** - The number of goats allotted per acre of pasture has a direct effect on the maintenance and growth performance of goats. Knowing the optimal number of goats per acre will enable farmers to make better decisions on the following: (1) efficient utilization of pasture forages, (2) better ways of using pasture space, and (3) enhanced growth performance. Information from this study would help farmers to know the estimated number of mature and juvenile goats to be placed per acre in order to maximize forage utilization and improve economic gains from the production of goats. Browsing goats in pasture would reduce production costs and hence the profit margin of farmers. By adopting this method, a farmer could save as much as one pound (1 lb.) of grain concentrate ration per 50-lb goat per day. This equates to a saving of approximately one and a half 50-lb bags of grain mix or \$9.75 per goat in a 77-day feeding period. The farmer’s savings would depend on the size of his herd.

<b>c. Scope of Impact –</b>	Regionally	
<b>d. Funding -</b>	Federal Funding	\$118,028
	State	\$ 77,086
	Other	
	Total	\$195,114

**Contact Information:**

Name: Dennis O. Balogu, Ph.D.  
 Title: Professor of Animal Agriculture  
 Affiliation: Department of Agriculture  
 1200 N. University Drive  
 Mail Slot 4913  
 Pine Bluff, AR 71601  
 E-mail: balogud@uapb.edu  
 Phone Number: 870-575-8154

**Goal 4 - An Agricultural System Which Protects Natural Resources and the Environment; Integrated 1890 Research and Extension Program 4– Water Quality Monitoring of a Swine Waste Treatment System and Constructed Wetland.**

**Key Themes: Nutrient Management, Water Quality**  
**Focus Areas: Natural Resources and Environment**

- a. Brief description of activities** – The project activities accomplished during the past year include:
- 1) Planting two wetland cells with cannas spp. Wetland cell one was planted for research purposes and utilized a randomized block design. Wetland cell three was planted with cannas spp. for demonstration purposes. Natural wetland plant recolonization was allowed to take place in wetland cell two.
  - 2) Cannas spp. were cultured from seeds utilizing the findings from the previous years germination project. Cannas spp. were also grown from rhizomes. These cannas were utilized in wetland cells one and three.
  - 3) Swine waste was produced from feeder size pigs kept at the feed-out facility. This swine waste was introduced into the waste treatment system. This is the first season that swine waste was introduced into the treatment system.
  - 4) The heavy use areas that were installed along the tops of the wetland levees the previous year were utilized for project demonstration and research related activities.
- b. Impact(s)** – This project has demonstrated a viable method for preparing large quantities of canna seeds for germination. We found that acid scarification was more effective than physical scarification for preparing large numbers of canna seeds for germination. This project has also utilized an abundant waste material (coal fly ash) for building and demonstrating the usefulness of heavy use areas for farm use. This project will demonstrate the environmental effectiveness of separating swine solid and liquid waste before anaerobic lagoon treatment, and the use of constructed wetlands for additional effluent treatment. Fact sheets, articles in Journals and newsletters have all been used to disseminate the information.

<b>c. Scope of Impact –</b>	Local and Regional	
<b>d. Funding - Research</b>	Federal Funding	\$ 44,119
	State	\$ 59,307
	Other	
	Total	\$103,426
	<b>Extension</b>	
	Federal Funding	\$ 87,306
	State Matching	\$ 38,084
	Other	
	Total	\$125,390

**Contact Information:**

Name: Edmund R. Buckner  
 Title: Assistant Professor  
 Affiliation: University of Arkansas at Pine Bluff  
 Department of Agriculture  
 1200 North University Drive, Mail Slot 4913  
 Pine Bluff, AR 71601  
 Phone Number: (870) 575-8542  
 Fax: (870) 575-4629  
 E-Mail: [bucknere@uapb.edu](mailto:bucknere@uapb.edu)

**Goal 5 - Enhanced Economic Opportunity and Quality of Life for Americans; Research Program 11 –Predictors of Quality Childcare Programs**

**Key Theme: Childcare/Dependent Care, Early Childhood Education**

**Focus Area: Improvements in the quality of early childcare/home daycare center programs in Southeast Arkansas**

a. **Brief description of activities:** There have been no significant changes in the program review processes since the 5-Year Plan of Work (2007-2011).

- 1) During Fall 2006, a cover letter, consent form, the front and back covers for each of the three survey booklets were developed, designed, and submitted to the university's print shop for printing.
- 2) During Spring 2007, directors, teachers, and parents of infant and toddler programs, early childhood programs, and family day care homes have been approached and contacted to participate in the pilot study.

b. **Impact(s)** – Survey data has not been compiled yet.

c. **Scope of Impact** – Regional/Southeast Arkansas

d. **Funding** –

Federal Funding	
State	\$ 17,626
Other	
Total	\$ 17,626

**Contact Information:**

Name: Janette R. Wheat, Ph.D.  
Title: Assistant Professor  
Affiliation: University of Arkansas at Pine Bluff  
Department of Human Sciences  
1200 North University Drive  
Mail Slot 4971  
Pine Bluff, AR 71601  
Phone Number: (870) 575-8808  
Fax: (870) 575-4684  
E-mail: [wheatj@uapb.edu](mailto:wheatj@uapb.edu)

**Goal 5 - Enhanced Economic Opportunity and Quality of Life for Americans, 1890  
Extension Program 6 – Family and Youth Programs**

**Key Theme: Children, Youth and Families at Risk**

**Focus areas: Decision making, enhancing skills**

a. **Brief description of activities** – Three 1890 priority programs were conducted within Goal 5. They are (1) The Young Scholars Program, (2) *Teens on the Go* Newsletters and (3) The Early Childhood Care and Education Program

b. **Impact(s)**

**The Young Scholars Program** - The Young Scholars Program is implemented in two counties (Monroe and Lee). Seventy-eight children, referred to as Young Scholars and their parents are enrolled in the program. The program is in its 11<sup>th</sup> year of operation. Program staff has seen a major transformation in the children and families. As a result of the program the children have improved school performance in math and science, increased their sense of self-worth and developed more effective social and problem-solving skills. One graduate of the program is scheduled to graduate from the University in FY 2007. Inspired by the achievement of their children eight parents have completed the GED, 4 are taking classes at the local community college and one will graduate from the University this May. Families credit the money management phase of the program for helping them to learn to control debt and improve their financial position. Two families are now homeowners. The accomplishments of the children suggest that many parents have gained the confidence, knowledge and skills associated with effective parenting.

**Teens on the Go** - This newsletter series has been written by the 1890 family and child development specialist since 1978. The 6 issues of *Teens on the go* distributed in schools to 72,000 students in 2006 included:

- Anger: Don't Let it Get to You
- How to Deal with Bullying
- Preventing Pregnancy and Protecting Your Life
- What you should Know About Marijuana
- Teens and HIV: A Growing Concern
- How to Deal with Bullying

Informal anecdotal evaluation includes the following student comments:

*I wish all students every where could read Teens on the Go. They help me to stay positive and to make decisions based on grounded values and focused goals.*

*I look forward to getting my copies of Teens on the go. I always share them with others including my mother. Thank you for writing such informative piece.*

*Teens on the Go have helped me think of the consequences before I do something that I know my parents would not approve of. This keeps me out of trouble.*

**Child Care Dependent Care** – Training was conducted for early childhood professionals and parents designed to provide a better understanding of the stages of child development and to provide developmentally appropriate activities for young children. In FY 2006, the 1890 family and child development specialist conducted 2 workshops for early childhood education professionals and 8 workshops for parents with total contacts of 332.

c. **Scope of Impact** - Arkansas



<b>d. Funding -</b>	Federal Funding	\$247,199
	State	\$116,245
	Other	
	Total	\$363,444

**Contact Information**

Name: Irene K. Lee, Ph.D.  
Title: Extension Family and Child Development Specialist  
University of Arkansas at Pine Bluff  
1200 North University Drive, Mail Slot 4966  
Pine Bluff Arkansas 71601  
Telephone Number: (870) 575-8530  
FAX: (870) 575-4679  
E-Mail: leei@uapb.edu

**Goal 5 - Enhanced Economic Opportunity and Quality of Life for Americans; 1890  
Extension Program 7 --- Agricultural Awareness.**

**Key Theme: Youth Development**

**Focus Area: Agricultural Awareness**

- a. **Brief description of activities** – Arkansas Ag Adventures developed as a result of Producer Focus Groups that identified a significant need for increasing factual public information and education regarding production agriculture with children and young people. A center to teach youth about agriculture was established on the University of Arkansas at Pine Bluff's Small Farm Outreach and Water Management Center in Lonoke, Arkansas. Children learn a variety of subjects through hands-on lessons at the center. The program also provides in-school visits for those schools limited in bringing students to the center due to constrained resources. Eight programs were held at the agricultural awareness center. Thirty seven outreach programs were held throughout the state.
- b. **Impacts** – This program continues to be a leader in geospatial technologies and has established unique programs bridging agriculture, science, and fitness into one curriculum. The Arkansas Ag Adventures program reached over 300 students in center programs and 3,000 in state outreach programs during 2006.
- c. **Scope of Impact** - The program is available to all youth and adults in the state of Arkansas. The program is available to counties by attending field trips at the center or reserving a program in their county. Materials about the program are available on the web and through the program coordinator. The increase of outreach participants has included over 30% of the counties in Arkansas.
- d. **Funding** –
- |                 |          |
|-----------------|----------|
| Federal Funding |          |
| State           | \$44,598 |
| Other           |          |
| Total           | \$44,958 |

**Contact Person:**

Name: Willa Williams  
Title: 4-H Youth Agriculture Associate  
Affiliation: University of Arkansas at Pine Bluff  
Address: 2301 South University AVE, Room 201G, Little Rock, AR 72203  
Phone #: 501-671-2225  
Fax #: 501-671-2028  
E-mail: [wwilliams@uaex.edu](mailto:wwilliams@uaex.edu)

**Goal 5 - Enhanced Economic Opportunity and Quality of Life for Americans Extension Program 9 – Youth Livestock Management**

**Key Theme: Youth Development/4-H**

**Focus Area: Personal Responsibility**

- a. Brief description of activities:** Youth (4-H and FFA) livestock projects are very popular in Arkansas. These projects encompass all species of domestic livestock. The culmination of many of these projects is a competitive event. The District 4-H Horse Show had forty-two exhibitors from eight counties. At the District Fair, 280 4-H and FFA youth from twelve counties exhibited cattle, goats, swine, sheep and horses. At the State Fair, a total of 1311 exhibitors from fifty-five counties entered 2106 animals in four shows. The largest was the Market Hog Show with 1453 entries from 830 youth. Eight 4-H Record Books were judged and additional participants were involved in Vet Science 4-H talks.
- b. Impact(s) -** These events provide opportunities for youth to learn and exhibit personal responsibility, sportsmanship and how to function and cooperate in group activities. These activities also offer youth a chance to show off their animal projects as well as to develop respect and an appreciation for animals and to expose them to career opportunities in animal science. Several County Extension Agents and FFA Instructors in Arkansas chose careers as a result of their experiences and participation in livestock related youth activities.
- c. Scope of Impact -** State-wide (fifty-five counties)
- d. Funding -**
- |                 |           |
|-----------------|-----------|
| Federal Funding | \$ 33,655 |
| State Matching  | \$ 15,276 |
| Other           |           |
| Total           | \$ 48,931 |

**Contact Information:**

Name: Robert J. Felsman, Ph.D.  
Title: Extension Livestock Management Specialist  
Cooperative Extension Program  
Address: 1200 North University Drive  
Mail Slot 4966, UAPB  
Pine Bluff, AR 71601  
Telephone: 870-5757214  
Email: [felsmanr@uapb.edu](mailto:felsmanr@uapb.edu)

## **Goal 5 - Enhanced Economic Opportunity and Quality of Life for Americans 1890 Extension Program 10 – Small Farm Management**

### **Key Theme: Agricultural Management**

### **Focus Area: Agriculture Profitability**

- a. **Brief description of activities-** The program provides educational outreach, technical assistance, and training in agricultural management. The program assists producers in the following areas:
1. **Financial Planning**—To annually provide 100 Small and Socially Disadvantaged Farmers (SDFs) with training and assistance on financial farm planning which includes education on financial statements, cash flow analysis, breakeven analysis, crop insurance, the Noninsured Crop Disaster Assistance Program (NAP), and the Direct and Counter-Cyclical Program (DCP).
  2. **Assistance in using land improvement practices**—To assist 25 producers in improving their land by providing information on USDA Programs that provide cost share assistance (50-75%) on irrigation wells, land leveling, and underground pipe.
  3. **Improving production practices**—To help producer improve their income by providing Cooperative Extension Service (CES) production recommendations to 250 row crop, and livestock producers.
  4. **Adding alternative enterprises**—To help 25 farmers or ranchers increase their income by adding alternative enterprises such as vegetables or goats to their operations.
  5. **Providing marketing education and assistance**—To assist row crop producers in marketing their crops by helping them to understand and use the marketing programs of local elevators; and to assist vegetable producers with marketing by hiring a person to help farmers locate markets and sell their vegetables.
  6. **Forestry management education**—To help SDFs make money from their forest land by using good management practices.
- b. **Impact(s)** - In 2006 the small farm staff provided financial planning technical assistance to 44 individuals who received \$5,503,677 in loan funds. Approximately 60% of these applicants would not have received loans without the assistance provided by the Extension Associates.

Although profit margins were small both this year and last year, approximately 10 producers received \$120,000 from the EQIP Program for land improvement practices. Once these practices are installed producers will be able to increase their yields by as much as 30 percent and the value of the land (180 acres) will also increased by 30%. Also the Central Arkansas area was classified as a CSP Area for the state. Approximately 13 SDFs received \$30,000 in funds from the CSP Programs after receiving assistance from the UAPB Extension Associates in gathering and presenting their data to qualify for the program.

In Eastern Arkansas approximately 8000 acres of row crops were planted with farmers using CES recommendations: soil testing, varieties, and pesticides. As a result yields were increased within a range of 10- 30%. In Southwest Arkansas ten ranchers have started using CES recommendations. This is a big improvement since none were using CES recommendations when the project started.

In Eastern Arkansas the Extension Associates assisted two groups and several individuals with vegetable production. The first group consists of five farmers who the Extension Associate convinced to grow sweet potatoes in 2004. However, due to a lack of infrastructure, the group stopped growing sweet potatoes. In 2006 with plans to build a sweet potato storage facility, the group grew 235 acres of sweet potatoes, 160 acres of greens and 60 acres of squash. The addition of vegetables to two of these operations increased their per acre income by as much as 30 % when compared to their row crop per acre income. Although, the sweet potato shed was not built in

2006, it is scheduled to be complete in 2007. Approximately \$2,000,000 was obtained for the construction of the sweet potato facility by Winrock International, and the Central Arkansas Resource and Conservation District. The second group consisted of the 20 drip irrigation farmers. These farmers were able to increase their yields considerably by adding irrigation as opposed to non-irrigated crops and by using CES recommendations provided by the Extension Associate. Also Mr. Harvey Williams, a project participant and vegetable farmer, won the “National Small Farmer of the Year Award” at the Annual Meeting of the National Organization of Professional Black Natural Resources Conservation Service Employees in Indianapolis, Indiana.

As a result of the marketing workshop and education provided by the Extension Associates, several row crop farmers forward contracted enough of their crops to increase income by 30% and were able to pay off their operating loans. The marketing individual was able to assist 15 vegetable farmers in Central Arkansas market 8,800 pounds of southern peas, 40,000 pounds of watermelons, 1,600 pounds of squash yellow, 400 cantaloupe, 1,200 pounds of horticulture beans, 20,000 pounds of sweet potatoes, and 1,200 pounds of butter beans. These vegetable producers would have lost about 70 percent of their crops without this marketing assistance.

Following each forestry educational meeting the Arkansas Forestry Service reported receiving numerous calls from SDFs requesting information and assistance in developing a forestry management plan. As a result of these meetings, several SDFs in Eastern Arkansas have forestry management plans that they are in the process of implementing.

**b. Scope of Impact** – Regionally

**d. Funding -**

Federal Funding	
State Matching	\$ 41,159
Other	\$413,820
Total	\$454,979

**Contact Person**

Name: Henry English, PhD  
 Title: Director, Small Farm Program  
 Affiliation: University of Arkansas Pine Bluff  
 Address: 1200 North University Drive  
 Mail Slot 4906  
 Pine Bluff, Arkansas 71601  
 E-Mail: [english\\_h@uapb.edu](mailto:english_h@uapb.edu)  
 Phone Number: (870) 575-7246  
 Fax Number: (870)-575-4682

## **Goal 5 - Enhanced Economic Opportunity and Quality of Life for Americans Integrated Research and Extension Program 5, Recreational Fishing in the Delta**

### **Key Theme Area: Natural Resources Management Focus Area: Recreation**

**a. Brief description of activities -** In 2006, 8 specific projects were conducted within the program area of Recreational Fishing in the Delta. These include:

1. Black Bass Population Stock Assessment for Lower Arkansas River
2. Influence of Stocked Hatchery-reared Fingerlings on Wild Largemouth Bass Fingerlings and Productivity of Bass in the Arkansas River
3. Improved Techniques for Managing Sunshine Bass Fingerling Production
4. Evaluation of AGFC Fishing Programs in Arkansas
5. Improving Recreational Fishing in Farm Ponds
6. Training for AGFC Personnel
7. Successful Management of Water Gardens
8. Managing Weeds and Water Quality in Recreational Fish Ponds.

Key impacts from 2006 work include: 1) largemouth bass in the Arkansas River were in fair to good condition, suggesting a quality largemouth bass fishery in the lower Arkansas River; and 2) stocking ponds in the Arkansas Family and Community Fishing Program half as many times (with the same number of fish) will produce the same fishing success but at a reduced transportation cost to AGFC. Individual impacts for each of the projects are listed below.

**b. Impact(s) -**

**Black Bass Population Stock Assessment for Lower Arkansas River -** Population age structures of Arkansas River largemouth bass were skewed towards younger fish, with a low numbers of individuals older than age 3. Largemouth bass size structure varied by pool and year. Proportional stock density (PSD) values throughout all pools averaged 51 ( $\pm 3 = SE$ ) in 2004 (range 33-67) and 55 ( $\pm 3$ ) in 2005 (range 27-61). Average annual mortality values computed from catch curves were 49% (range 28-65%) and 47% (range 28-64%) for 2004 and 2005, respectively. Mean total lengths (mm) at age for largemouth bass for ages 1-6 were 205, 289, 345, 392, 427, and 418 for 2004 and 167, 264, 345, 388, 419, 434 for 2005. This length at age estimates were above average nationally and for Arkansas. We are presently compiling data from similar impounded river systems in the region to additional analysis. Bass were in fair to good condition throughout the river. Results of the study suggest a quality largemouth bass fishery in the lower Arkansas River, though we recommend continued monitoring of populations in light of continuing environmental changes in the river.

**Influence of Stocked Hatchery-Reared Fingerlings on Wild Largemouth Bass Fingerlings and Productivity of Bass in the Arkansas River –** We conclude that although the size of the spawn varies among locations, average recruitment to age-1 was not different among the Arkansas locations we examined. Although variance in size of the spawn differed among locations, the homogeneity of variance in age-1 abundance suggests there might not be a need to “fill in the valleys” during years of below average spawns in the Arkansas River. Recruitment was no more variable in the Arkansas River than it is in the other Arkansas locations we examined.

We completed a pilot study on marking young of the year largemouth bass with VIE tags. We have been able to mark the opercle of a 100 mm fish with three distinct marks. We held these fish to determine the timeframe and frequency of tag loss. As of December 2006, we observed

better than 90% retention rates of three marks in a single opercle. These results suggest that our plan to conduct Jolley-Seber mark/recapture studies based on marking with VIE tags should be successful and would allow us to assess the influence of stocked fish on mortality rates of wild fish, a study planned for Summer 2007.

Based on these preliminary results the Arkansas Game and Fish Commission is altering their stocking strategy for Pool 4 of the Arkansas River. UAPB will get the fish that they would be stocking into this pool. These fish will become part of the assessment of stocked fish influences on wild fish planned for Summer 2007. If the Summer 2007 study progresses as planned, the results could impact the way that many state natural resource agencies stock largemouth bass from hatcheries into existing wild populations. Largemouth bass have been stocked in all of the lower 48 states, so the scope of the impact could be nation-wide.

**Improved Techniques for Managing Sunshine Bass Fingerling Production** - Several members of the USDA-ARS H.K. Dupree Stuttgart National Aquaculture Research Center (SNARC) have indicated an interest in pursuing the possibility of selection for favorable larval characteristics. The SNARC is the repository for a Moronid National Brood Stock Program. Geneticists and fish culturists from SNARC are interested in organizing a full factorial experiment this spring to determine the heritability of size at hatch within white bass.

The majority of the Phase-I fingerling production for the U.S. hybrid striped bass industry occurs in Arkansas. Breeding of white bass that consistently produced larger larvae could enhance Phase-I production in Arkansas, and thereby favorably impact grow out facilities in other states (e.g. California, North Carolina, and Alabama).

**Evaluation of Arkansas Game and Fish Commission Fishing Programs in Arkansas** Stocking practices of the Arkansas Game and Fish Commission's (AGFC) Family and Community Fishing Program (FCFP) were evaluated to determine if stocking effort and costs can be reduced without impacting program success.

The findings of research on FCFP stocking practices clearly demonstrated that stocking effort can be reduced by half (no reduction in fish numbers) without negative impacts on program success. It also provided better understanding of angler motivations, attitudes, awareness, and expectations. The evaluation of the FDP demonstrated that fishing derbies do increase fishing effort and awareness at derby event locations. Furthermore, the FDP is effectively recruiting new anglers and providing retention of anglers who have previously left the sport. The annual HOFNOD evaluation was completed, providing information on teacher demographics, preferences, activities, and fishing participation. In general, teachers stated that the HOFNOD program has a positive influence on students and the program goals are being met. Educational units with limited applicability and use rates were identified for modification or elimination.

Reduction in FCFP stocking effort would increase resource (money, man-hours) available to other AGFC responsibilities. This will increase the cost-effectiveness of the FCFP, and benefit other agency programs. By providing evidence that the FDP is recruiting and retaining anglers, AGFC can justify resource allocation to this program and fine tune derby protocols to maximize recruitment and retention. Improved recruitment and retention means increased fishing license sales, which results in greater agency political and financial support. Evaluations of the HOFNOD program are critical for continued success of the program. Curriculum limitations identified by this research are being addressed, and the program is being tailored to fit teacher expectations. A successful HOFNOD program should keep students interested in the environment, recruit new anglers, and reduce illegal activities by participating youth.

**Improving Recreational Fishing in Farm Ponds** - Factors influencing hybrid striped bass survival following stocking were evaluated using controlled laboratory studies and cage studies in

Arkansas ponds. The influences of acclimation, water hardness, temperature change, and synergistic effects were assessed. The hybrid striped bass research is the first step in understanding how to stock hybrid striped bass effectively. These findings will add to the knowledge base and help improve handling, hauling, and stocking procedures for hybrid striped bass. All primary pond documents are available electronically from the website with links from other agencies. There were more than 8,350 web hits on the Farm Pond Management website in 2006. County agents, AGFC biologists, and the general public have all expressed appreciation of the improved access to farm pond information. Seven farm pond press releases were sent to county agents in 2006, the Farm Pond Calendar is now available in hardcopy and print on demand, and an article was written for Arkansas Aquafarming, with about 1,800 contacts. Extension resources (web-based, article, fact sheets) and training events provide a more informed resource issues, and increased motivation. These resources have reduced contact time for county agents, increased used of internet inquiries, and allowed for faster implementation of management activities.

An evaluation survey of participants in the 4-H activities indicated that 96% of participating enjoyed the revised event, learning about tackle, knots, fish ID, and fish anatomy. In addition, 78% of participants also said they would participate in the revised activity again.

**Training for Arkansas Game and Fish Commission Personnel** - Training workshops were conducted with more than 500 participants. The Stream Sampling and Management Workshop will have direct impact on the development of stream management decisions in the future indicated by the Arkansas Game and Fish Commission personnel holding discussions following the workshop on designing their new stream sampling protocols.

Participants increased their knowledge in the basics of pond management, fish anatomy and ID, leasing opportunities, and much more. Additional topics include stream hydrology and ecology, sampling considerations, indices of stream health, and the sampling protocols of other state and federal agencies. AGFC personnel from hatcheries, administration, and field stations learned aspects of fish health including fish kill assessment, fish stress issues, anatomy, handling, disease diagnosis, treatments, and regulations. The also were instructed in stream hydrology and ecology, sampling considerations, indices of stream health, and the sampling protocols of other state and federal agencies.

**Successful Management of Water Gardens** - Six regional programs were conducted as a part of Lawn and Garden Shows and Master Gardener Training for homeowners interested in water gardening and KOI ponds with over 300 attendees gaining the knowledge, skills and ability to successfully build and maintain water gardens and aquatic habitats. Participants are very appreciative of the hands-on demonstration and consistently rank this topic among the highest on the Master Gardener Training schedule.

**Managing Weeds and Water Quality in Recreational Fish Ponds** – Increased 75 county extension agents and farm owners competency in farm pond weed identification and management by gaining the knowledge, skills and ability to correctly identify aquatic weeds and determine the appropriate treatment. At least seventeen individual farm pond or recreational pond owners developed detailed management strategies to manage weeds, improve water quality and improve fishing in their ponds.

<b>c. Funding - Research</b>	Federal Funding	49,970
	State	71,507
	Other	22,747
	Total	144,224



<b>Extension</b>	Federal Funding	58,518
	State	70,306
	Other	
	<b>Total</b>	<b>128,824</b>

d. **Scope of Impact** – Primarily Arkansas

**Contact Information**

<b>Name of Project</b>	<b>Contact Person</b>
Black Bass Population Stock Assessment for Lower Arkansas River	Name: Michael Eggleton Title: Associate Professor Affiliation: Aquaculture/Fisheries Center Address: University of Arkansas at Pine Bluff 1200 N. University Dr. Mail Slot 4912 Pine Bluff, AR 71601 E-mail: <a href="mailto:meggleton@uaex.edu">meggleton@uaex.edu</a> Telephone Number: 1-870-575-8100 FAX Number: 1-870-575-4637
Influence of Stocked Hatchery-Reared Fingerlings on Wild Largemouth Bass Fingerlings and Productivity of Bass in the Arkansas River  Improved Techniques for Managing Sunshine Bass Fingerling Production	Name: Steve Lochmann, Ph.D. Title: Associate Professor Affiliation: Aquaculture/Fisheries Center Address: University of Arkansas at Pine Bluff 1200 N. University Dr. Mail Slot 4912 Pine Bluff, AR 71601 E-mail: <a href="mailto:slochmann@uaex.edu">slochmann@uaex.edu</a> Telephone: 1-870-575-8165 Fax: 1-870-575-4637
Evaluation of Arkansas Game and Fish Commission Fishing Programs in Arkansas  Improving Recreational Fishing in Farm Ponds  Training for Arkansas Game and Fish Commission Personnel	Name: J. Wesley Neal Title: Assistant Professor Affiliation: Aquaculture/Fisheries Center Address: University of Arkansas at Pine Bluff 1200 N. University Dr. Mail Slot 4912 Pine Bluff, AR 71601 E-mail: <a href="mailto:wneal@uaex.edu">wneal@uaex.edu</a> Telephone Number: 1-870-575-8136 FAX Number: 1-870-575-4637
Successful Management of Water Gardens  Managing Weeds and Water Quality in Recreational Fish Ponds	Name: David Heikes Title: Extension Specialist Affiliation: Aquaculture/Fisheries Center Address: University of Arkansas at Pine Bluff 1200 N. University Dr. Mail Slot 4912 Pine Bluff, AR 71601 E-mail: <a href="mailto:dheikes@uaex.edu">dheikes@uaex.edu</a> Telephone Number: 1-870-575-8143 FAX Number: 1-870-575-4638

**Summary of Total Resource Allocations  
1890 Research and Extension Programs  
University of Arkansas at Pine Bluff**

	<b>2,006</b>			<b>TOTAL</b>
	<b>Federal</b>	<b>State</b>	<b>Other</b>	
<b>GOAL 1 - An agriculture system that is highly competitive in the global economy</b>				
<b>Research Programs</b>				
1. Crop protections systems	100,301	65,508		165,809
2. Alternative crop production	157,308	102,740		260,048
3. Minimally processed value-added products	44,119	52,746		96,865
4. Efficiency and profitability of hog farms	74,563	48,698		123,261
5. Engineering insect resistance in cowpea through gene transfer	91,414	59,704		151,118
<b>Extension Programs</b>				0
1. Adoption of new best management Practices	63,586	261,983		325,569
2. Beef herd improvement	100,964	45,828		146,792
<b>Integrated Research and Extension Programs</b>				0
1. Sustainable vegetable production				0
<b>Research</b>	52,383	34,212		86,595
<b>Extension</b>	156,721	66,082		222,803
2. Catfish production and management				
<b>Research</b>	269,642	385,856	53,456	708,954
<b>Extension</b>	255,205	306,610		561,815
3. Baitfish Production and management				
<b>Research</b>	204,621	292,812	37,533	534,966
<b>Extension</b>	228,113	274,061		502,174
<b>Goal 2 - A safe and secure food and fiber system</b>				0
<b>Research Programs - NA</b>				0
<b>Extension Programs</b>				0
3. Nutrition education and wellness system (Food safety)			54,144	54,144
4. HACCP training and education	82,322	35,058		117,380
<b>Goal 3 - A healthy well-nourished population</b>				0
<b>Research Programs</b>				0
6. Herbs and vegetable production	144,317	94,256		238,573
7. Health benefits of probiotic bacteria	103,599	32,356		135,955

<b>Extension Programs</b>				
5. Nutrition education and wellness system (Diet and Health)			162,433	162,433
<b>Integrated Research and Extension Programs - NA</b>				
<b>Goal 4. - An agricultural system which protects natural resources and the environment</b>				
<b>Research Program</b>				
8. Small ruminant nutrition/management	118,028	77,086		195,114
<b>Extension Program - NA</b>				
<b>Integrated Research and Extension Program</b>				
4. Water quality monitoring				
<b>Research</b>	44,119	59,307		103,426
<b>Extension</b>	87,306	38,084		125,390
<b>Goal 5 - Enhanced economic opportunity and quality of life for Americans</b>				
<b>Research Programs</b>				
9. Socio-economic impact of agricultural policy on minority- and limited-resource farmers				0
11. Predictors of quality child care programs		17,626		17,626
<b>Extension Programs - NA</b>				
6. Family and youth programs *Young Scholars *Grandparents raising children *Parenting educating *Child care training	247,199	116,245		363,444
7. Agriculture awareness		44,598		44,598
9. Youth livestock programs	33,655	15,276		48,931
10. Small farm management		41,159	413,820	454,979
<b>Integrated Research and Extension Programs</b>				
5. Recreational fishing in the Delta				
<b>Research</b>	49,970	71,507	22,747	144,224
<b>Extension</b>	58,518	70,306		128,824
<b>RESEARCH TOTAL</b>	1,454,384	1,394,414	113,736	2,962,534
<b>EXTENSION TOTAL</b>	1,313,589	1,315,290	630,397	3,259,276