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April 4, 2005

Mr. Bart Hewitt
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Dear Mr. Hewitt:

The 2004 Report of Accomplishments and Results for the 2000-2004 POW for the 1890 Research and Extension Programs at the University of Arkansas at Pine Bluff is presented in the attached document. As explained in the document, research and Extension programs for Agriculture and Human Sciences are presented in Part I as Agriculture, Community and Family Programs. Research and Extension programs in Aquaculture/Fisheries are presented as Part II because of the structure of the programs.

With the recent emphasis on integrated programs, you will note that the organization of the report identifies integrated programs as well as independent research and Extension efforts.

Sincerely,

Jacquelyn W. McCray
Dean/Driector

JWMcC/bjc

Attachment

**IMPLEMENTATION OF PLANS OF WORK (POW) 2000-2004
UNDER THE AGRICULTURAL RESEARCH, EXTENSION, AND EDUCATION
REFORM ACT OF 1998 (AREERA)**

**2004 ANNUAL REPORT OF ACCOMPLISHMENTS AND RESULTS
University of Arkansas at Pine Bluff**

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March 31, 2005

TABLE OF CONTENTS

Introduction	1
Stakeholder Input Process	1
Program Review Process	2
Overview of Research and Extension Programs Reported in the 5-Year Plan of Work by GPRA Goals	3
Part I – Agriculture, Community and Family Programs	
Goal 1 – An agriculture system that is highly competitive in the global economy	
Executive Summary	4
Research Program 1 – Alternative crop production	5
Research Program 2 – Crop protection systems	7
Extension Program 1 – Livestock management	9
Integrated Research and Extension Program 1 – Sustainable vegetable production	11
Goal 2 – A safe and secure food and fiber system	
Executive Summary	13
Extension Program 4 – Families First-Nutrition Education and Wellness System (FF-NEWS)	14
Goal 3 – A healthy well-nourished population	
Executive Summary	16
Research Program 5 – Vegetable and herb production	17
Research Program 6 – Health benefits of probiotic bacteria	19
Extension Program 5 – Families First-Nutrition Education and Wellness System (FF-NEWS)	21
Goal 4 – An agricultural system which protects natural resources and the environment	
Executive Summary	23
Research Program 7 – Integrated pest management	24
Research Program 8 – Small ruminant nutrition/management	25
Goal 5 – Enhanced economic opportunity and quality of life for Americans	
Executive Summary	27
Research Program 9 – The economic status and behavior of minority farmers in Arkansas	28
Research Program 10 – Improving quality of life	30
Extension Program 6 – Family and youth programs	31

TABLE OF CONTENTS, continued

Part II – Aquaculture/Fisheries Research and Extension Programs

Executive Summary	38
Goal 1 – An agricultural system that is highly competitive in the global economy	38
Goal 4 – Greater harmony between agriculture and the environment	38
Stakeholder Input Process	38
Program Review Process	39
Goal 1 –Research Program 3 – Extension Program 2 – Catfish production and management	
Executive Summary	40
Project 1 –Optimizing cash flow in catfish aquaculture	42
Project 2 –Fish disease biosecurity	43
Project 3 –Grading catfish for the foodfish marker	44
Project 4 –Evaluation of preferences for farm-raised catfish	45
Project 5 –Improved diet formulation and strategies for restricted feeding rations	46
Project 6 –Impacts of drift of herbicides on fish pond water quality	47
Goal 1 – Research Program 4 – Extension Program 3 – Baitfish production and management	
Executive Summary	48
Project 1 –Fish disease biosecurity	49
Project 2 –Improving baitfish nutrition	50
Project 3 –Optimizing hatchery methods	51
Project 4 –Optimizing stocking rates	52
Goal 4 – Research Program 11 – Extension Program 7 – Recreational fishing in the Delta	
Executive Summary	53
Project 1 –Managing fish populations in Delta ponds	54
Project 2 –Stocking hatchery-reared fingerlings to improve largemouth bass population in the Arkansas River	55
Project 3 –Characterization of floodplain lake fish assemblages in the lower White River, Arkansas	56
Project 4 –AGFC urban fishing program	58
Summary of Total Resource Allocations (CSREES/State/Other)	59

**IMPLEMENTATION OF 5-YEAR PLANS OF WORK (POW) 2000-2004
UNDER THE AGRICULTURAL RESEARCH, EXTENSION, AND EDUCATION
REFORM ACT OF 1998 (AREERA)**

2004 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. Research Faculty in the Departments of Agriculture and Human Science are integrated in the academic units, while Extension personnel are under the direct supervision of the Associate Extension Administrator. Faculties with split appointments are evaluated jointly by appropriate administrators with supervisory authority resting with the associate administrator with the greater percentage FTE (research or Extension). The academic department chair has supervisory and evaluation authority for academic appointments. The number of split appointments is increasing.

The Department of Aquaculture/Fisheries and the Aquaculture/Fisheries Center of Excellence are administered by a Department Head who is also the Center Director. Under this structure, academic faculty are integrated into the functions of the Center of Excellence through joint appointments that include academic, research and/or Extension functions. Functions within the departments of Agriculture and Human Sciences are not integrated to this extent. These structural differences among the departments require related differences in the structure of the institution's POW and in its annual reporting documents.

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. Consistent with the university's five-year POW, accomplishments in these areas are presented in Part I (Agriculture, Family and Community Programs) of the report. Accomplishments in Aquaculture/Fisheries research and Extension are reported in Part II of this report.

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 at both the state's Aquaculture industry and recreational fishing.

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. The Extension program has structured programs in 28 counties with staff housed in 10 counties. Demonstrations and outreach activities are conducted at these county sites as well as the three farm sites located on the UAPB campus and at Lonoke and Marianna, Arkansas. Stakeholder input is obtained from

one-on-one contact and evaluations conducted on site. Extension and research personnel are attending producer meetings, professional meetings, workshops and focus groups as additional means of disseminating information and to obtain stakeholder input.

In addition to the above mechanisms of obtaining stakeholder input, the Agriculture research and Extension programs initiated a formal stakeholder input process in 2004. On February 12, 2004, the first meeting of Agriculture Research and Extension Advisory Council was held. The council consisted of approximately twenty members who represented diverse agricultural interests in the state of Arkansas. Members included representatives of agricultural agencies, producers, educators and agricultural businesses. The structure provides for at least 50 percent agricultural producers representing a cross-section of agriculture enterprises and geographic regions of the state. The council was invited to review existing programs, and/or recommend new research and outreach programs consistent with the mission of addressing the varied needs of small- and limited-resource farmers, disadvantaged families and youth of Arkansas. Recommendations emerged via a focused discussion process.

A second Agriculture Research and Extension Advisory Council Meeting was held February 10, 2005. This will become an annual event. Membership on the council will change with the need of research and Extension programs as determine by 1890 Administration and the Council.

Program review process

Merit review is central to the institutional goal of implementing quality programs that make a difference in the lives of people. The research and Extension programs are monitored annually through a performance appraisal system that assures adherence to this goal. Each department in the School of Agriculture, Fisheries and Human has an internal peer review system that evaluates research proposals prior to their implementation. The newly initiated Agriculture Research and Extension Advisory Council reviews the research and Extension programs annually as part of the stakeholder input process.

All Extension and research programs are required to under go a CSREES review or other external review by evaluators invited by university administrators every three or four years. A request was made for a CSREES review in 2004. That review did not develop. A second request for a CSREES review will be made in 2005. This review will include all Extension and research programs in the school.

**OVERVIEW OF RESEARCH AND EXTENSION PROGRAMS REPORTED
IN THE 5-YEAR PLAN OF WORK BY GPRA GOALS**

Function	Goal 1	Goal 2	Goal 3	Goal 4	Goal 5
Part I – Agriculture, Community and Family Programs					
1890 Research Program	1. Alternative crop production 2. Crop protection system		5. Vegetable and herb production 6. Health benefits of probiotic bacteria	7. Integrated pest management 8. Small ruminant nutrition/management	9. The economic status and behavior of minority farmers in Arkansas 10. Improving quality of life
1890 Extension Program	1. Livestock management	4. Families First-Nutrition and Education and Wellness System	5. Families First-Nutrition and Education and Wellness System		6. Family and youth programs
Integrated Research and Extension	1. Sustainable vegetable production				
Part II – Aquaculture/Fisheries Research and Extension Programs					
1890 Research Program	3. Catfish production and management 4. Baitfish production and management				11. Recreational fishing in the Delta
1890 Extension Program	2. Catfish production and management 3. Baitfish production and management				7. Recreational fishing in the Delta

ANNUAL REPORT OF ACCOMPLISHMENTS AND RESULTS – POW
October 1, 2003 - September 30, 2004

Part I — AGRICULTURE, COMMUNITY AND FAMILY PROGRAMS

Goal 1 — An agriculture system that is highly competitive in the global economy

Executive Summary

Two research, one Extension, and one integrated research and Extension program were executed under National Goal 1 in 2004. The two research programs were directed toward agricultural competencies needed by small- and limited-resource farmers in a global economy. The Extension program disseminated information and developed farmer skills critical for managing farming enterprises.

Research program 1 employs a multi-disciplinary approach that includes plant breeding and cultural practice research coupled with economic evaluation to develop farming approaches suited to small- and limited-resource farms. A variety of vegetable crops are evaluated with cowpea as a focal crop. Cowpea is planted by a high percentage of small- and limited-resource farmers in the Arkansas Delta. Research program 2 investigated alternative methods of crop pest control and production techniques. Non-restricted insecticides and different mulch types were among treatments used with several vegetable crops.

Extension program 1 supports activities by youth groups (4-H and FFA) and small cattle and swine producers. Recently, Extension activities relative to goat production were added to disseminate new information developed by UAPB researchers. The integrated research and Extension program (Integrated program 1) continued as a focal point of UAPB Agricultural Extension program. Research and demonstration plots were established on research stations and farmer-owned land. A variety of vegetable crops were used. The Horticultural Specialist strengthens cooperation with county Extension agents and continued facilitating input from UAPB researchers.

Goal 1 – Research Program 1 – Alternative Crop Production

Key Themes: Agriculture Profitability, Small Farm Viability

Focus Areas: Small Farms and their Contributions to Local Economies

- a. Brief description of activities - Field plot studies that evaluate the effect of NPK fertilizer and herbicide use on southern pea yields are being conducted. Enterprise budgets are being developed that can be used to measure the increased profit potential of using herbicide for weed control in southern peas. Fall greens, (broad leaf mustard and purple top turnips) are being grown under two planting methods (bed planting and non-bed planting) to determine the effect of planting method on yields. Sweet potato variety tests, in-row planting spacing studies, and fertility studies are being conducted to determine practices best suited for limited-resource farmers.
- b. Impact(s) – Southern peas are one of the most popular and profitable alternative crops grown by small- and limited-resource farmers in the South. However, many of these limited-resource farmers do not use herbicides and have poor weed control. Studies have determined that there is economic value in using herbicide - Treflan (Trifluralin) for weed control. Tests were conducted on two varieties of peas at the UAPB experimental farm between 1999 and 2004. Yields of peas (fresh pod) were increased from 6 to 73% (average increases 21%) when using Treflan herbicide for weed control. On a per acre basis yield increases ranged from 9 to 52 bu/A (average increases 22 bu/A). The level of response to herbicide use was also related to weed pressure in the test plots. Enterprise budgets developed for southern peas (fresh market 1999-2004) indicate that average returns per acre were \$1,717.80 for Coronet variety and \$1,712.20 for LA Quick-Pick variety. The average production cost per acre is \$821.63 (with herbicide) and \$816.03 (without herbicide).

For example, farmers involved in the UAPB Small Farm Project, about one-third (or one-hundred) grow southern peas. Each farmer grows an average of 2 acres of peas. Thus, the total number of acres of peas grown by these farmers is approximately 200 acres. The economic benefit of growing Coronet is approximately \$343,560 (200 acres * \$1,717.80 = \$343,560). The economic benefit of growing LA Quick-Pick is approximately \$342,440 (200 acres * \$1,712.20 = \$342,440).

The average benefit of using Treflan was \$308/A (22 bu/A * \$14/bu = \$308/A). Total benefit would be \$61,600 (\$308/A * 200 Acres = \$61,600). The additional cost per acre of using herbicide is \$5.60 per acre. Other small farms in the Lower Mississippi Delta Region should be able to reap similar per acre benefits from the use of herbicide, Treflan.

Using adapted sweet potato varieties and better cultural practices enhanced profits for small acreage sweet potato farmers in south Arkansas. US#1 root grade yields per acre increased by more than 49% (489BU/A) especially for farmers who planted early before

the prolonged April/May rains. Better cultural practices (reduced in-row spacing) and early maturing potatoes lower production cost and increase U.S. #1 yield. Farmers who harvested early and sold at \$14.50 to \$16.00 per bushel recorded profits of more than \$720.00 per acre in Lee, Little River and Phillips counties.

The response of Fall greens (broadleaf mustard and purple top turnips) to bed vs. non-bed planting has been inconsistent. However, based on observations and results of this study, Fall greens will yield just as well on beds or planted without beds when planted on moderately well to well-drained soils.

- c. Scope of Impact - This information will be disseminated to farmers via pamphlets and newsletters. The target audience will include: Small- and Limited-Resource Farmers in Arkansas and the Lower Mississippi Delta; however, farmers in other regions of the country may benefit as well.
- d. CSREES Funding – **\$192,815.59**
State Matching – **\$103,753.44**

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Goal 1 – Research Program 2 – Crop Protection System

Key Themes: Agricultural Profitability, Innovative Farming Techniques

Focus Areas: Improved Pest Control and Food Quality and Protection

- a. Brief description of activities – In 2004 activities included the screening of alternative insecticides for insect control in tomatoes. A total of ten treatments, 7 alternative insecticides, 2 chemical insecticides and a control were tested on 4 varieties of tomatoes. Insect numbers were low. The potato aphid was present before fruiting but did not damage the control plots. Tests results were inconclusive due to low pest insect numbers and excessive rains during the growing season.

In 2004 activities included a demonstration to determine if the increased amount of vegetable yield, when using mulching, was worth the additional expenses and labor. Using plastic mulch in vegetables has been reported to increase yields but the amount of increase has not been documented in Arkansas. Vegetables were planted in 15' plots on raised beds with and without black plastic mulched. Planting occurred in April and twice weekly harvests were made in May - July. The vegetables grown were bush beans, cucumbers, straight neck squash, crook neck squash, purple hull peas, and sweet corn.

- b. Impact(s) – With comparisons between mulched and non mulch yields, a producer can compare costs with expected returns to determine if mulching is worth the extra labor and expense. The impact of black plastic mulch was considerable. The average increased yield was 90% for all vegetables. In bush beans, cucumbers, and straight neck squash yield increase was over 100% when compared to the non mulched plots. Purple hulled peas had the lowest (16%) increases. Crook neck squash had a 77% increase in yield and there was an 83% increase in number of sweet corn ears over the non mulched plots. Using plastic mulch which adds an additional expense and more labor should be weighted against the increase yield. In this study the average increase was 90%. At a 90% increase, a 52' row mulched would yield the same as 100' row not mulched. For vegetable producers with limited space, mulching could increase yields using the same space or allow planting less area and getting the same yield as a larger area not mulched. The space saved would allow the planting of other vegetables. The amount of increase varied considerably and the decision to mulch or not mulch should be made separately for each vegetable and growing situation.
- c. Scope of Impact – National
- d. CSREES Funding – **\$121,600.23**
State Matching – **\$69,820.08**

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Katayama, R. W. 2004 (in press). Comparison of tomato yield grown staked or not staked. Arkansas Agriculture and Rural Development. 5:17-18.

Katayama, R. W. and A. Handcock. 2004 (in press). Report on the yield increases when using black plastic mulch in spring vegetable production. Arkansas Agriculture and Rural Development. 5: 10-12.

Goal 1 – Extension Program I – Livestock Management

Key Theme: Agricultural Competitiveness

Focus Area: Sustainability of Agriculture and Forestry

- a. Brief description of activities – The major activities associated with the Livestock Management Program involved Cow Herd Performance Test work, Bull Breeding Soundness Exam Clinics (BSE Clinics) and general herd management practices. Two bull BSE Clinics were conducted in the last twelve months with a local county agent and a local large animal veterinarian. The general purpose of these clinics is to identify bulls that are capable of getting the herd bred and more importantly to identify bulls that are not capable of breeding the herd and replacing them before they fail to produce a calf crop. Performance Test work is being carried out with a few selected herds. Performance test work identifies growth rate and other traits of economic value in the herd, which the herd owner can select for in his or her breeding program. Selection for improved performance should improve the market quality and market value of animals produced in the herd. With other herds, work has been done to improve the general herd management. This involves herd health, winter-feeding, pastures, working facilities, breeding and calving seasons and general herd records.

Work has also started with the small farms program on beef cattle and goats projects. In addition work began with the Silas H. Hunt Foundation in Ashdown, Arkansas and some cattle producers in that area of the state.

- b. Impact(s) – Performance Test work is a long-term management practice with a herd. One herd came on test in the late 1970's with an average herd weaning weight of 225 pounds. In 2004, the average herd weaning weight was 563 pounds – a 338-pound increase in weaning weight for each calf in the herd. One livestock producer stated that he would have gone out of the cattle business had it not been for the Livestock Management Program helping with his herd management.

In 2004, twenty-nine bulls were tested in two Bull BSE Clinics. Three (10.3%) of the 29 were classified as unsatisfactory for breeding. The actual cost of replacing these bulls would be \$3000 to \$6000. However the cost of missing a calf crop from these bulls would have cost these producers nearly \$40,000 each in lost income – this is the value of identifying problem bulls at BSE Clinics.

Initial work has begun with producers in southwest Arkansas (the Silas H. Hunt group) on herd production records and set breeding and calving seasons. Initial work has also begun with the ALFDC group in eastern Arkansas with meat goats and beef cattle.

All of this work is designed to enable these farmers to produce more livestock, more productive livestock and livestock that has more market value with the end result they will be more competitive in the U.S. and world economy.

- c. Scope of Impact – State of Arkansas
- d. CRESS Funding – **\$110,153.57**
State Matching – **\$125,987.94**

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Goal 1 – Integrated Research and Extension Program 1 – Sustainable Vegetable Production

Key Theme: Small Farm Viability, Agricultural Productivity

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

- a. Brief description of activities – More than ninety percent of small family farms in southeast and delta regions of Arkansas raise vegetable crops of self consumption and major source of farm income. Unfortunately, these group of farmers are declining in numbers and popularity across races and gender, largely due to falling farm revenues. Small acreage farmers are ill prepared and less educated to identify tastier vegetable varieties that will double return on investment and are preferred by the growing market. Demonstration plots were conducted at farmer’s fields in Lonoke and Miller counties with adapted high yielding seed varieties tested by scientists at the University of Arkansas at Pine Bluff. The Horticultural Specialist collaborated with county Extension Agent and provided farmers information on new emerging cultural practices including sustainable chemical use, effective IPM program, and minimum fertilizer input to optimize yield, and hold down production cost.
- b. Impact(s) – Results of the demonstration led to farmers eliminating more than 60% of the old varieties and replacing with better varieties adapted to their growing conditions, short maturing time and tolerance to pests. Yield increase of more than 58% were recorded in watermelon at a producer’s farm in Lonoke County. Better cultural practices and use of the right variety increased his profit more than 70% for two years in watermelon, leafy green and peas. For the first time in many years, he harvested watermelon before the 4th of July that sold for more than \$5.75 per fruit compared to his previous sales of \$2.35 due to delayed harvest and a less tastier variety. According to the producer, UAPB Extension Outreach taught me something new, I have never planted a watermelon variety that bears more than 50 good size quality fruit per 100ft row. The highest I previously harvested before the demonstration was 25 to 27 fruits per 100 ft rows with an average sale of \$63.45. My present sale after the demonstration was \$287.50.

Similar results were recorded in southwest Arkansas where land acreage under vegetable cultivation was increased by 50% (especially in Little River County following adoption of the demonstration program). Vegetable producers increased by five farmers producing peas, greens, tomatoes squash. A producer increased sale at his vegetable stand from \$330.00 per week \$650.00. Better variety choice and improved cultural practices resulted in reduced chemical and fertilizer cost of \$189.00 per acre producing greens, eggplants, and summer squash. Average acreage yield increased by 200 lbs. for okra, 380 lbs. for squash and more than 489 lbs. for eggplant. Good quality vegetables and dependable supply enabled this producer to sell baby okra for more than \$2.75 per pound to a local restaurant compared to previous sale of \$1.66 per pound for his old variety.

c. Scope of Impact – Eastern Arkansas

d. **Total Allocated Resources – Sustainable Vegetable Production**

Research CSREES – **\$60,804.48**
State Matching – **\$40,851.59**

Extension CSREES – **\$222,455.48**
State Matching – **\$251,975.88**

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GOAL 2 – A safe and secure food and fiber system

Executive Summary

The Families First-Nutrition Education and Wellness System (FF-NEWS) program supplies nutrition and food safety information limited resource participants with the aim of promoting a safe and healthy life style. Direct contact was made with the targeted audience through 391 lessons on various food safety topics. Evaluations indicated a 44 percent positive change in hand washing procedure as an example of selected safety information. FF-NEWS is a collaborative effort with a consortium of nine 1890 institutions. The project is funded primarily by the USDA Food and Nutrition Service with additional fund from state and federal 1890 Extension.

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

Key Theme: Food Safety

Focus Areas: Modifying Food Intake Behavior

- a. Brief description of activity – The FF-NEWS Program at the University of Arkansas at Pine Bluff offers a comprehensive, culturally sensitive nutrition intervention education program. The program offers a curriculum module on food quality and safety to program participants. Unit four of the curriculum is devoted to basic food safety. Program participants are taught lessons on food purchasing and storage, kitchen safety and sanitation practices.

Emphasis is placed on sanitation practices that contribute to food quality and safety, and the correct procedures used in purchasing, storing and preparing food to prevent the spread of bacteria and reduce the incidences of foodborne illnesses. Demonstrations and discussions on correct procedure for hand washing is continually reviewed during each lesson in this unit of study.

Multi-evaluation methods are used by the FF-NEWS Multi-county Agents to determine program participants' knowledge base of food safety and quality prior to instruction. Audiovisual, displays, handout materials, food demonstrations on proper storing and preparation techniques are means by which information is shared with the targeted audience.

- b. Impact(s) – Direct contact with the targeted audience were made through 391 lessons on various food safety topics. The FF-NEWS clientele made 192 requests for additional food safety data. Sixty-eight percent (68%) of the targeted audience through post-food safety sessions, reported that they practice washing hands in hot soapy water for at least 20 seconds before handling food as opposed to the 24% who reported washing their hands with hot soapy water for a least 20 seconds prior to lessons presented by the agents on the necessity of hand washing.

Listed below are typical testimonials of what food stamp recipients have said about information gained on food safety.

I now know the importance of washing my hands for at least 20 seconds with plenty of hot soapy water.
-Desha County

We learned how long to wash our hands, all we have to do is begin washing our hands as we sing a little song (Twinkle, Twinkle Little Star) and when we stop singing the song we can stop washing our hands with hot soapy water. Then they are clean! -Drew County

The best way to tell if your meat is done, is to use a meat thermometer. -Lincoln County

*Washing off can goods before opening them can be helpful in fighting germs.
-St. Francis County*

Thawing food on the kitchen counter is unsafe. -Woodruff County

*I like the slogan-Keep hot foods hot, cold foods cold, and keep a kitchen clean.
-Jefferson County*

Research data on nutrition indicate a need for comprehensive nutrition education intervention programs. Such programs are designed to help limited resource participants select and prepare meals consistent with cultural traditions while increasing the likelihood of the participants making safe and healthy food choices consistent with the most recent advice as reflected in the Dietary Guidelines for Americans and the Food Guide Pyramid.

c. Source of Impact – Eastern Arkansas

d. CSREES Funding – **\$1,333.49**
State Matching – **\$2,720.08**
Other Funding – **\$44,519.18**

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GOAL 3 – A healthy well-nourished population

Executive Summary

Two research and one Extension program are supported by the University of Arkansas at Pine Bluff under goal 3. Research program 6 is a collaborative project with the University of Arkansas at Fayetteville that is investigating the potential nutritional, medicinal and/or nutraceutical properties of selected horticultural crops. The crops are being studied to determine adaptability to Arkansas environmental conditions and to identify horticultural requirements. One of the goals of this research is identify specific compounds with medicinal or nutraceutical value.

The goal of research program 7 is to verify the health benefits of yogurt containing live lactic acid bacteria on respiratory and gastrointestinal problems of pre-school (3 to 5 years) children. In addition this program promotes a healthy lifestyle by stimulating consumption of the high quality digestible protein and calcium found in yogurt.

Extension program 5 is part of a multi-state nutritional education effort designed to impact the diet of low-income families. Topics covered in the educational plan include but are not limited to obesity, nutrition, diet guidelines and physical activity. A strong collaborative effort between the 1890 and the 1862 programs provided 576 in-depth lessons for participants.

Goal 3 – Research Program – Vegetable and Herb Production

Key Theme: Human Health, Medicinal Plants and Nutraceuticals

Focus Areas: Modifying Food Intake Behavior, Sustainability of Agriculture and Forestry

- a. Brief description of activities – Replicated field trials were conducted on seven bitter melon varieties/lines and seven varieties of bottle gourd to determine production potential and cooking qualities. Four varieties of bitter melon were analyzed for total proteins, Phenolic contents and Phenolic acid components. The phytochemical analyses were conducted at the Food Science Department of the University of Arkansas, Fayetteville. Two varieties of bitter melon and two of bottle gourd were used in cooking and taste testing experiments for developing suitable recipes for consumers' acceptance. Five promising hot pepper varieties were tested in a replicated trial to determine yield potential.
- b. Impact(s) – Four varieties of bottle gourd and five varieties of bitter melon were confirmed as having high-yield potential in southeastern Arkansas. Agronomical studies on cultural practices such as spacing, fertilization, water management, insect management need to be conducted to develop production packages for these two crops. In general, white varieties of bitter melon had relatively higher total proteins and Phenolic content in the edible parts than the green varieties, indicating that bitterness may not be associated with the color pigments. Results of hot pepper analyses will help identify superior lines for vitamins, antioxidants, and capsaicins as data become available. In a few years, some varieties of bitter melon and hot pepper may be available for on-farm trials and demonstration.

As observed in the past years, southernpea varieties showed remarkable variability in their micronutrients, total Phenolic contents, and the functional properties of the protein isolates. Results indicate high potential for nutritional enhancement of southernpea varieties. Higher lysine contents and other protein characteristics of southernpea in general, compared with soybean, may explain its functional properties for potential application in food products.

Taste testing studies conducted in 2004 confirmed results of tests conducted in 2003. Bottle-gourd-chickpea soup and bitter-melon-beef stew were among the most preferred recipes taste tested. White varieties of bitter melon were less bitter in taste and thus were more accepted than the green varieties by the tester panels. More recipes using spices of known medicinal qualities need to be included in the cooking studies.

Improved varieties of bitter melon, bottle gourd, hot pepper, and southernpea (cowpea) may provide additional alternative crops for the small farmers and home-gardeners to

make additional cash benefits. Moreover, these special vegetables may increase health benefits for many of the target consumers.

- c. Source of Impacts – Arkansas and the Southeastern United States
- d. CSREES Funding – **\$129,830.85**
State Matching – **\$73,741.88**

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Goal 3 – Research Program 6 – Health benefits of probiotic bacteria

Key Theme: Human Health

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

- a. Brief description of activities -- During spring 2004, yogurts containing probiotics *Lactobacillus acidophilus* and *Bifidobacteria Bifidus* were fed to children 4 to 5 years old and data were collected to find out if these yogurts had any effect on the frequency and the duration of respiratory and gastro-intestinal symptoms. Sixty nine children from 3 Head Start programs were fed each 8 ounces of yogurt with acceptable flavors per day for 42 days. Parents had to sign a consent letter to have their children participate in the study and children were screened for lactose intolerance and gastrointestinal conditions. Thirty six participants were fed yogurt with probiotics Crowley® with flavors strawberry, blueberry, lemon, and pineapple while thirty three children were fed yogurt without probiotics Dannon® with flavors cherry and strawberry/banana. Teachers and parents (on weekends) recorded daily respiratory (fever, runny nose, sore throat, cough, chest wheezes, earache) and gastrointestinal symptoms (diarrhea, vomiting and stomachache) throughout the study. We are in the process of preparing impact statements with the results of the feeding study to be addressed to parents. Also, we are writing surveys to be used to question parents and pre-school children about their consumption of yogurt after the feeding study. Results of the yogurt feeding study were highlighted at the 2005 Rural Life Conference at UAPB (Exhibit #8) and will be presented at the 18th International Congress of Nutrition in Durban, South Africa.
- b. Impact(s)
- Results indicated that 18.2% of the children in the group without probiotics had gastrointestinal symptoms compared with 5.6% in the probiotics group (significance at .002)
 - Duration of gastrointestinal symptoms was reduced from 10 days in the group without probiotics to 4 days in the group with probiotics.
 - Results showed no difference in the frequency of respiratory symptoms (16.67% in the probiotics group versus 15.5%) and the number of days of symptoms (53 in the probiotics group versus 47).
 - There was a possibility of a lower rate of absenteeism by children from school in the probiotics group and that parents missed less days from work to care for their sick children. Therefore, there was reduced cost associated with absenteeism of parents from work and reduced expenses for health care.
 - We anticipate that exposure of these pre-school children to yogurt will increase their consumption of yogurt. The increased consumption of yogurt is beneficial as yogurt provides protein in a more digestible form and it is a source of considerable amount of calcium.

- c. Scope of Impact – This study relates to human health because its application can help to improve the health of children attending pre-schools by decreasing the incidence and frequency of gastrointestinal symptoms and reducing absenteeism. Children exposed to yogurt in this study can improve their health by increasing their consumption of yogurt that provides them with high quality digestible protein and considerable amounts of calcium. Results of the study have potential to impact food consumption of children worldwide.

- d. CSREES Funding – **\$116,528.45**
State Matching – **\$67,403.43**

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Goal 3 – 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 – FF-NEWS Multi-county Agents and 1862 Family and Consumer Sciences Agents participating in the FF-NEWS program provided 576 in-depth lessons in basic nutrition to program participants. Topics addressed were: obesity, basic knowledge of nutrients, understand the Food Guide Pyramid and the Dietary Guidelines for Americans, and the connection between physical activity, nutrition, health, and wellness.

Food stamp participants in the program were made aware of the interrelationship between caloric intake and obesity. Multi-county agents provided nutrition lessons on the health consequences of obesity such as: coronary heart disease, diabetes, elevated blood pressure and cholesterol levels. Emphasis was placed on the distinction between obesity and overweight. The agent discussed dietary patterns, serving sizes and the inclusion of more fruits and vegetables into the participant's daily diet. Program participants were encouraged to develop self-monitoring and sustainable diet and health practices throughout nutrition education sessions.

Food demonstrations that incorporated the concepts of healthy eating as set forth by nutrition standards and guidelines were conducted for participants to observe and sample the finished products. Nutrition related exhibits and displays along with accompanying handout materials, and interactive activities were part of the FF-NEWS educational presentations.

- b. Impact(s) – Nutrition education resulted in 59,771 total contacts with program participants. Direct contact with the targeted audience was made through 1,564 educational sessions to 35,037 participants. Five hundred ninety four (594) requests were made by program participants for additional information on basic nutrition concerns.

As a result of this program, 2,066 program participants indicated the following changes made to their diet/lifestyle.

- 38% Increased knowledge of nutrition
- 54% Selected healthy food choices when deciding what to eat
- 47% Provided their children with something to eat in the morning within two hours of waking up
- 49% Reduced food portion sizes
- 74% Ate fresh fruits and vegetables as part of their daily diet

- 62% Read food labels and select low salt or sodium items
- 62% Read food labels and select food with less fat
- 68% Practice washing hands in hot soapy water for at least 20 seconds before handling food
- 35% Increased physical activity

Listed below are typical comments from program clientele on their increased knowledge of nutrition concerns upon completion of FF-NEWS sessions:

The FF-NEWS recipes came in handy when I didn't know what to fix for my family. -Cross County

I now buy food when it is on sale and store it the right way, so I will have food for my family. -Lincoln County

I read food labels often to see what nutrients are in the foods. -Woodruff County

I've learned to eat more fruits and vegetables daily. I will be using more canned goods when certain foods are out of season. -St. Francis County

I like this program because it lets us know about foods and the number of servings. -Desha County

Research data on nutrition indicates a need for comprehensive nutrition education intervention programs designed to help limited resource participants select and prepare meals consistent with cultural traditions while increasing the likelihood of the participants making safe and healthy food choices consistent with the most recent advice as reflected in the Dietary Guidelines for Americans and the Food Guide Pyramid.

- c. Source of Federal Funds
 - CSREES Funding – **\$4,000.47**
 - State Matching – **\$8,160.25**
 - Other Funding – **\$133,557.53**

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

Executive Summary

Research program 8 support goat production as an alternative to large ruminant animals (cattle) for small- and limited-resource farms. Goats, generally reported to have less negative impact on the environment compared to cattle and swine, are being studied to determine stocking densities and pasture types best suited to small farm production. Confinement studies are being conducted to study the interaction of stocking density and goat feeding behavior on weight gain. This research will provide critical information needed to determine profit margins for goat producers. Goats also have the potential of utilizing low-quality crop by-products. These by-products are being incorporated into the feeding experiments.

Goal 4 – Research Program 7 – Integrated Pest Management

- a. Research scientist retired and the project was terminated.

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Goal 4 – 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 – Many small- and part-time farmers are continually looking for affordable and productive alternatives to costly large farming systems. Small ruminants, such as goats and sheep are affordable and have convenient body size for low-income farming systems. The small body sizes of sheep and goats enable the small farmer to stock greater numbers, and capital investments for equipment required in sheep production is less than that for cattle. Consequently, goats are becoming increasingly attractive to limited-resource farmers in southern Arkansas. Goats can also, utilize low-quality crop by-products to produce high-quantity protein. In the U. S., goat farmers have small flocks or herds (50 or fewer animals). The nature of small ruminant production systems results in an environmentally friendly alternate enterprise for small- and limited-resource farmers. Specifically, this area of research is designed to: (1) increase the understanding of utilizing crop by-products as animal feed to reduce production costs and protect the environment, (2) develop strategies to determine the level of dietary supplementation required when feeding crop by-products to sheep and goats, and (3) document feeding and general management, and grazing efficiency incurred in a mixed grazing system. The first and second year findings of the research show that by harvesting forage or grazing at the late flowering stage, the farmer will benefit from higher digestibility of the forage by the animals. However, higher yields of dry matter (DM) are obtained when the forage is harvested during the mature seed stage.

In 2004, a free-range styled grazing management system was used to estimate grazing efficiency of mature and obese goats browsing on a five acre pasture compare to those on a two-acre pasture. Goats received concentrate grain rations prior to the browsing trial. Crossbred Boer female goats and wethers were randomly assigned to the two pastures at varying stocking density. The pastures had abundant native grasses and shrubs at late maturity before being stocked with goats. The two pastures were stocked as follows: pasture A (two acres) was stocked at the rate of 4.5 goats per acres including one nursing doe whose kid was allowed to free-range; pasture B (five acres) was stocked at the rate of 2.8 goats per acre including three nursing does whose kids were allowed to free-range. All goats received only water and trace mineral salt block ad-libitum. The goats were not given supplemental grain concentrates. The goats browsed in the pastures for eighty-five days (August 30 to November 23, 2004). The result showed an average weekly negative wet gain (we loss) of -0.53 percent for the goats stocked at the rate of 2.8 goats per acre compare to -0.28 percent those stocked at 4.5 goats per acre. Although the weekly weight loss was not significant ($P > .05$), the cumulative weight loss for the 85 days' span for both stocking levels of the experiment was significant ($P < .05$). However the nursing kids gained moderate weight during the experiment. The result of

this study indicates that obese and mature goats can be maintained with all forage diets at stocking densities of 2.8 to 4.5 goats per acre during the late summer and early spring months without adverse weight loss in a sustainable pasture environment.

- b. Impact(s) – Mature goats could be maintained without adverse effects in a well-grown mixed forage pasture without additional grain given to the goats. Also, stocking goats at the rate of 2.8 or 4.5 goats per acre would produce similar results provided that the densities of forage in both pastures are about the same. Information collected from these exercises would enable farmers to know that (1) mature animals can be maintained adequately without grain supplementation in a well-grown pasture; (2) depending on the length of time exposed in the pasture, goats can be stocked as low as three goats per acre for a prolonged browsing period. Adopting these ideas would reduce production cost and hence increase the farmers' income without adverse impacts on the environment.
- c. Scope of Impact – National
- d. CSREES Funding – **\$143,128.88**
State Matching – **\$80,078.24**

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

Executive Summary

Two research program and two Extension programs addressing the quality of life for Americans are conducted under goal 5 at the University of Arkansas at Pine Bluff. Research program 9 is directed toward the decline of minority farmers in the Lower Mississippi Delta (LMD). This program has facilitated the transfer of information to state and federal agencies that serve small- and limited-resource farmers. Interviews were conducted with 755 farmers in 31 counties. Employees of agricultural agencies were also interviewed. The investigator developed seven recommendations for farmers, agricultural researcher and government agency personnel designed to reduce the loss of minority and small-limited resource farms.

Research program 10 investigated the link between student problems in school and the level of parental involvement. This year a Head Start component was added. Different strategies for promoting parental involvement were tested with the overall objective of determining the influence of parental involvement on student achievement and/or problem level. Preliminary evaluation show increased parent evolvment.

Extension program 6 utilizes several approaches to stimulate achievement in children from low-income minority families. The Young Scholars program designed for children age 6 to 15 and their parents were conducted in two Delta counties, promotes male responsibility. Teens on the Go, a newsletter, was developed to help adolescents with life decisions. Six issues were developed in 2004 covering topics such as sexuality and substance abuse. Youth evaluate the newsletters and suggest future topics. The Early Childhood and Education program helps child care professionals to be effective care providers.

Goal 5 – Research Program 9 – The Economic Status and Behavior of Minority Farmers in Arkansas

Key Themes: Impact of Change on Rural Communities, Families at Risk

Focus Area: Small Farms and their Contributions to Local Economies

- a. Brief description of activities – This project was designed to investigate the casual factors of the decline of minority farmers in Lower Mississippi Delta (LMD). The decline of minority farmers in the Arkansas Delta has been greater than the national average and, prior to this study, there was little or no research on the economic behavior and status of minority farmers in Arkansas. Historical trends of minority farmers was studied and documented from the early 1900s to the present using data from the U. S. Census of Agriculture. Interviews and focus group discussions were conducted with 755 farmers in 31 counties in the LMD. Agricultural agency personnel were also interviewed. In order to ensure sufficient information on the minority farm population, the project focused on counties that had at least 10 minority farmers. Through this process both quantitative and qualitative data were collected and analyzed.

The average minority farm in Arkansas is smaller than the national average. Arkansas also has a higher minority tenancy rate, or conversely the nation has a higher minority farm ownership rate than Arkansas. The rate of the decline in minority farms in the nation and in Arkansas began to reduce in the 1980s. However, data indicate that most minority farmers are operating at a small- or no-profit level. Most are subsidizing their farms with off-the farm income. Minority farmers have difficulties accessing credit, markets and market information. Recommendations supported by this project include: 1) minority farmers should become more aware of market demand and how they affect production decisions; 2) farmers should be more proactive in seeking market information; 3) the size of minority farms lend themselves to cooperative marketing to gain bargaining power; 4) value-added processing should be developed to capture a larger share of the consumer dollar; 5) research and improvements in technology suited for small farms are needed; 6) government farm programs need to be more “minority-farm-friendly” to reduce alienation and marginalization of the minority farm population; and 7) collaboration between researchers and minority farmers should be increased.

- b. Impact(s) – The impact of this research will depend on the receptivity of project finding by governmental and research institutions. The potential reduction in the rate of loss in farm families, including minority farm families, could have a tremendous impact on the revitalization of rural communities. Economic vitality of small farms will result in increased vitality of rural communities in the Lower Mississippi Delta.
- c. Scope of Impact – Southeast Region

- d. CSREES Funding – **\$89,706.43**
State Matching – **\$54,623.05**

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Goal 5 – Research Program 10 – Improving Quality of Life

Key Theme: Other – Parental Involvement in Schools

- a. Brief description of activities – The Parental Involvement Program was expanded to include Head Start. Approximately 200 head Start employees responded to a national survey on parental involvement. Survey results indicate that the family involvement component in Head Start promotes regular interaction between parents, teachers and directors. Seventy-five (75) Head Start graduates were nominated to appear in a book profiling outstanding Head Start graduates.
- b. Impact(s) – The major impact of the program has been the continued focus on strengthening parental involvement in schools in the State of Arkansas through the passage of ACT 603 which requires public schools to create a parental involvement plan. The project director provided technical support to parent coordinators from partnership schools to develop their plans. Parent coordinators assisted with the development of a two-day Family Involvement Summer Institute that focused on the importance of establishing partnerships between schools and families. Approximately 120 parents, teachers, parent coordinators and school administrators attended the Institute. Attendees represented 22 public schools throughout Arkansas and two (2) higher education institutions. Evaluation results and follow-up surveys indicate the parent-school interactions increased.
- c. Scope of Impact – Statewide
- d. CSREES Funding – **\$78,977.32**
State Matching – **\$49,506.74**

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Goal 5 – Extension Program 6 – Family and Youth Programs

Key Theme: Children, Youth and Families at Risk

- a. Brief description of activity – Young Scholars Program is implemented in two counties in the Delta Region of the state, Monroe and Lee Counties. The program targets low-income, minority children, ages 6-15 and their parents who live in housing projects. The program promotes male responsibility and teams boys with their fathers/grandfathers and other role models.

Issue: (Who cares and Why?)

Minority children from low-income families frequently experience inadequate readiness for school. Many of these children come from homes where parents neither have the skills to prepare them for school nor to help them succeed once they are there. It is no wonder then that an increased number of minority 17-year-olds experience difficulty in such school subjects as reading, math and science, not being able to demonstrate essential tasks such as calculating decimals or summarizing a newspaper article. Parenting is a complex and demanding role. Families experiencing stress and deprivation caused by poverty, unemployment, family disorganization, and inexperience are more likely to experience difficulties in being responsive parents. Children in these families are likely to be at risk of abuse and neglect, academic underachievement, and behavior problems. With appropriate education, families and other caregivers can obtain the confidence, knowledge, and skills they need in order to deal with children effectively.

What Has Been Done?

A Young Scholars Program, in its 8th year of implementation, is designed to reverse the poor academic trends of low-income, minority children and help them succeed in school. The program, offered in two counties in the Delta Region of the state, promotes male responsibility and targets low-income, minority children, ages 6-15, their families and organizations/agencies that service low-income families. Special emphasis is placed on boys and their fathers/grandfathers and other role models. Two Extension human sciences educators (paraprofessionals) provide leadership to the county program.

Ninety-one (91) children, referred to as *Young Scholars*, meet one hour per day, five days a week in an after-school program that is year long. The program is conducted in housing projects for low-income families in Monroe and Lee Counties. The facilities are furnished by the housing authorities in both counties at no cost to the program. The university entered into agreement with both governing boards. The children are taught math and science skills using subject matter areas in agriculture and human sciences. The children engage in learning experiences that strengthen character, develop conscience, build social and problem solving skills, enhance the development of high self-esteem, and teach civility, respect, citizenship, individual and social responsibility and how to resolve

conflict. Once the children reach age 16 they remain in the program and serve as mentors for the younger children.

Each year the children spend a week in summer day camp to further refine the skills learned in the after-school program. They are taught by scientists at the University of Arkansas at Pine Bluff who set up mobile laboratories in the counties. Day camp closes with an award recognition banquet to showcase the achievement of the children.

The program reaches the entire family. Parents serve as volunteers for the after-school program and participate in weekly group meetings. The educational component for the parents includes the curriculum for the children as well as information on parenting education, job related skills, stress management and coping skills, family relationships and economic and self-sufficiency skills.

Key stakeholders, including some of the children and parents enrolled in the program, serve on a task force in each county to oversee the implementation and evaluation of the program. The program also utilizes a mentoring phase which connects middle-income, mainstream minority families to low-income families. These mentors are important resources and help the program promote male responsibility and focus special attention on boys.

b. Impact: (So What?)

Program evaluation indicates a major transformation in the children and families. As a result of the program the children have improved school performance in math and science, an increased sense of self-worth and more effective social and problem solving skills. The five of the first six graduates of the program are in college. Three parents and two of the children reported the success of the program to state legislators last fall in Little Rock. There is evidence that some of the families have achieved skills for managing resources. Some have improved their financial position by controlling debt and increasing savings. Twelve families participated in an asset building program with the Good Faith Fund in Pine Bluff. Two families are now home owners. Inspired by the achievement of their children some parents are studying for the GED, some are enrolled in community college and one is enrolled at the University. The accomplishments of the children suggest that many parents have gained the confidence, knowledge and skills associated with effective parenting.

a. Brief description of activity --TEENS ON the GO is a newsletter series to help youth make better decisions.

Issue: (Who cares and Why?) Adolescents face critical decisions about such problems as substance abuse, teen pregnancy and sexually transmitted diseases. Parents and peers play a role in influencing youth to make the kinds of choices that will enable them to make the most of their potential and opportunities. Adolescents must make decisions that help them resist problems and guide them toward a productive and self-reliant adulthood.

They need to be connected to caring and supportive adults who can challenge them to reach their full potential.

What Has Been Done? More than two decades ago, the 1890 family and child development program formed a partnership with 1862 county-based faculty to: 1) reach Arkansas youth with information that complemented the teachings in the 1890 adolescent pregnancy prevention program, 2) address critical issues, perhaps too sensitive for them to discuss with others, 3) empower teens to make critical decisions that have long term consequences, and 4) appease students in the adolescent pregnancy prevention program who complained that the classes were not long enough (although four full days were spent in each school). The 1890 family and child development specialist decided that a newsletter would be an appropriate vehicle for reaching this audience. She named the newsletter, *Teens on the Go*, to capture the high energy level of adolescents and to communicate the unlimited potential of this group for accomplishing significant goals and making the world a better place to live. FY 2004 marked the 25th year that she has developed the newsletter which targets public school students in grades 7-12. Offered bi-monthly, the newsletter is distributed at the schools during the school year. Six issues are developed each year. Each issue addresses a single topic. At the request of students, each year one issue is devoted to sexuality, while another addresses substance abuse. Students evaluate the newsletter each year and suggest topics for future issues.

b. Impact: (So What?)

In FY 2004, students in 37 Arkansas counties read *Teens on the Go*. Total contacts with teens exceeded 83,000.

Teens had this to say about the FY 2004 newsletter:

This newsletter is full of interesting information that teenagers need to know. I learned things that will help me now and in the future. I have learned to say *No* and not give in to pressure. -A teen

Teens on the Go is very important and informative. It is a good source of information. It helped me understand the life-changing effects of STDs. -A teen

I wish every student could read this newsletter. I wish we could get them every week. They have helped me a lot with family problems. The topics are what we care about. -A teen

These newsletters helped me to improve my self-esteem. I now know how to pick true friends because of *Teens on the Go*. I have learned that abstinence is a choice with results we can live. -A teen

The newsletters are very informative, especially about issues that are hard to talk about. The newsletters have helped me to stay focused, not only on what is important but also

what is right. I have learned to always do the right thing no matter who or what anyone thinks. -A teen

Theme: Child Care/Dependent Care

- a. Brief description of activity – The Early Childhood Care and Education Program is a partnership effort that prepares child care professionals to work effectively with you children.

Issue: (Who Cares)

The home environment is important not only to a child's development, but also to his or her readiness for school and subsequent school performance. There is a critical need for renewed effort to increase parent's awareness of the relationship between early home experiences and later school readiness and success. The child needs the proper care provided by the family but also can benefit from the experiences provided through high quality early childhood programs and services. A large amount of information now exists on the positive outcome for children who attend quality preschool programs. Research indicates that the impact of good early childhood care and educational experiences can be long lasting. Children from disadvantaged backgrounds benefit even more from quality early care and education programs. A longitudinal study followed children from low-income families who were enrolled in a quality preschool program through childhood and the young adult years. The impact of the preschool program was clear. The children who attended the quality preschool program were more likely to:

- score higher on school achievement tests
- have less need for special education classes
- stay in school until graduation
- get into less trouble with the law
- avoid becoming teen parents, and
- become gainfully employed as young adults.

Researchers found that in general, attitudes toward school and skills for success in school were improved by participation in a good early childhood program. The data indicated that society can save almost seven dollars worth of later services for every dollar spent on preschool programs.

Research further shows that good preschool programs nurture creativity. They help children develop positive social skills. They also provide opportunities for children to develop thinking and problem-solving skills. But high-quality preschool programs are expensive.

What Has Been Done?

During the 2004 legislative session, the Arkansas Legislature enacted Act 49, requiring the state to provide quality pre-kindergarten services for three and four year - old

children living in families earning up to 200 percent of poverty, roughly \$37,000 for a family of four. Funding was provided totaling \$40,000,000 to expand pre-kindergarten services. Although not nearly enough to meet the state's needs, these funds provide a good beginning for creating the path to ensure that the state's young children are ready to learn when they enter school.

A number of years ago the Early Care and Childhood Education Program at Arkansas State University and the 1890 Family and Child Development Program formed a partnership to meet the state's need for quality programs for young children through providing high-quality in-service training for early childhood education professionals. The specialist provides training at the district level and teaches two workshops each year at the Early Childhood Education Conference sponsored by Arkansas State University. All early childhood education professionals (representing family day care homes, childcare centers and Head Start) are usually in attendance at these trainings. The 1890 program provides the curriculum. The focus of the 1890 program includes: understanding stages of child development and learning, strategies for working with groups of young children, importance of and achieving small group size, developmentally appropriate activities for young children, a child-centered program, using a positive guidance approach, parental involvement and initiating a parent-focused program. In the 1890 program the educational services for children promote their cognitive development, while activities for parents both support parenting and also encourage the parents' own development and learning. As parents pursue their own educational and employment opportunities, they can increase the family's income, over time reducing the direct impacts of poverty on the child. This three-prong approach (promoting child development, enhancing parenting skills and providing adult economic and self-sufficiency services) is a promising intervention strategy for helping families overcome some of the challenges they confront. Over the years early childhood education professionals, using the 1890 curriculum, have taught a variety of parenting classes, including: 1) Balancing Work and Family, 2) Merchandizing Your Job Skills, 3) When There's Not Enough Time, 4) Finding the Job You Want, 5) I'm Positive: Growing Up With Self-Esteem, 6) Self-Esteem in Parents and Children, 7) Play: A Vehicle for Learning, 8) Helping Children Grow Toward Self-discipline, 9) Sharing Parenting Responsibilities, 10) Communicating With Young Children, and 11) Using Positive Guidance Techniques.

The specialist taught these two workshops at the Early Childhood Education Conference in FY 2004:

- 1) Helping Babies Learn, and
- 2) Fathers Are Caregivers, Too

- b. Impact: (So What?) Arkansas is one of 40 states that do not require providers who care for young children in their home to have any childhood training prior to serving children. Arkansas is also numbered among the states that allow teachers in childcare centers to

start work without prior training. The 1890 program focuses on factors that make for a quality program (such as skilled teachers and staff who understand stages of child development; how to work with groups of young children; using positive guidance techniques; providing developmentally appropriate activities for children; parental involvement; and initiating a parent-focused program. These principles of quality are embodied in the criteria that the National Association for the Education of Young Children (NAEYC) use when accrediting early childhood care and education programs. The 1890 family and child development area has made a significant contribution to developing quality early care and childhood education programs in the state. It has added value to the early childhood education professionals and the communities they serve and has advanced best practices that embrace quality programs. Head Start is an example of the impact of a high quality program. All Head Start classrooms are licensed by the state and 45 percent have been determined quality centers by NAEYC and/or Arkansas Quality Approval System. Head Start accounts for 84 percent of NAEYC Accredited Centers and 36 percent of Arkansas Quality Approved Centers. This means that these centers have reached a high level of excellence in its program for young children. Another achievement that is noteworthy, Arkansas has recently been recognized by the National Institute for Early Education Research for outstanding quality standards for pre-K programs. As a result of the parent education focus, early care and childhood education professionals report an increase in the program's influence on parents' expectations of children, an increase in the number of parents reporting that they interact with their children in a warmer, more positive fashion, an increase in the number of parents who have re-arranged the home to provide learning opportunities for the children, and an increase in the number of parents reporting spending more time talking and reading to their children

All of the programs reported under this goal contribute to enhancing the economic opportunity and quality of life for Americans. These programs use research-based information to help parents achieve self-sufficiency skills in the Young Scholars Program. Program efforts are strengthening the problem solving, decision making, social and academic skills of students and providing quality early childhood education for young children.

- c. Scope of Impact – The Young Scholars program is implemented in two counties. Other programs have state-wide impact.
- d. CSREES Funds – **\$287,823.35**
State Matching – **\$190,476.36**

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**ANNUAL REPORT OF ACCOMPLISHMENTS AND RESULTS – POW
October 1, 2003 - September 30, 2004**

Part II – AQUACULTURE/FISHERIES RESEARCH AND EXTENSION PROGRAMS

Executive Summary

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

In 2004, the UAPB Aquaculture/Fisheries Center of Excellence continued to play a key role in assisting catfish farmers to recover from the recent years of severe financial distress and baitfish farmers to prevent the spread of the OIE-reportable disease, Spring Viremia of Carp. The activities that contributed to these initiatives were developed in the two areas of catfish and baitfish production and management under Goal 1. Specific output under this Goal in 2004 included: 1 book chapter on catfish and 2 that covered both catfish and baitfish, 4 refereed journal articles specifically on catfish, 4 specifically on baitfish, and 1 journal article that was applicable to both catfish and baitfish, 1 fact sheet and 1 bulletin specifically on catfish, 1 laminated hangtag for baitfish, and a fact

Goal 4 – Greater harmony between agriculture and the environment

UAPB is rapidly developing its new priority program area in Recreational Fishing in the Delta, under Goal 4. The volume of output is increasing rapidly. This scientific output is being utilized actively by the Arkansas Game and Fish Commission in their deliberations related to managing the natural fisheries populations of the state. Specific output in 2004 included: 1 book chapter, 6 refereed journal articles, and 2 Extension bulletins. There were also 8 abstracts published in addition to 15 scientific presentations and 3 presentations to stakeholder groups.

Stakeholder Input Process

Stakeholder input is a continuous process in the Aquaculture/Fisheries Center. In the early part of 2004, researchers and extension specialists devoted time to meeting with the respective trade and professional associations related to aquaculture and fisheries. These include the annual meetings of the Catfish Farmers of Arkansas, the Arkansas Bait and Ornamental Fish Growers Association, the Aquaculture Division of the Arkansas Farm Bureau, the Arkansas Chapter of the American Fisheries Society, and the Arkansas Catfish Promotion Board. During these meetings, individuals have the opportunity to discuss research and extension programming needs with industry representatives. Several members of the Aquaculture/Fisheries Center are requested to meet with the respective boards of the major trade and professional associations in the state. The boards use this as an opportunity to discuss specific research and extension needs of their industry. Scientists and extension personnel then bring these needs back to staff meetings of the Aquaculture/Fisheries Center for discussion and prioritization. The bi-annual Arkansas Aquaculture Field Day was held in October, 2004. This is an important time to both extend and present the latest research results to stakeholder groups, but also to interact in an

informal setting throughout the events of the day. Much important information is shared during the Field Day in terms of additional research and extension needs and programs.

Throughout the year, Extension specialists relay additional research and Extension programming needs to other faculty and staff through the monthly meetings of the Aquaculture/Fisheries Center. Since Extension faculty are integrated with research and academic programs within the Aquaculture/Fisheries Center, input into Extension activities and programming is also obtained from research and teaching faculty. Four fish health laboratories provide ample opportunities to discuss farm-level problems with growers and to identify research and extension programming needs.

The National Fisheries Advisory Council, composed of local, state, and national representatives, provides advice and guidance to the program. The council members are selected to ensure to have adequate representation from all sectors of the aquaculture industry and to have representation on natural fisheries issues, problems and priorities.

Program Review Process

All Evans-Allen research projects and manuscripts that are to be submitted to refereed journals for publication undergo an internal review. The reviewers sign a form to indicate when the manuscript is deemed ready to be submitted. In addition, 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.

Several programmatic changes were made in response to the external evaluation. The extension appointment of David Heikes was changed to provide for a greater time allotment for work on the fish grading equipment. Also, more research information is being included in the Extension newsletter that is published. The web site for the Aquaculture/Fisheries Center has been expanded to include more research summaries and information.

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 3 university scientists who meet annually to review and recommend new directions for the UAPB Aquaculture/Fisheries Center.

Goal 1 – Research Program 3 – Extension Program 2 – Catfish Production and Management

Executive Summary

Research

Catfish research in 2004 focused on five main problem areas identified by stakeholder groups: production economics of catfish production, fish health, aquaculture engineering, catfish marketing, fish nutrition, and water quality management. Specific initiatives conducted in 2004 included:

- a. Optimizing cash flow in catfish aquaculture
- b. Fish disease biosecurity
- c. Grading catfish for the foodfish market
- d. Evaluation of preferences for farm-raised catfish
- e. Improved diet formulation and strategies for restricted feeding rations
- f. Impacts of drift of herbicides on fish pond water quality

Specific published research output in 2004 included: 1 book chapter on catfish and 2 that covered both catfish and baitfish, 4 refereed journal articles specifically on catfish, and 1 journal article that was applicable to both catfish and baitfish, 1 fact sheet and 1 bulletin specifically on catfish, and a fact sheet applicable to both catfish and baitfish. There were also 24 abstracts published exclusively on catfish and 4 applicable to both catfish and baitfish. In addition, there were 39 scientific presentations exclusively on catfish topics and 9 applicable to both catfish and baitfish.

Extension

Catfish extension programs conducted in 2004 included programs in the areas of improving cash flow in catfish aquaculture through development of new spreadsheet tools for improving financial management, educational programs on fish disease biosecurity to reduce the risk of transferring diseases from farm to farm and from pond to pond, demonstration of in-pond grading technology for foodfish producers, and catfish yield verification.

Catfish prices began to recover in 2004, but the financial distress of the industry continued as farms continued to experience high debt levels that continued to generate financial stress on farm businesses. Extension assistance provided by the UAPB Aquaculture/Fisheries Center continued the emphasis on intensive financial analysis of existing farm operations to improve financial decision making. Additional farm financial analysis tools were developed and extended to growers and used in the Trade Adjustment Assistance Training conducted in 2004. The Center continued to provide assistance to the lending community from banks to FDIC and state examiners to understand the situation of the catfish industry. Fish disease and water quality diagnostics services continued in addition to the new initiatives in fish biosecurity. The in-pond

grading technology continued to be demonstrated and continues to be adopted by the industry. Catfish Yield Verification was re-designed and active during 2004 with wireless data acquisition technology and active use of the web site for up-to-date communication of farm production performance. There were 2 Arkansas Aquafarming articles on catfish and 2 applicable to both catfish and baitfish. There were also 16 extension presentations at catfish producer meetings and 6 presentations applicable to both catfish and baitfish. Overall, the UAPB Aquaculture/Fisheries Extension program provided 151 consultations on farm financial planning in 2004 and provided a total of 11,281 contacts with catfish farmers in 2004.

Project 1 – Optimizing Cash Flow in Catfish Aquaculture

Impact Area – Research/Extension

Key Themes: Competitive agriculture systems in a global economy

- a. Brief description of activity – For two years leading up to November of 2004, catfish prices have been depressed by competition from inferior imported fish and by a slow US economy. During this period many farms experienced critical cash flow problems that continue today and that are expected to worsen as additional imported fish are dumped in US markets. Many farms are on the brink of foreclosure. Scientists at UAPB investigated new feeding strategies designed to maximize cash flow during critical periods. New spreadsheets were developed for farmers to predict strategies to optimize cash flow. Extension personnel assisted farmers and lenders by physically assessing pond inventories and by organizing farm record keeping and accounting practices. The Catfish Yield Verification Program provides a database on production performance indicators that can be used as benchmarks for performance of individual farms. Cooperators included: Steeve Pomerleau, David Heikes, and Larry Dorman from UAPB, and the Catfish Farmers of Arkansas.
- b. Impact(s) – Research showed that common practices to reduce feed costs were having a devastating effect on cash flow and yield and suggested new strategies that would be far more efficient. These strategies were included in the spread sheets and used by farmers and Extension to develop husbandry and financial practices that enabled farmers to obtain new loans and keep their businesses. Data from the Catfish Yield Verification Program demonstrated the cost savings possible from careful management of aeration strategies.
- c. Scope of Impact – Mississippi Delta Region (MS, AR, LA)

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Project 2 – Fish Disease Biosecurity

Impact Area – Research/Extension

Key Themes: Competitive agriculture systems in a global economy

- a. Brief description of activity – Infectious diseases are a major source of loss in commercial aquaculture. Reduction of these losses requires timely disease diagnosis, accurate management recommendations, and cooperative development of biosecurity programs. UAPB maintain 4 fully equipped fish disease diagnostic laboratories. These have diagnosed more than 2300 cases in the last year and conducted numerous fish health inspections. Biosecurity education programs have been presented to the industry. New rapid diagnostic tests for viral disease of fish have been developed.
- b. Impact(s) – If work done by our diagnostic program saves only 10 % of the fish in ponds associated with diagnostic cases submitted to our laboratories (a very conservative estimate), savings to Arkansas farmers amount to more than \$7,000,000/yr. In addition, more than \$1,000,000 in fish every year are exported to other states and countries based on health inspections available only at UAPB.
- c. Scope of Impact – Mississippi Delta Region (MS, AR, LA)

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Project 3 – Grading Catfish for the Foodfish Market

Impact Area – Research/Extension

Key Themes: Competitive agriculture systems in a global economy

- a. Brief description of activity – To more successfully compete with imported fish, the U.S. catfish industry must increase production efficiency and reduce processing costs. Of critical importance is managing production and harvesting systems to provide a steady supply of appropriately-sized fish to processors. Size variation, oversized fish, and undersized fish cause the industry millions of dollars in increased processing costs each year. An in pond fish grader originally developed at UAPB to grade fingerlings (and now widely adopted by the industry) has been scaled up and modified to handle thousands of pounds of large fish at a rate sufficient to meet the demands of harvester and farmers. The grader efficiently grades fish into 3 sizes (adjustably) and produces a product in a narrow size range that maximizes processing efficiency. Successful demonstrations and actual use of the grader in commercial situations has occurred and collaborative work is underway with processors to adopt this new technology. Preliminary estimates by the largest catfish processor in Arkansas are that large tightly graded fish may increase plant output by nearly two-fold.
- b. Impact(s) – The in-pond grading technology developed at UAPB has been adopted on more than 15 major aquaculture production facilities. While previous work had focused on further developing fingerling grading technology, the most recent focus has been on improving grading of food-sized channel catfish at harvest. Several major improvements have been made to the in-pond fish grader design resulting in a renewed interest in food-fish grading at both the producer and processor level. Additionally, a new crowding system has been developed to decrease the labor and fish handling stress associated with grading and loading out catfish from production ponds. An in-depth economic analysis of the food-fish grading technology has been completed and confirmed that adoption of the UAPB fish grading technology has a positive net benefit at the producer level.
- c. Scope of Impact – Mississippi Delta Region (MS, AR, LA)

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Project 4 – Evaluation of Preferences for Farm-Raised Catfish

Impact Area – Research/Extension

Key Themes: Competitive agriculture systems in a global economy

- a. Brief description of activity -- The retail grocery and food service sectors constitute important catfish market channels that need to be examined. In particular, their preference structure and their perceptions of catfish compared to other finfish products that they handle need to be assessed. This is because the relationship between these industries and their customers is primarily based on the ability to supply quality fish. Thus, the preferences and perceptions of these retail grocery and food service operators could help to position catfish as a high-quality product. In addition, one effective marketing strategy for meeting the competition is for the industry to differentiate its products from the competition. By determining the preferences of grocers and restaurateurs, the industry can market catfish products to directly meet their needs. The study involves a nationwide survey of retail grocery outlets and restaurants. It is envisaged that the marketing strategy of labeling, emphasizing “U.S. farm-raised catfish” can be better pursued at the retail market level. Proper household-size retail packages for catfish could be used to provide labeling information on origin, price, quality, nutrition, product safety and other relevant product information to consumers. That way, a positive relationship could be developed between consumers and U.S. catfish to establish a US farm-raised brand equity and loyalty, and probably a guarantee of quality and safety. The study evaluates grocery-retail demand for retail catfish packs, including a determination of factors that may be necessary for developing such retail packages. An assessment will also be made about the use of origin as a cue for food safety and quality.
- b. Impact(s) – Retail food sales continue to attract a larger share of consumer expenditures on food accounting for over 52% of total household food expenditures. The grocery retail outlet presents potential for increased sale and demand for catfish products but has not been explored. It could result in increased profitability for producers and processors if consumers are willing to pay a higher price for a U.S. farm-raised brand.
- c. Scope of Impact – Mississippi Delta Region (MS, AR, LA)

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Project 5 – Improved Diet Formulation and Strategies for Restricted Feeding Rations

Impact Area – Research/Extension

Key Themes: Competitive agriculture systems in a global economy

- a. Brief description of activity -- While marine fish oils are very important components in the diets of both fish and humans, there is increasing pressure to minimize the use of marine fish products in animal feeds. In order to promote the health of both humans and fish, substitutes for these marine resources must be found. UAPB scientists have conducted a series of studies to find replacements for fish oil in bait and ornamental fish feeds and have completed studies to find non-marine lipid sources that will improve the nutritional profile of freshwater fish. Restricted access to operating capital has forced some catfish farmers to restrict the quantities of feed fed to ponds. Three different pond studies were conducted to evaluate performance of catfish when fed every other day in multiple batch production systems.
- b. Impact(s) – Fatty acid supplements significantly increased the levels of healthy fatty acids in fish muscle, indicating the practical potential for manipulating channel catfish composition to benefit human health. It was found that there is no apparent advantage to use of marine fish products in baitfish diets, which may reduce diet cost and enhance sustainability of the industry. The growth and survival of LMB were compromised by total removal of fish meal from the diets, however, the substitution of poultry and plant oils to the extent possible without compromising production could decrease feed cost by as much as 20%. Together, these findings show that the use of marine fish oils can be greatly reduced without an impact on human or fish health. Pond study results showed that feeding every other day results in lower growth and yield of catfish than if fed every day. However, while larger carryover fish do grow when fed every other day, growth of understocked fingerling catfish is severely curtailed. Feeding every other day will result in a reduced crop for the following year. Fully feeding ponds with smaller fish and restricting feeding to ponds with higher numbers of market-sized fish will generate improved economic outcomes than feeding the entire farm every other day.
- c. Scope of Impact – Mississippi Delta Region (MS, AR, LA)

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Project 6 – Impacts of Drift of Herbicides on Fish Pond Water Quality

Impact Area – Research/Extension

Key Themes: Competitive agriculture systems in a global economy

- a. Brief description of activity -- Much of Arkansas aquaculture production occurs in ponds immediately adjacent to row crops that are sprayed with pesticides applied by aircraft. Farmers have long suspected that drift produced problems in ponds, but there is little data available to help farmers, applicators, and state regulators evaluate the real risks. Studies have been conducted to determine the toxicity of common pesticides to crops produced in Arkansas including catfish, baitfish, ornamental fish, and shrimp. Additional studies have examined the potential of herbicide drift to kill planktonic algae in ponds. Loss of these algae would be expected to cause water quality problems and disrupt the food chains of some fish species.
- b. Impact(s) – Our studies have shown that herbicides have a very low toxicity to fish and that they are unlikely to kill pond algae at reasonable drift rates. Some pesticides were shown to be marginally detrimental to fish at high drift rates and extremely toxic to shrimp. The results of these studies are used by farmers to evaluate the likelihood of pesticide induced losses, by applicators to assist in decisions regarding safe chemicals and application conditions for treatments near ponds, and by the Arkansas State Plant Board when investigating fish kills.
- c. Scope of Impact – Mississippi Delta Region (MS, AR, LA)

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Total Allocated Resources – Catfish Production and Management

Research	CSREES – \$372,933.32 State Matching – \$286,278.34 Other Funding – \$69,292.91
Extension	CSREES – \$264,233.41 State Matching – \$184,648.31

Goal 1 – Research Program 4 – Extension Program 3 – Baitfish Production and Management

Research

Baitfish research in 2004 focused on 4 main problem areas identified by stakeholder groups: fish disease, fish nutrition, improved hatchery management, and improved pond management.

Specific initiatives in 2004 included:

- a. Fish disease biosecurity
- b. Improving baitfish nutrition
- c. Optimizing hatchery methods
- d. Optimizing stocking rates

Specific published research output in 2004 included: 2 book chapters (baitfish and catfish), 4 refereed journal articles specifically on baitfish and 1 applicable to both baitfish and catfish, 1 laminated hangtag for distribution to retail bait dealers, and 1 fact sheet applicable to both baitfish and catfish. There were also 7 published abstracts exclusively on baitfish and 4 applicable to both baitfish and catfish. In addition, there were 8 scientific presentations exclusively on baitfish and 9 applicable to both baitfish and catfish.

Extension

Baitfish extension programs conducted in 2004 included programs in the areas of fish disease biosecurity, fish nutrition and diets, demonstration of new hatchery methods, demonstration of new stocking rate strategies, and the new baitfish verification program.

The baitfish industry has been a stable industry for many years. Over time, however, costs have continued to increase slowly and have slowly eroded farm profits. New hatchery technologies that have been developed at UAPB over the last decade have been transferred successfully to the baitfish industry. These new technologies have allowed baitfish farmers to expand production levels on far fewer acres. This intensification has resulted in significant increases in farm productivity measures, decreased dependence on ground water resources, and reduced costs of production. Efforts continue to further refine and optimize the new technologies and continue to work to expand adoption of the new technologies to all farmers. There was 1 extension article published in Arkansas Aquafarming exclusively on baitfish and 2 applicable to both baitfish and catfish. There were also 15 extension presentations at baitfish producer meetings and 6 extension presentations applicable to other baitfish and catfish. The UAPB Aquaculture/Fisheries Center Extension program provided 12,648 individual contacts with baitfish farmers in 2004.

Project 1 – Fish Disease Biosecurity

Impact Area – Research/Extension

Key Themes: Competitive agriculture systems in a global economy

- a. Brief description of activity -- Infectious diseases are a major source of loss in commercial aquaculture. Reduction of these losses requires timely disease diagnosis, accurate management recommendations, and cooperative development of biosecurity programs. UAPB maintain 4 fully equipped fish disease diagnostic laboratories. These have diagnosed more than 2300 cases in the last year and conducted numerous fish health inspections. Biosecurity education programs have been presented to the industry and foreign animal disease surveillance programs established in the bait and ornamental fish industries. New rapid diagnostic tests for viral disease of fish have been developed.
- b. Impact(s) – Exotic viral diseases of cyprinid fish are a continuing threat to the bait and ornamental fish industries. We now conduct surveillance, inspection, and education programs for 5 dangerous viruses. Our surveillance programs have convincingly documented that the reportable SVC virus and devastating Koi Herpes Virus are not present in Arkansas aquaculture. This information is critical in maintaining markets for Arkansas farmers. Additionally, if work done by our diagnostic program saves only 10 % of the fish in ponds associated with diagnostic cases submitted to our laboratories (a very conservative estimate), savings to Arkansas farmers amount to more than \$7,000,000/yr. In addition, more than \$1,000,000 in fish every year are exported to other states and countries based on health inspections available only at UAPB.
- c. Scope of Impact – Mississippi Delta Region (MS, AR, LA)

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Project 2 – Improving Baitfish Nutrition

Impact Area – Research/Extension

Key Themes: Competitive agriculture systems in a global economy

- a. Brief description of activity -- We tested diets containing poultry meal versus fish meal+ blood meal (Year 1), and fish meal + poultry meal versus an all plant-protein diet (Year 2) in separate pond studies. Water quality confounded results in Year 1 but production was not reduced by poultry meal compared to fish meal + blood meal. Fry production was similar on an all-plant-protein diet compared to a commercial diet with fish meal + poultry meal. This study ran from 2002-2003. A series of trials has been conducted in ponds and pools looking at regular versus high fat levels and different types of fat (menhaden fish oil or poultry fat).
- b. Impact(s) – Growth tends to be higher on the regular-fat diet with 28-29% protein, but survival is better on the high-fat diets. Fish fed different types of fat had the same response to a low-temperature stress test (high survival across diets), but fish fed the diet with a high level of menhaden oil survived better than fish fed poultry fat (regular or high level) when exposed to high temperatures. Diets with high fat and protein levels reduced the time needed to achieve 0.5-gram fish by about two weeks.
- c. Scope of Impact – Mississippi Delta Region (MS, AR, LA)

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Project 3 – Optimizing Hatchery Methods

Impact Area – Research/Extension

Key Themes: Competitive agriculture systems in a global economy

- a. Brief description of activity – The new hatchery technologies to produce fry indoors were developed initially for golden shiners and then adapted for goldfish. However, there are a number of small-scale producers who raise primarily fathead minnows on a very extensive scale. Little is known about the potential for adapting more intensive hatchery techniques for production of fathead minnows.
- b. Impact(s) – Fathead minnows were shown to respond similarly to the other species in terms of egg removal and handling indoors. Further testing of the roughness of various types of spawning materials showed that rougher materials will retain a larger percentage of eggs. Use of appropriate spawning substrates will enhance egg retention and increase performance efficiency during the spawning phase.
- c. Scope of Impact – Mississippi Delta Region (MS, AR, LA)

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Project 4 – Optimizing Stocking Rates

Impact Area – Research/Extension

Key Themes: Competitive agriculture systems in a global economy

- a. Brief description of activity -- The majority of US bait and ornamental fish production occurs in Arkansas. Farmers face increasing pressure to keep prices low and must reduce production costs to maintain market share. The production changes most likely to provide this increased efficiency require increased pounds per acre of production and more consistent yields. Studies have been conducted to optimize feed formulations (vitamins, lipids, protein), hatchery methods (egg collection and hatching, fry handling), and stocking rates.
- b. Impact(s) – Recently completed studies have shown that appropriate feeding and stocking of golden shiner ponds can yield crops far in excess of industry averages. These methods are being adopted by farmers and if spread industry-wide will be expected to increase yields by 200 lb/acre (50%). Farmers can either reduce production acreage, saving \$550/acre annually in variable costs, or find new markets for the additional production. Net returns/acre have been estimated to increase by \$138 for every 50-lb increase in yield. If adopted by the entire industry, the impact would be a minimum of \$3.3 million per year.
- c. Scope of Impact – Mississippi Delta Region (MS, AR, LA)

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Total Allocated Resources – Baitfish Production and Management

Research	CSREES – \$179,747.41 State Matching – \$138,054.29 Other Funding – \$43,602.14
Extension	CSREES – \$236,183.15 State Matching – \$165,046.58

Goal 4 – Extension Program 7 – Recreational Fishing in the Delta

Executive Summary

Research

Research on recreational fishing began in 2003. This work focused on objectives that included enhancing the largemouth bass recreational fishery in the Arkansas River, improved hatchery methods for producing hybrid striped bass fingerlings for recreational fishing, community fishing programs, and improving recreational fishing in farm ponds. Specific initiatives in 2004 included:

- a. Stocking hatchery-reared fingerlings to improve largemouth bass populations in the Arkansas River
- b. Stock assessment of largemouth bass populations in the lower Arkansas River reservoirs
- c. Enhancing community fishing programs
- d. Improving recreational fishing opportunities in farm ponds and reservoirs

Specific published research output in 2004 included: 1 book chapter, 6 refereed journal articles, and 2 Extension bulletins. There were also 8 abstracts published in addition to 15 scientific presentations and 3 presentations to stakeholder groups.

Extension

Spending on recreational fishing generates a great deal of economic activity in the delta region of Arkansas as elsewhere across the nation. Recreation creates over \$200 million in direct revenue along the upper Mississippi River, over 3,000 jobs, and the even greater indirect effects. It is likely that the economic value of recreation in the Lower Mississippi River is of similar magnitude. In the Upper Mississippi River System, recreational fishing generated 31% of the total value of recreation, and was the most popular recreational activity. In addition to the recreational value of fishing in the rivers and streams in Arkansas, the thousands of farm ponds across Arkansas and the United States represent an opportunity to provide fishing opportunities for recreation and for profit for farm owners. Properly managed farm ponds will yield two to three times more fish than unmanaged ponds. The UAPB extension program provided 3,324 individual contacts with farm pond owners, organized 1 educational meeting with farm pond owners and an intensive in-service core curriculum training program for county agents.

Increased opportunities for young people to become involved in fishing may contribute to the development of positive attitudes towards environmental stewardship. Increased community fishing opportunities will contribute to community development. UAPB continues to work with the Arkansas Game and Fish Commission on the Community Fishing Program in Arkansas. The UAPB Extension Program provided over 25 individual contacts on community fishing, 381 youth participated in 4-H activities, and 68 in fishing derbies.

Project 1 – Managing Fish Populations in Delta Ponds

Impact Area – Research/Extension

Key Themes: Greater harmony between agriculture and the environment

- a. Brief description of activity – Private pond owners in the delta region of Arkansas rely on their ponds for watering livestock, irrigation, recreation, and food. In order to optimize these functions, pond owners need access to quality management information to prevent excess nutrient loads, fish population imbalances, or fish losses. The Arkansas Game and Fish Commission quit supplying sportfish fingerlings to pond owners and reduced its involvement in small pond management. Scientists and Extension Specialists at UAPB wrote and published two new booklets on farm pond management in collaboration with Arkansas Game and Fish and debuted a new web site with comprehensive information and links. Training on farm pond management was provided to Extension agents. A list of sportfish suppliers was published. New research projects were begun to investigate better methods of farm pond management.
- b. Impact(s) – Hundreds of copies of the new booklets and fish supplier lists have been requested. County agents are now doing water testing and providing better advice regarding weed management. The web site is experiencing hundreds of hits per month.
- c. Scope of Impact – Mississippi Delta Region (MS, AR, LA)

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Project 2 – Stocking hatchery-reared fingerlings to improve largemouth bass population in the Arkansas River

Impact area: Research

Key Themes: Greater harmony between agriculture and the environment

- a. Brief description of activity – Arkansas largemouth bass anglers are concerned about the low number of large bass (>5lbs) in the River and the general health of the population. The Arkansas Game and Fish Commission (AGFC) is stocking largemouth bass fingerlings in the Arkansas River as a means of rebuilding depleted stocks. This stocking program is quite expensive, but the positive impact of stocking on Arkansas River populations of largemouth bass has not been demonstrated. It is also unclear which are the most appropriately sized fingerlings to stock. In collaboration with the AGFC, 50,000 50-mm bass fingerlings, marked with oxytetracycline hydrochloride (an antibiotic chemical) were stocked into pools 5 and 9 of the Arkansas River. When these fish are recovered, their otoliths (ear bones) will glow under black light, indicating that they were raised in a hatchery and stocked by AGFC. We collected fish samples from pools 5 and 9 in the fall of 2002 and spring of 2003. Our research suggests that between 15% and 20% of fish in these pools born in 2002 are from the hatchery. We stocked 50-mm or 100-mm fingerling bass into 10 coves of pool 4 during the summer of 2003 to see whether the extra expense of raising 100-mm bass was worthwhile. We sampled fish from each cove in autumn of 2003 to compare relative contributions to the 2003 year class of each size group.
- b. Impact(s) – Supplemental stocking has potentially increased the year class by 20%. These results are likely to guide the supplemental stocking efforts of the Arkansas Game and Fish Commission and other state natural resource agencies interested in using supplemental stocking as a management tool for largemouth bass.
- c. Scope of Impact – Mississippi Delta Region (MS, AR, LA)

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Project 3 – Characterization of Floodplain Lake Fish Assemblages in the Lower White River, Arkansas

Impact Area: Research

Key Themes: Greater harmony between agriculture and the environment

- a. Brief description of activity – Although modified by upstream impoundments that affect both hydrologic and thermal conditions, the lower White River presently represents one of the least altered floodplain river ecosystems (FRE) on a developed continent. The White River contains a diverse fish assemblage with excellent recreational fisheries for crappie, black bass, catfish, and sunfish as well as commercial fisheries for catfish, buffalo, and gar. In addition, the White River FRE supports species of interest that include paddlefish, alligator gar, and blue sucker. Backwater lakes provide habitat for wetland species such as shiners, pirate perch, and backwater darters. We sampled the fish communities of eight floodplain lakes using electrofishing, mini-fyke nets, and gill nets. We also characterized the lakes with respect to area, depth, and other physical attributes. We are using multivariate statistics to define relationships between fish community structure and lake characteristics. The fish community structure tended to vary with size and average depth of the floodplain lakes. We will be sampling an additional twelve floodplain lakes during both high and low water to further characterize fish community structure and to determine the influence of hydrography and connectivity to the main channel of the White River on fish community structure. We are developing a Bayesian belief network for the fish of the White River ecosystem. This model is a tool that effectively identifies key components that affect ecosystem structure and function, predicts impacts of habitat change, and, through sensitivity analyses, prioritizes management and research activities. The model is based on current and future habitat conditions and synthesis of existing life history, distribution, and abundance information for fishes and mussels.
- b. Impact(s) – The continued viability of this floodplain-river ecosystem depends on the suitability of the hydrologic environment to the resident flora and fauna. Given the critical role of hydrology in regulating the structure and function of floodplain-river ecosystems, alterations have cumulatively degraded the habitat value of this resource for fish and wildlife in the Basin. The model will aid state and federal natural resource managers in determining risks to habitat changes and in prioritizing research needs.
- c. Scope of Impact – Mississippi Delta Region (MS, AR, LA, MO, IL, TN)

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Project 4 – AGFC Urban Fishing Program

Impact Area: Research/Extension

Key Themes: Greater harmony between agriculture and the environment

- a. Brief description of activity – In Arkansas, current urban fishing programs rely primarily on put-take stocking of channel catfish during warmer months and rainbow trout during colder months. Rainbow trout are well received by urban anglers, but a special trout permit is required to retain this species. Channel catfish are difficult to catch when water temperatures are low, making it difficult for anglers without a trout permit to harvest fish in cooler months. For this reason, there is a need for alternative species in urban fisheries management. A diversification of urban lakes would also allow resource managers to target a more diverse group of anglers. With cooperation of the Arkansas Game and Fish Commission (AGFC) we evaluated hybrid striped bass as a potential addition to urban fisheries by stocking this fish in two urban fishing ponds. Angler surveys were used to determine angler demographics, success, and attitudes/preferences.
- b. Impact(s) – Of the anglers who caught hybrid striped bass, over 90% said that it added to their fishing experience and they were more likely to return to the lake to fish. Of all anglers surveyed, 90% said that the Arkansas Game and Fish Commission should begin stocking hybrid striped bass as part of urban fisheries management.

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Total Allocated Resources –Recreational Fishing in the Delta

Research	CSREES – \$71,872.32 State Matching – \$55,303.48 Other Funding – \$14,713.66
Extension	CSREES – \$60,588.55 State Matching – \$42,339.74

**Summary of Total Resource Allocations (CSREES/State/Other)
1890 Research and Extension Programs
University of Arkansas at Pine Bluff**

	2004			TOTAL
	CSREES	State	Other	
PART I – AGRICULTURE, COMMUNITY AND FAMILY PROGRAMS				
GOAL 1 – An agriculture system that is highly competitive in the global economy				
Research Programs				
1. Alternative Crop Production	192,815.59	103,753.44		296,569.03
Research SYs	4.03	0.49		4.52
2. Crop Protection System	121,600.23	69,820.08		191,420.31
Research SYs	2.94	0.49		3.43
Extension Programs				
1. Livestock Management	110,153.57	125,987.94		236,141.51
Extension FTEs	1.40	2.00		3.40
Integrated Research and Extension Programs				
1. Sustainable Vegetable Production				
Research	60,804.48	40,851.59		101,656.07
Research SYs	1.91	0.49		2.40
Extension	222,455.48	251,975.88		474,431.36
Extension FTEs	4.92	4.00		8.92
Goal 2 – A safe and secure food and fiber system				
Research Programs –NA				
Extension Programs				
4. Families First – Nutrition Education and Wellness System	1,333.49	2,720.08	44,519.18	48,572.75
Extension FTEs		0.13	1.20	1.33
Integrated Research and Extension Programs – NA				
		2004		TOTAL

	CSREES	State	Other	
Goal 3 – A healthy well-nourished population				
Research Programs				
5. Vegetable and Herb Production	129,830.85	73,741.88		203,572.73
Research SYs	3.54	0.49		4.03
6. Health Benefits of Probiotic Bacteria	116,528.45	67,403.43		183,931.88
Research SYs	2.10			2.10
Extension Program				
5. Families First – Nutrition Education and Wellness System	4,000.47	8,160.25	133,557.53	145,718.25
Extension FTEs		0.38	3.70	4.08
Integrated Research and Extension Programs – NA				
Goal 4 – An agricultural system which protects natural resources and the environment				
Research Programs				
7. Integrated Pest Management	0.00	0.00		0.00
Research SYs	0.00	0.00		0.00
8. Small Ruminant Nutrition/Management	143,128.88	80,078.24		223,207.12
Research SYs	3.54	0.49		4.03
Extension Program – NA				
Integrated Research and Extension Programs – NA				
Goal 5 – Enhanced economic opportunity and quality of life for Americans				
Research Programs				
9. The Economic Status and Behavior of Minority Farmers in Arkansas	89,706.43	54,623.05		144,329.48
Research SYs	2.97	0.41		3.38
10. Improving Quality of Life	78,977.32	49,506.74		128,484.06
Research SYs	1.60	0.30		1.90

	2004			TOTAL
	CSREES	State	Other	

Extension Program				
6. Family and Youth Programs •Young Scholars • <i>Teens On the Go Newsletter Series</i> •Early Childhood Care and Education Program	287,823.35	190,476.36		478,299.71
Extension FTEs	8.16	1.77		9.93
Integrated Research and Extension Programs – NA				
PART II – AQUACULTURE/FISHERIES RESEARCH AND EXTENSION PROGRAMS				
GOAL 1 – An agriculture system that is highly competitive in the global economy				
Research Programs				
3. Catfish Production and Management	372,933.32	286,278.34	69,292.91	728,504.56
Research SYs	4.40	9.77		14.16
4. Baitfish Production and Management	179,747.41	138,054.29	43,602.14	316,403.84
Research SYs	5.41	5.45		10.86
Extension Programs				
2. Catfish Production and Management	264,233.41	184,648.31		448,881.72
Extension FTEs	3.81	3.23		7.04
3. Baitfish Production and Management	236,183.15	165,046.58		401,229.73
Extension FTEs	3.40	2.90		6.30
Goal 5 – Enhanced economic opportunity and quality of life for Americans				
Research Programs				
11. Recreational Fishing in the Delta	71,872.32	55,303.48	14,713.66	141,889.46
Research SYs	0.76	3.04		3.80
Extension Programs				
7. Recreational Fishing in the Delta	60,588.55	42,339.74		102,928.29
Extension FTEs	0.87	0.72		1.59
RESEARCH TOTAL	1,555,945.28	1,019,414.55	127,608.71	2,704,968.54
Research SYs	31.16	18.38		49.54
EXTENSION TOTAL	1,186,771.47	971,355.14	178,076.71	2,336,203.32
Extension FTEs	22.56	15.12	4.90	42.58