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

2000 ANNUAL REPORT OF ACCOMPLISHMENTS AND RESULTS

University of Arkansas at Pine Bluff

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

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INTRODUCTION

The School of Agriculture, Fisheries and Human Sciences at the University of Arkansas at Pine Bluff (UAPB) is composed of three academic departments and the 1890 research and Extension programs.

The main thrust of research and Extension programs at the un iversity is to provide the necessary information and assistance to small scale farmers and limited -resource families in Arkansas which will ultimately help them improve their living conditions. The formal research program at UAPB began in 1967 with $16,980 in formula funds from CSRS:USDA. The first Extension Programs were implemented in 1972. Since that time research and Extension activities have experienced steady growth due particularly to federal funding but more recently, the AREERA mandated, state ma tching funds have contributed to expanded program offerings and greater responsiveness to clientele needs.. Current research studies are conducted in agricultural economics, aquaculture/fisheries, family life, human nutrition and health, plant science, and poultry science.

The 1890 Cooperative Extension Program at UAPB delivers outreach education and technical assistance as needs exist for specific program priorities. Program areas include economic and community development, family and youth development, l ivestock management, small farms, and aquaculture/fisheries.

Since Arkansas is the only major aquaculture producing state where leadership to the aquaculture industry is provided by the 1890 Extension program, research and Extension programs are very c losely networked. Plans of work in this area are listed in a separate section (Part II) of the report under the heading – Aquaculture/Fisheries research and Extension. Plans of work for all other research and Extension programs are presented in Part I - Agricultural, Community, and Family Programs.

STAKEHOLDER INPUT

Stakeholder input is a core component of all 1890 research and Extension programs. Means for acquiring input varies depending upon the nature of the research or Extension program and the diver sity of relevant stakeholders.

The System for Obtaining and Reporting Stakeholders Input

Organizational structures and consequently systems for obtaining and reporting stakeholders input differ from department to department within the School of Agri culture, Fisheries and Human Sciences. The

overall picture of the Stakeholder Input system for each department follows.

I. Department of Agriculture

Faculty in the Department of Agriculture at the University of Arkansas at Pine Bluff (UAPB) conduct research in the Areas of Animal Science, Plant Science, Entomology, and Agriculture Economics. There are only one or two faculty in each subject area, thus research in any given commodity or issue is narrowly defined. The department's focus has evolved into research support serving the small limited resource farmers in southern Arkansas. The scope has furthered narrowed into research programs dealing mainly with vegetable and small animal production.

In many instances stakeholders input is informally gathered via comments, discussion of problems, or questions about new technologies for or from limited resource small farmers, Advisory Committees, and members of NRCS/UAPB Small Farm Project. The data are used to develop future research initiatives and program directions. Each research scientist is expected to collect and process stakeholder input for their individual speciality.

Data from stakeholders are gathered through individual contacts at state meetings, field days, farm forums, other departmental programs, extension agents, and other groups. Researchers document input using existing reporting systems. Present reporting systems include, trip reports, annual reports, telephone logs, letters, e-mail, and memoranda. Researchers solicit responses from readers of publications, responses from web pages and document the exchanges.

Researchers are also encouraged to include any input from stakeholders as well as gathering new technology information applicable to the stakeholders in trip and other reports. Comments and evaluations of conferences, field days, grower meetings, etc. are reviewed for stakeholder input and event organizers are encouraged to transmit the information to the department for dissemination to researchers. Departmental sponsored events include attempts to gather input using simplified "check boxes" to determine interest of participants during registration. Lists of participants interested in different research topics are forwarded to appropriate faculty. Contact or forwarding information, i.e., future conference dates, referrals or publications lists, is the responsibility of the researcher.

The evaluation of the data collected is at the discretion of the individuals in the research area. However, researchers are expected to use stakeholder input as a basis for the justification of new initiatives. The department requires that all "Research Preproposals" (an internal report) include comments from stakeholders as a part of the justification.

During July of 1998 – a cross section of limited-resource farmers participated in the 2501 Small Farm Project. Approximately 30 farmers attended a full-day focus group discussion with research and Extension faculty and administrators. Many were also members of the Arkansas Land and Farm Development Corporation (ALFDC) organization (a non-profit organization designed to promote the

agriculture industry in South and Eastern Arkansas). The focus of the discussion was a delineation of research and outreach needs of producers that could be addressed by the 1890 Research and Extension Programs.

The primary needs identified were recommendations on alternative crop and animal enterprises suitable for small-scale operations; and appropriate production practices suitable for the soil, and environmental conditions of Southern and Eastern Arkansas. Farmers also requested economic models and enterprise budget to assist in managing human and fiscal inputs into their farm operations. Modifications were made in the Extension Livestock Management Program (swine demonstration system added) and the Extension Horticulture Program (applied research studies, a newspaper series and a publication series were added). Three new research programs (alternative crop production, economic behavior of minority farmers, and small ruminant nutrition management) were developed. The two entomological studies (crop protection systems and integrated pest management) were modified to respond to the types of crops producers are growing.

II. Department of Human Sciences

The Department of Human Sciences conducts research in areas of nutrition, child development and family studies. The department's mission is to improve the physical, psychological, social and economic well-being of individuals and families through education, research and outreach. Stakeholders of Human Sciences research could be either direct beneficiaries of the research programs such as community participants and lay persons or professionals such as physicians, nurses, health care providers, health department staff, Governor's office representative, nutrition program officials, county agents, county specialists, WIC nutritionists and other researchers, grassroots leaders, school administrators, local businessmen, and religious leaders. Stakeholders input plays an important role in the identification of health and social problems, existing local health programs, barriers and facilitators to health programs, as well as evaluation of the programs. Input is reported through focus group discussions held with different stakeholders; State Advisory committee annual meetings, key informant surveys and through a community readiness group which plans, coordinates and periodically contacts community leaders via telephone calls, letters and in- person in local and county events.

Stakeholders have been identified according to their categories. Professionals are identified through the yellow pages, local hospitals, health department, Extension specialists and other "helping professionals" through personnel communication. They are contacted via phone calls, personal visits and letters and are invited for informal discussions. Lay-persons on the other hand, are identified and recruited through advertisements (posters, brochures, press releases and newspaper announcements). Physicians and health care providers and agencies are instrumental in identifying community participants. Key informants are contacted by letters first to describe the goals and objectives and prepare the key informant for a personal phone call. The letters are written on institutional letterhead and signed by the Principle investigators. Key informants are contacted by phone and welcomed to serve as stakeholders. A face-to-face meeting is scheduled with persons who agree to participate in the interview and he/she is interviewed locally for convenience.

All stakeholders are contacted regularly via letters, newsletters, and phone to reassure their support and to

solicit their feedback. For some projects, this is performed by a local community person hired to function as the university liaison in the community. Other means of obtaining stakeholders input include researchers, participation in local community events where research plans and results are presented and ideas and feedback from attendees are solicited. Formal and scientific presentations are offered at national, state and local meetings to disseminate the results to other researchers/stakeholders.

Data collected includes key informants' opinion, concerns and suggestions are summarized, analyzed and mailed back in the form of newsletters. Suggestions are considered and integrated into curricula and in formulating future research plans.

III. Department of Aquaculture/Fisheries

. The University of Arkansas at Pine Bluff's Aquaculture/Fisheries Center encourages stakeholder input into its research, extension and educational programs through diverse means and from a wide variety of audiences. Solicitation of stakeholder input is a continual, on-going process, and ranges in scope from formal reviews to individual concerns and suggestions.

In 1987, the University of Arkansas at Pine Bluff established a National Fisheries Advisory Council composed of local, state and national stakeholders, to provide advice and guidance on research, extension and education programs of the Aquaculture/Fisheries Center. This advisory council meets annually and consists of fish farmers, aquaculture industry suppliers, aquaculture a ssociation representatives, the state aquaculture coordinator, state natural resource agency representatives, and other university, state, regional and national stakeholders, including elected representatives and the press. Quarterly and annual reports of Aquaculture/Fisheries Center activities are also distributed to Council members.

The Catfish Farmers of Arkansas, Arkansas Bait and Ornamental Fish Growers Association, and Arkansas Farm Bureau Federation conduct formal annual reviews of UAPB research and extension activities.

Stakeholder input is also obtained through formal and informal focus groups and through contacts with individuals, especially in soliciting input on programming needs for small farms and diverse clientele. Public extension activiti es, such as producer meetings, provide opportunities for stakeholders to express needs and concerns. Aquaculture/Fisheries Center personnel also serve as speakers in schools and at meetings of fraternal, social, and service organizations, which provides in formal opportunities for stakeholder input.

Cooperative Extension Service (1862) personnel are stakeholders of the 1890 research and extension programs at UAPB. Input is sought through discussions with CES personnel and through in-service training evaluations by county extension agents.

Stakeholders also include research and extension scientists in other states, particularly as UAPB is an

active participant in a large number of regional projects. A review team of four research and extension scientists from out-of-state universities conducted a peer review of the aquaculture/fisheries program in November of 1999.

University of Arkansas at Pine Bluff faculty and staff are also stakeholders. The Aquaculture/Fisheries Center is composed of personnel with various extension, research and academic appointments, which meet and function in a unified manner, promoting a free exchange of suggestions and concerns among the three components of the Land Grant mission.

By definition, stakeholders are "persons who conduct or use agricultural research, extension or education." As programs of the Aquaculture/Fisheries Center are directed towards a wide range of audiences, so too are the means by which the Center seeks to identify stakeholders and solicit input.

A core group of stakeholders are those that define themselves as users of our programs through membership in a producer organization. Additionally, state and federal agencies with aquaculture and fisheries-related responsibilities are also key stakeholders.

In 1989, the University of Arkansas at Pine Bluff initiated development of a State Aquaculture Plan for Arkansas, culminating in the publication of the plan in 1990. Development of the plan was widely publicized and resulted in considerable input from diverse sources. The plan identified critical issues affecting the aquaculture industry in the state, and included key areas of research priorities and education needs. Appropriate areas identified within the plan were targeted for extension educational programs. The State Plan was re-visited five years later and was the subject of a series of focus groups to report progress and update recommendations

Another means to identify stakeholders is through various mailing lists that are used to notify individuals of meetings and other activities. An Extension newsletter, "Arkansas Aquafarming", is produced by Center Extension personnel and is used to reach all individuals on county mailing lists.

Input from stakeholders is carefully considered and integrated into Center programming on several levels. The integrated nature of the Aquaculture/Fisheries Center, where research, extension and academic personnel work together, facilitates collaborative planning and action in response to stakeholder input. Extension personnel frequently raise stakeholder issues and concerns at monthly staff meetings and responses by the appropriate individuals are discussed. Program priorities and funds are allocated to a large degree based on stakeholder input. Personnel are encouraged to incorporate stakeholder input in the planning of future work. Faculty development plans (education), proposals and experimental protocols (research) and annual goals (extension) are reviewed internally to maintain a focus on stakeholder needs. Some stakeholder suggestions can be accommodated using existing personnel and programs. Funding and research priorities are proportioned among short, medium and long term projects, to not only assist with immediate problems, but also to help stakeholders prepare for the future.

Specific means of gathering stakeholder input for the various programs are presented in the narrative for each program area.

In keeping within the framework of departmental stakeholder input systems, faculty are allowed latitude in determining appropriate methods of obtaining stakeholder input depending upon nature of the Research or Extension Program.

MERIT REVIEW

Merit review is central to the University's goal of implementing quality programs that make a difference in the lives of people. Both research and Extension programs are monitored through the annual performance appraisal system to ensure adherence to this goal. Additionally, each department – Agriculture, Aquaculture/Fisheries, and Human Sciences – historically conducted separate reviews of research and Extension program proposals prior to their implementation. However, a new school-wide system for merit review was implemented in FY 2000. The system expands the current research peer review system to require a periodic external merit review process for all programs, as well as a school-wide peer review of all research proposals. The new system also clarifies expectations for scientific productivity that is monitored annually. Merit review in Extension programs includes inter- and intra-institutional assessments of program quality prior to the initiation of new programs and an annual review of program accomplishments during the annual performance appraisal process. Additionally, all programs will undergo an external merit review every three to four years either via a CSREES review or by external evaluators invited by University administration. Each department or unit head is required to facilitate the review process.

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**
1890 Research Programs	1. Poultry Production and management 2. Crop Protection systems 3. Alternative crop production 4. Catfish production and management 5. Baitfish production and management		6. Herbs and vegetable production 7. Human nutrition and health	8. Integrated pest management 9. Small ruminant nutrition/ management	10. Economic behavior of minority farmers 11. Improving quality of life
1890 Extension Program Projects	1. Small farm/ Horticulture Management 2. Livestock management 3. Catfish production/ management 4. Baitfish production/ management	5. Nutrition education and wellness system (Food Safety)	5. Nutrition education and wellness system (Diet and Health)	6. Farm pond management and irrigation reservoirs	7. Family and Youth Programs Young Scholars •Adolescent pregnancy prevention •Drug abuse prevention •Parenting Education •Child care training

ANNUAL REPORT OF ACCOMPLISHMENTS AND RESULTS – POW
October 1, 1999 – September 30, 2000

In two program areas, Agriculture and Human Sciences, research and Extension program are conducted and reported independently, while research and Extension are integrated in the Aquaculture/Fisheries areas. In order to accommodate this diversity, this accomplishment report is presented in two parts. Part one includes stand alone program accomplishments in Agriculture, Community and Family Programs. Part two includes integrated accomplishment reports for the Aquaculture unit.

Part 1 – AGRICULTURAL, COMMUNITY AND FAMILY PROGRAMS

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

Executive Summary

During FY 2000 the 1890 research program supported three stand-alone agricultural systems research programs. These include poultry production and management, crop protection systems and alternative crop production. The major thrust of research programs supporting this goal is to identify strategies, production systems and enterprises that will increase profitability and competitiveness of small-scale family farms in the Arkansas Delta. Given the low-profit margin from small-scale production of row crops (primarily due to economies of scale), alternative enterprises are key to the survival of small farms in the target area. Research programs are designed to improve the efficiency of egg-type chickens through management (program 1), identify crop protection systems that reduce reliance on chemicals (program 2) and to examine alternative crops and production systems for economic feasibility.

The poultry study is a part of an ongoing research program on cage densities for raising layer birds. Preliminary analysis of data show some potential for increasing profits through management of cage densities. Further analyses should provide reliable cost saving estimates for producers choosing to stock birds at optimal densities.

Researchers continue to evaluate the feasibility of producing alternative crops given the soil and climatic conditions prevalent in the Arkansas Delta. The production of alternative crops (cowpea, chickpea and pigeon-pea) and the use of alternative production strategies should increase the profitability of limited resource farmers in the Arkansas Delta and decrease their need to compete with larger row crop (rice, soybean, cotton) farmers.

The project, "Insect pest management for late season tomato," will determine the efficacy of biological insecticides on the control of insect pests. This information will be used in the development of IPM programs for fall tomato programs for fall tomato production. Programs will be aimed at identifying the lowest inputs that can produce high quality tomatoes. The project is being conducted in concert with the Arkansas Agricultural Experiment Station. Project results will be useful to farmers who want to product tomatoes late in the season when prices are likely to be high. Insect frequency and impact on tomato were determined in studies conducted in northwestern and southern Arkansas in 1993 and 1994. The

corn earworm, Helicoverpa zea (Boddie), was the most damaging insect in both locations during each of the two years. Although thrips were present at both locations throughout the season, no plants infested with tomato spotted wilt virus were detected. Other potential insect threats, i.e., stink bugs, flea beetles and tomato pinworms, had no apparent effect on late-season production. Impacts of the research will be realized by those Arkansas farmers who want to grow tomatoes for the late season market. The current study examines effective methods of insect control.

The Arkansas swine industry has changed drastically in the last 20 years. During 78-89, an average of 905,000 heads of swine were marketed from 6,400 operations. In '95, 1.8 million hogs were sold from 2,800 farms. During this period of time the number of heads sold per firm increased 4.5 fold, while the number of farms decreased by 56 percent. Current estimates indicate 90 to 95 percent of these swine are grown under contract on the west side of the state. Extension contact and work with these operations has been limited to waste control and dead animal disposal. The contracting companies handle the remainder of the herd management program through their fieldmen.

A small independent swine industry still exists throughout the state. Swine Extension work at UAPB focuses on providing technical information to County extension Agents and independent swine producers. A pasture system is being developed as a low cost, low input, low intensity demonstration unit that will not be subject to liquid animal waste permit requirements.

The Arkansas beef industry is basically a cow-calf business with calves moving west for backgrounding, feed out and slaughter. The 1997 state inventory indicated 1.9 million cattle and calves with 1.144 million of these being breeding age females. These cattle are located on 33,000 farms. This level of beef production ranks Arkansas as the fifteenth largest beef cattle producing state in the nation.

The 1890 Extension Livestock Management Specialist works with the 1862 Livestock Specialists (Animal Science Section) to present a unified beef cattle management program to all the beef producers in the state. The primary areas involving the 1890 specialist include: 1) cow herd performance testing; 2) bull breeding soundness evaluation clinics; 3) development of computer software; 4) ration formulation for beef and swine; 5) cattle working facilities; and 6) youth competitive activities involving animals.

Horticulture (fruits and vegetables). Educational programs and on-farm assistance to small-scale horticultural producers is the primary function of the 1890 Horticulture Program in Arkansas. This program was expanded greatly in FY00 to include more on-farm demonstrations and educational programs related to production, processing and marketing products.

Other programs contributing to goal 1 (catfish production and management and bait fish and management) are reported in part II - Aquaculture Programs.

Summary of Goal 1 Program Area Initiatives and Impacts

Goal 1 – Research Program 1 – Poultry Production and Management

a. Situation – A five-year study of the "Effects of rearing density on age to sexual maturity and subsequent egg production of White Leghorns" provided useful results that can improve the production of layers. Two significant findings of the study s uggest that 1. Cage reared birds seemed to have higher egg production and better feed efficiency than floor pen reared birds, and 2. Providing more than necessary cage space during the growing period does not seem to enhance egg production, improve feed ef ficiency or improve egg quality.

a. Impact(s) – Caged layers previously reared in spacious floor pens are not less fearful than layers previously reared in grower cages. Although results are not conclusive at this time, the low bird-density during the growing period does not necessarily improve egg production. Preliminary results suggest that egg producers may reduce production cost by using the optimum bird - density during the growing period rather than the high - bird density.

b. Stakeholder Input Process – This research program was initiated in FY 96 prior to the stakeholder input requirement of AREERA in FY 98. Because of this, stakeholder's input was not solicited.

c. Source of Federal Funds – Evans-Allen 1890 Research - $116,240.
Source of Other Funds – State Matching - $12,885.

d. Scope of Impact – State

Contact Information -

Name: Kwang Lee, Ph. D.
Title: Professor and Associate Dean for Research and Extension
Affiliation: School of Agriculture, Fisheries and Human Sciences
Address: 1200 N. University Drive
Mail Slot 4990
Pine Bluff, AR 71601
E-Mail: lee_k@vx4500.uapb.edu
Phone Number: 870-575-8133
Fax Number: 870-543-8035

Goal 1 – Research Program 2 – Crop Protection Systems

a. Situation – A research project was begun to determine the effectiveness of "non restricted-used insecticides" (NRI) to control insect pests in tomatoes. Various NRIs were mixed with the bacterial insecticide, *Bacillus thuringiensis* (BT) to determine if the mixes were effective to control the tomato fruit worm, Helicoverpa zea (TFW). Combined with the tomato research are efforts to develop Insect Pest Management for fall greens (brassica type). Mustard, turnip, and collard greens were seeded after the tomato harvest. The same plastic covered seed bed as used in the tomato study was combined with drip irrigation system. Demonstration plots of heirloom tomatoes and the new long shelve life varieties were planted to determine relative production potential in southeast Arkansas. Gardeners, hobby farmers and limited resource farmers may increase profits by selling to specific markets. Potentially, restaurants and individuals will pay for premium prices for tomatoes that have reputations for good taste, i.e. heirloom varieties. Profits may also be increased by selling to fall markets after storing tomatoes with longer shelve life than normal varieties.

b. Impact(s) - Results from last year's tomato research were inconclusive due to low numbers of the TWF in the spring plantings. Past research to control TWF in late season plantings indicated insecticides mixed with BT were more effective than either one used alone and had comparable control effectiveness as restricted-use insecticides. As more insecticides are removed from the market by the Environmental Protection Agency, gardeners, limited resource, and hobby farmers will need information on which control measures are readily available to protect their crops. Most gardeners and many small farmers do have access to restricted use insecticides. Purchase of restricted use chemicals requires training, licenses, and continual certification.

In the two years of research the aim was to document the different pest insects attacking the greens. The spinach flea hopper was documented as a pest in southeast Arkansas for the first time. There appears to be different levels of tolerance between varieties of greens and types of greens. Curly mustard had considerably less damage than either Tendergreen or Florida Broad leaf varieties. Rape seed greens sustained only minor damage while all turnip varieties were severely damaged. The southern cabbage worm present in high numbers last year did not appear in plots this year.

c. Stakeholder Input Process - User input was obtained informally through conversations with producers, Extension Agents and other research scientists, Formal input was obtained via a special field day. A total of 30 tomato varieties, heirlooms, long-shelve life, and several heat tolerant varieties were shown to the public during the field day. Some 30 people attended, viewed demonstration plots, and tasted samples of some 25 ripe varieties. Participants were able to see the plants and taste the tomatoes before selecting a variety for next year's planting. Participants also discussed specific pest management problems

they are having in their fields. Scientists will continue to design management schemes to address these problems.

d. Source of Federal Funds - Evans - Allen 1890 Research - $93,741.
Source of other Funds - State Matching - $12,885.

Contact Information -

Name: Dr. Robert Katayama
Title: Professor
Affiliation: Department of Agriculture
Address: 1200 No. University Drive
Mail Slot 4913
Pine Bluff, AR 71601
E-Mail: katayama_r@vx4500.uapb.edu
Phone Number: 870-575-8139
Fax Number: 870-543-8035

Goal 1 - Research Program 3 - Alternative Crop Production

a. Small farmers account for most of the agricultural producers in the U.S. while larger farmers account for most of the farm sales. Small farmers sell less than other farmers creating serious financial problems for their operations. Farm programs and production technologies favor the larger farmers. Because of the small profit margin on traditional row crops, most limited - resource farmers are having severe financial problems. The application of appropriate alternative production practices (i.e., vegetables) is a possible solution.

Small limited-resource farmers are the major clientele of The University of Arkansas at Pine Bluff's research and Extension Program. This research program addresses three areas of study in attempting to be responsive to their needs.

Crop Production and Marketing - economic feasibility analysis of alternative crops - southern-peas, greens and sweet potatoes including the assessment of feasibility of marketing alternative crops.

Crops Genetic Enhancement - Identification of Southern-pea varieties that are high yielding under limited resource farmer production practices, and are most appropriate for production and marketing in the form of fresh market peas.

Crop Agronomy - Analysis of Crop Production systems for southern-peas, sweet potatoes and greens for improved productivity under the resource limitations of small -scale farmers.

b. Impact(s) - This multi disciplinary study originated in FY 2000. Thus with only one year of study, no impacts are possible.

c. Stakeholder Input Process - On July 30, 1998 farmer/participants in the Section 2501 small Farm Project, University of AR-Pine Bluff, met with faculty in the Department of Agriculture to discuss the specific needs of small limited-resource farmers in Arkansas. The small Farm Project provides agricultural research/extension to 200-300 small limited-resource farmers in Arkansas.

Farmers indicated that some of their major constraints include: The acquisition of capital, decreasing output prices, and the need for enterprise budgets for vegetables (i.e., southern-

peas, greens and sweet potatoes) that fit the small farm situation specifically for the mid - South. This research program area was developed to provide probable solutions to some of these problems. Researchers continue to involve participants in the project through continuing formal and informal discussions.

d. Source of Federal funds - Evans-Allen-1890 Research programs - $110,498.
Source of other funds - State Matching - $12,885.

e. Scope of Impact - Eastern Arkansas

Contact Information -

Name: Dr. Tracy Dunbar
Title: Assistant Professor
Affiliation: Department of Agriculture
1200 No. University Drive
Mail Slot 4913
Pine Bluff, AR 71601
E-Mail: dunbar_t@vx4500.uapb.edu
Phone Number: 870-575-8532
Fax Number: 870-543-8543

Goal 1 - Program Initiatives and Impacts

Goal 1 - Extension Program 1 - Small Farm/Horticulture Management

a. Situation - The major performance goal of this program is to increase the acreage and the number of small and limited resource farmers who produce vegetable crops as an alternative to row crop enterprises.

The basic idea behind diversified/alternative agriculture is to halt the rapid decline of small farmers. These farmers can no longer make a profitable living by farming from traditional row crops, threatening the viability and stability of the rural economy.

The Extension Horticulture Specialist developed a comprehensive program to inform and educate farmers about the economic advantages of growing vegetables as an alternative to row crops such as rice, soybeans and cotton. Production meetings, conferences and agriculture expositions were organized to inform and teach vegetable production meth ods. Visual aids were used to demonstrate new emerging technology for vegetable crops. In addition, collaboration with alternative crops marketing personnel helped farmers access markets with attractive prices. Five local newspapers carry monthly Horticulture production articles developed by the specialist. Demonstration trials were set up at different locations in the state to identify and evaluate different varieties of seeds with potential to enhance yield and provide better economic returns. Seven sweet potato varieties, eight okra varieties, and twenty peas varieties were tested. Cultural practices commonly used by the small farmers were followed. These results will be used to define selection criterial for determining variety with desirable yield, su perior quality, and/or adaptability to Arkansas weather conditions.

b. Impact(s) - The program started in June of 2000. is in its infancy, however, some positive results have been realized at this point. Acreage in vegetable production has increased significantly especially in the Southern regions of the state. Attendance at meetings has

increased from less than 10 per meeting to more than 100 in some cases. Newspapers in five counties publish vegetable crops news and provide information to more tha n ten thousand subscribers. The average yield of sweet potato variety (Beauregard) was increased by 36% when planted at an in-row spacing of 9 inches. The "Excel" and "Louisiana Purple Hull" (Quick pick) pea varieties were very adaptable to Arkansas weather. The okra data indicated that the variety, "North and South" had higher yield and more stress tolerance than the commonly grown Clemson Spineless variety. Numerous phone calls have been received from individuals asking production questions or about what they read in Extension leaflets or newspaper articles. Also, more producer cooperatives have been formed and some cooperatives have secured contracts to produce fresh vegetables for major grocery warehouses.

c. Stakeholder Input Process - The Extension program is a companion program to research program 3. The June 1998 forum with participants of the 2501 Small Farmers Project participants that led to the development of the multi disciplinary Alternative Crop Production program indicated a dire need for outreach education and applied research in the area. Research and Extension faculty continually dialogue with farmers and each other to ensure that program directions and outcomes are addressing producer needs.

d. Source of Funds - 1890 Extension Program - $104,646.
Source of Other Funds - State Matching - $50,783.

e. Scope of Impact - Eastern Arkansas

Contact Information -

Name: Dr. Ehiorobo Izekor
Title: Extension Specialist - Horticulture
Affiliation: Cooperative Extension Program
1200 North University Drive - Mail Slot 4966
Pine Bluff, AR 71601
E-Mail: izekor_e@vx4500.uapb.edu
Phone Number 870- 575-8152
Fax Number: 870-543-8166

Extension Program 2 - Livestock Management

a. Situation - The Extension program includes educational outreach to beef and swine producers.

Beef - Arkansas ranks fifteenth in beef cattle production in the nation. The Arkansas beef industry is basically a cow-calf business with all the calves moving west for backgrounding, feed out, and slaughter. The average herd is about 26-30 cows - a one bull unit. A vast majority of these operations are side line operations to an off farm job, other farming operations or it is a retirement occupation. The major goal is to increase the number of herds participating in Bull Breeding Soundness Exam Clinics (Bull BSE Clinics).

Swine - The Arkansas swine industry has grown and changed significantly in recent years. In 1998, 2.086 million hogs were sold from 1,300 farms in Arkansas (1558 head per farm). Twenty years earlier, 905,000 head were sold from 6,400 farms (141 head per farm). These represent an 80% decrease in the number of hog farms in the state and an eleven fold increase in size. In addition, 98 to 99+ percent of these hogs are now grown under contract to one of the major integrated swine companies. When an operation is under contract, all management services are supplied by company fieldmen. The 1890 Extension Livestock Specialist is working with the UAPB Faculty and the 2501 Small Farms Project to develop a small pasture based demonstration swine unit. The unit will feature electric fencing and enough pasture plots to rotate swine and beef management. Fencing materials are on site and being installed. The unit should be operational by

mid-summer 2001.

The swine on pasture demonstration unit will be used to conduct field days on pasture units and as a training unit for individuals working with farmers interested in pasture operations. This program is designed to increase the number of small scale and limited resource farmers adopting pasture-based systems for swine production.

b. Impact(s) - (Beef) - The 1890 Extension Livestock Specialist has worked with the 1862 Specialists for several years in conducting Bull BSE Clinics. Work has included assistance in developing forms, a video tape, and direct assistance to County Extension Faculty in conducting county wide clinics.

The number of clinics being held in South Arkansas has decreased over the last few years partly due to bad weather during the period of the year clinics are held and lowered participation at other county clinics.

However, interviews with several veterinarians that have been involved in these clinics indicates many producers have gone to having the breeding soundness exam conducted on their own farms instead of county clinics. This represents adoption of a major management practice on these farms and the success of an Extension program to improve "Anim al Production Efficiency."

Swine - Although the pasture system was under construction in FY 2000 the Specialist did provide swine production assistance to the Arkansas Farm Bureau and the Arkansas Department of Corrections. The Specialist meets with the Farm Bureau Swine Commodity Committee at their policy development meetings.

Assistance was also provided to the Department of Corrections to reformulate all their swine rations, network their feeding programs, and develop new premixes for these that would be suitable for s

c. Stakeholder Input Process - Outcomes of the 1998 Focus group discussion with limited resource farmers led to the inclusion of the pasture-base swine demonstration unit in the Livestock program.

d. Source of Federal Funds - 1890 Extension Program - $143,992.
Source of Other Funds - State Matching - $16,880.

e. Scope of Impact - Eastern Arkansas

Contact Information -

Name: Dr. Robert J. Felsman
Title: Extension Livestock Management Specialist
Affiliation: Cooperative Extension Program
1200 North University Drive - Mail Slot 4966
Pine Bluff, AR 71601
Phone Number: 870- 575-7214
Fax Number: 870-543-8166

Summary of financial resources expended in animal and plant agricultural programs related to goal 1.

Federal Formula - $569,117

Other Federal - N/A

State Matching - $106,318

Total - $675,435

GOAL 2. A safe and secure food and fiber system.

Executive Summary

One Extension Program, Families First-Nutrition Education and Wellness System (FF-NEWS) supports this goal. The project is funded primarily by the USDA Food and Nutrition Service. However, both state and federal 1890 Extension funds augment the program. No 1890 research funds are expended in this area.

The FF-NEWS Program in collaboration with Southern University (Louisiana), Langston University (Oklahoma), Lincoln University (Missouri), South Carolina State University and Prairie View A&M University (Texas) is designed to help food stamp recipients enhance the health status of family members and effectively utilize food resources. This culturally sensitive nutrition education progr am pays specific attention to nutritional problems associated with southern, soul food, and Tex-Mex diets. The 44-week program encompasses four modules, one of which focuses exclusively on food safety. This module includes instructions on food handling and storage weeks of instruction as well as demonstrations and tours.

Funded largely from USDA: FNS, the program is in it's third year of operation. A primary outcome of the Food Safety instruction has been issuance of certificates by the University's Contin uing Education Program. This certification has enabled some participants to find employment in food service establishments while other participants have used the certification for job advancement. Summary evaluations of behavioral changes suggest that the program is highly effective in promoting safe food handling and storage practices among participants.

Goal 2: Extension Program 5-Families First-Nutrition and Wellness System (Food Safety)

a. Situation - Food-borne illnesses are a major health and wellness problem. Consumer mishandling of food during storage and preparation contributes to millions of cases of food-borne illnesses annually. This is especially true of low-income families. A comprehensive program on food safety education can prevent contamination which causes food-borne illnesses.

The FF-NEWS Program is a multi-state partnership involving the University of Arkansas at Pine Bluff, Southern University and A & M College (Louisiana), Langston University (Oklahoma), Prairie View A & M University (Texas), South Carolina State University, and Lincoln University (Missouri). It is designed to help food stamp recipients and other low-income families select and prepare meals consistent with their cultural traditions while improving their family's overall health. FF-NEWS Staff made 484 contacts with local agencies for the purpose of developing partnerships, increasing client participation, securing resources and technical experts to serve as guest speakers for the program.

b. Impact(s) - The major impact of the program has been increased awareness of food-borne illnesses and increased knowledge of appropriate food handling and storage techniques. The staff conducted 180 in-depth educational sessions for food stamp recipients related to food safety and management practices; conducted 30 point-of-purchase demonstrations at local grocery stores and farmers markets; used 145 educational exhibits (prepared by staff and program participants) at county fairs, commodity distribution centers, faith-based organizations and medical clinics for program awareness. These exhibits attracted a number of potential clients of which 3,221 asked for additional information. The food safety classes reached 1,800 participants. One thousand four hundred four (1,404) participants reduced health risk-factors through developing food safety practices. Multi-county agents conducted grocery store tours to teach participants how to keep food safe when shopping as an essential way to prevent food borne illnesses an promote food safety.

c. Stakeholder Input Process - Coalitions are formed in each county where the program is implemented. The coalitions assist in identifying target areas and program participants, and program implementation and evaluation strategies. A number of ways were used to identify stakeholders to ensure that diversity is achieved. Contacts were made with individuals who are knowledgeable about the community. Recommendations were sought from key leaders of various racial and ethnic groups. Throughout the year a file of news articles are maintained that showcase potential stakeholders. Meetings are held at times stakeholders can participate. Stakeholders on the coalitions represent an appropriate cross section of the impacted clientele and communities.

d. Source of Federal Funds - USDA - FNS - $39,878.
1890 Extension Program - $31,948.
Source of other Funds - State Matching - $55,715.

e. Scope of Impact - Eight counties in Southeastern Arkansas

Contact Information -

Name: Jacquelyn McCray
Title: Dean/Director
Affiliation: School of Agriculture, Fisheries and Human Sciences and Research and Extension Programs
Address: 1200 N. University Drive
Mail Slot 4990
Pine Bluff, AR 71601
E-Mail: mccray_j@vx4500.uapb.edu
Phone Number: 870 - 575-8529
Fax: 870 - 543-8033

Summary of Financial Resources expended in program related goal 2.

CSREES Federal Formula -
1890 Extension Program - $31,948

Other Federal Funds: FNS - $39,878

State Funds - $55,715

Total - $127,541

Goal 3 - A Healthy Well-Nourished Population

Executive Summary

Numerous factors influence the health status of individuals and families. Some factors (i.e., heredity and environment) are outside the control of the individual, but many factors - diet and lifestyle - can be controlled. Two research programs and one Extension program seek to help families improve health status via diet and life style modifications.

One study focuses on evaluating specialty vegetables and herbs for medicinal value addresses improving health status via diets. The research is designed to identify suitable species and varieties of selected herbs and vegetables, determine best production practices for environmental conditions in the state, and to develop cooking methods acceptable to consumers. The study is in early stages of implementation, but consumer interest in specialty crops appears to be high.

Breast feeding is the optimal way to nurture infant growth and development and to reduce infant illness, medical costs, and mothers' absenteeism from work. Trends of initiation and continuation of breast feeding at six months postpartum has been fluctuation during the 70s and 80s. The 1194 data show a national initiation rate of 57% and a continuation rate of 21%. The national goal i s to increase the proportion of mothers who initiate breast feeding to at least 75% and to increase the proportion who continue to breast feed until their infants are six months old to at least 50%. (Health People 2000, 1990).

A Research study in Human Nutrition and health (Breast Feeding promotion) succeeded in establishing and maintaining professional collaborations with local, regional and state health personnel and community participants. The increased visibility of the Breast Feeding Promotion Program accomplished increased awareness of breast-feeding as normal, natural, and acceptable behavior. Community awareness was gained through a series of focus group discussions in churches, community rooms or at the health department. The impact of the promotio n initiatives continues to be assessed, however, the Arkansas Department of Health has requested preliminary findings to use in developing a new breast-feeding program in another area of the state.

The FF-News Extension Program includes two modules (knowledge of nutrition and the relationship between diet and health) that focus on this goal. The modules include 12 weeks of instruction in basic nutrition and 10 weeks of instruction in the diet and hea lth module. The lessons focus primarily on risk factors among the target population including obesity, coronary heart disease, hypertension and diabetes. Evaluation of pre and post-tests of food selection and eating patterns indicate that the program's focus on cultural factors impacting food selection and cooking methods is an effective way to promote dietary change. During FY2000, almost 12,000 participants reported food selection and preparation changes after participating in the FF-News Program.

Goal 3 - Research Program 6. Herbs and Vegetable Production

a. Situation - Disadvantaged rural and urban populations, especially individuals suffering from physiological health such as hypertension, diabetes, obesity and arthritis, need help in improving their quality of life. Nutritional intervention through the introduction of alternative food constituents such as special kind of vegetables, herbs, and nutraceuticals may alleviate the problems. Research designed to identify suitable species/varieties of specialty vegetables and herbs, determine their production practices, evaluate their nutritio nal qualities, and develop cooking methods and recipes that are acceptable to consumers can expand the production and use of nutritional and nutraceutical alternative crops.

b. Impact(s) - The project was initiated during FY2000 however some progress has been made. Five exotic varieties of vegetables have been grown for preliminary observations. These vegetables were adaptable and grown successfully except the growing season was slightly shorter than required for the full maturity of the crops.

Preliminary samples were collected and sent to The University of Arkansas (UAF) Food Science department for chemical analysis to determine their nutraceutical qualities. Seeds of more different varieties of herbs and vegetables were collected for the next season's experiments.

c. Stakeholder Input Process - The project was planned in consultation with the collaborating scientists from The University at Arkansas and Fort Valley State University. The Principle Investigator (PI) visited the laboratories, greenhouses and fields at the participating universities. The Co-PIs shared seeds, planting materials and relevant publications. A sample of the target population, small farmers and home-gardeners were invited to a Field Day on the UAPB research farm August, 2000. Visitors and invited guests showed keen interest in the project. They enthusiastically asked questions as to how soon they would be able to obtain health promoting benefits from this research. The overall participation of the Stakeholders was very encouraging and has provided impetus and meaningful directions to the research activities. The project also responds to the need for Alternative Crops identified by participants in the July 1998 Focus Group discussion with producers.

d. Source of Federal Funds - Evans-Allen 1890 Research $41,530.
Source of other Funds - State Matching $1,074.

e. Scope of Impact - South Eastern United States

Contact Information -

Name: Dr. Mohammad Jalaluddin
Title: Professor
Affiliation: Department of Agriculture
1200 No. University Drive
Mail Slot 4913
Pine Bluff, AR 71601
E-Mail: jalaluddin_md@vx4500.uapb.edu
Phone Number: 870-575-8117
Fax Number: 870-543-8035

Goal 3 - Research Program 7 - Human Nutrition and Health (Infant Nutrition)

a. In Arkansas, breast feeding is characterized by low incidence, low duration, and limit ed availability of programs and services to promote and support breast-feeding practice. In 1997, the Department of Health reported that the rate of breast-feeding initiation ranged from 5 to 5.5% in south Arkansas. Hospital-based breast-feeding promotion programs may be effective in extending the duration of exclusive breast feeding. The research is designed to identify barriers to breast feeding in south Arkansas, determine the impact of prenatal nutrition and lactation educations on breast-feeding initiation, and to prolong the duration of breast feeding. Results of this study will help in designing and promoting intervention programs that can increase both the incidence and duration of the breast feeding.

b. Impact(s) - The program succeeded in establishing and maintaining professional collaborations with local, regional and state health personnel and community participants. The increased visibility of the Breast Feeding Promotion Program accomplished increase d awareness of breast-feeding as normal, natural, and acceptable behavior. Community awareness was gained through a series of focus group discussions in churches, community rooms or at the health department. The relationship with the mothers did extend bey ond the focus group where multiple participants have been professionally counseled. Through these efforts mothers' awareness, of the availability of local support groups, such as La Leche support group, and the Health Departments 24 hour telephone line has increased. Collaboration with local obstetricians and 14 obstetric and public health nurses has been established. Professional materials about breast-feeding and targeting professionals and the public have been provided to nine OBGYN's offices. Physicians have also referred patients to the program for free consultations. This collaboration continues to expand rapidly in the region, where the State Health Department requested findings of the current study to use in developing a new breast-feeding program in another area of the state.

c. Stakeholder Input Process - Twelve focus group discussions were conducted with health care providers, pregnant mothers, lactating and non-lactating women. Researchers also participated in local community events such as chur ch meetings, health fairs and on-campus classroom discussions to present the program and to get feedback and solicit ideas for program development.

Data collected from the focus groups and other discussions included perceptions of breast-feeding as well as barriers and promoters to breast-feeding. Results were summarized, analyzed and mailed back to physicians as a newsletter. Suggestions were considered and integrated into the program curriculum and in formulating future research p lan.

d. Source of Federal Funds - CSREES Capacity Building $147,306.

Source of Funds - State Matching $12,885.

e. Scope of Impact - Statewide

Contact Information -

Name: Dr. Shara S. Zaghloul
Title: Associate Professor
Affiliation: Department of Human Sciences
Address: 1200 No. University Drive
Mail slot 4971
Pine Bluff, AR 71601
E-Mail: zaghloul_s@vx4500.uapb.edu
Phone Number: 870-575-8811
Fax Number: 870-543-8823

GOAL 3 -Extension Program 5 - Nutrition Education and Wellness System (Diet and Health)

a. Situation - Typically, food purchases are based on family preferences, cultural practices, and other factors that are often unrelated to health status and USDA dietary guidelines. Considering the obvious link between culture and food selection and preparation practices - instruction that is culturally sensitive and that directs particular attention to risk factors associated health problems extends the value usefulness of nutrition education.

Obesity, diabetes, hypertension, and cardiovascular disease rank high among health problems in all racial groups, but general health statistics indicate that the incidence of these health problems are higher in the African-American, Hispanic, and Native-American population than in other population groups. In addition, there is a high incidence in the general population of obesity suggesting that Anglo-American food stamp recipients would benefit from more healthy diets as well. The Families First-Nutrition Education and Wellness System Program (FF-NEWS) addresses these needs.

The FF-NEWS Program is a multi-state partnership involving the University of Arkansas at Pine Bluff, Southern University A&M (Louisiana), Langston University (Oklahoma), Prairie View A&M University (Texas), South Carolina State University, and Lincoln University (Missouri). It is designed to help food stamp recipients enhance the health status of family members and effectively utilize food resources. This culturally sensitive nutrition education program pays specific attention to nutritional problems associated with southern, soul food, and Tex-Mex diets.

b. Impact(s) - In FY 2000 contacts with food stamp participants and other low-income audiences exceeded 24,000: staff made 484 agency contacts for the purpose of developing partnerships, increasing client participation, securing resources and technical experts to serve as guest speakers for the program; developed 5 culturally sensitive educational resources on diet-related health risk factors and distributed them to 4,602 food stamp recipients and other low-income families; conducted 359 nutritional educational sessions for food stamp recipients related to reducing risk factors for selected chronic diseases through improved long-term dietary practices and physical activity; conducted 30 point-of-purchase demonstrations at local grocery stores and farmers market; and used 145 educational exhibits (prepared by staff and program

participants) at county fairs, commodity distribution centers, faith-based organizations and medical clinics for program awareness.

FF-NEWS staff reached 14,704 participants with in-depth educational sessions. Eleven thousand-seven hundred sixty-three (11,763) participants reduced diet-related, health risk factors through changing dietary behavior by eating more baked and boiled foods and less fried foods; selecting healthy snacks; including a variety of foods in the diet; balancing food intake with physical activity; eating more grain products, vegetables and fruits; improving and maintaining weight; eating a diet moderate in sugar and low in salt and sodium, fat/saturated fat, and cholesterol. In cooperation with local health-care providers, FF-NEWS staff provided dietary guidance to 274 heads of households with family members who were experiencing health problems such as obesity, diabetes, hypertension and cardiovascular disease.

c. Stakeholder Input Process - Coalitions are formed in each county where the program is implemented. The coalitions assist in identifying target areas and program participants and program implementation and evaluation strategies. A number of ways were used to identify stakeholders to ensure that diversity is achieved. Contacts were made with individuals who are knowledgeable about community. Recommendations were sought from key leaders of various racial and ethnic groups. Throughout the year a file of news articles are maintained that showcase potential stakeholders. Meetings are held at times stakeholders can participate.

d. Source of other Federal Funds - USDA: FNS $133,504.
CSREES 1890 Extension Program $48,609.
Source of other Funds- State Matching $146,894.

e. Scope of Impact - Eight Counties in Southeast Arkansas

Contact Information -

Name: Dr. Jacquelyn W. McCray
Title: Dean/Director
Affiliation: School of Agriculture, Fisheries and Human Sciences and Research and Extension Programs
Address: 1200 N. University Drive
Mail Slot 4990
Pine Bluff, AR 71601
E-Mail: McCray_J@vx4500.uapb.edu.
Phone Number: Ph #: (870) 575-8529
Fax Number: Fax #: (870) 575-8033

Summary of Financial Resources expended in Agricultural, and Human Sciences Programs related to goal three.

Source of Federal Formula - $237,445

Other Federal Funds - $133,504

State Matching - $160,853

Total - $531,802

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

Executive Summary

Reducing environmental hazzards and protecting soil and water resources while simultaneously producing high yield Agricultural Crops is a major challenge facing American Agriculture. Two Research projects related to Agricultural production address this pro blem. One Extension program in Aquaculture is designed to improve the efficiency and utility of farm ponds. This Extension program is reported in part II of this document with other research and Extension programs in Aquaculture. Another major outreach program related to goal 4 is the development of a wetlands and water management system on an off-campus farm site.

An Integrated Pest Management study evaluates the effectiveness of non-restricted-use pesticides in alternative crop production schemes. If the effectiveness of these pesticides can be proven resulting decreases in economic and chemical inputs can save money for producers while protecting soil, water and other environmental resources.

The nature of small ruminant production systems results in an environmentally friendly alternative enterprise for small and limited-resource farmers. Specifically, this area of research is designed to increase understanding of utilizing crop by-products as animal feed to reduce production costs and protect the environment, develop strategies to determine the level of dietary supplementation required when feeding crop by-products to sheep and goats, and document grazing efficiency incurred in a mixed grazing system. The research area is under development.

The University is developing, through partnerships with federal and state agencies, a Wetlands and Water Management Center on its 871-acre Lonoke farm site. Current partners include NRCS and the Coor of Engineers. In FY 2000 approximately 200 acres of crops were planted to demonstrate the effectiveness of alternative irrigation systems using a reservoir (with a recirculating system versus deep well) to supply irrigation water. The eastern and southern sections of the state have been designated

critical water-use areas because of the rapid decline in two major aquifers in the state. This decline is caused primarily because the irrigation of Agricultural crops is depleting ground water sources at levels that greatly exceed the recharging ability of the aquifers. When com pletely operational, the center will be a clearinghouse and demonstration site for a wide array of environmentally friendly production practices.

Goal 4 - Research program 8 - Integrated Pest Management

a. Situation - This project seeks to establish the incidence and degree of insect infestation on alternative crops such as cowpeas, pigeon peas, and hot peppers. Examining widely scattered fields of cowpeas is aimed at providing the basic information to formulate an integrated Pest Management system for small farms in the Delta. Information on time of planting, sampling methods, design and frequency of sampling and probability pest of detection are needed to formulate an effective IPM program. This information is lacking and present efforts are dire cted to obtaining the requisite information. In addition, the evaluation of the effectiveness of non - restricted-use pesticides will provide information needed by limited resource farmers, whereby any farmer can control potentially damaging pest regardless of the status of licensor for pesticide use.

b. Impact(s) - So far, three fields have been sampled weekly throughout the growing season for two summers. An insect incidence has been found to be rather sporadic and unpredictable. There is a weak trend toward early appearance in the more southern fields and progressing northward, however, a more extensive data base will be needed to determine this trend. Insects appear to be more of a problem for the second crop, planted in late June or July, than the earlier crop. Fungal epizootics may be an important part of the natural control system that limits aphid infestations. Isolines of peppers show promise for cultivation in the Delta and are relative free of insect attack at the present level of production. However, Helicoverpa zea larvae do attack the pepper pods and cause some visual damage pod abscission.

c. Stakeholder Input Process - Program direction and crops evaluated grew out of the July 1998 forum with producers.

d. Source of Federal Funds - Evans-Allen 1890 Research Program $117,666.
Source of Funds - State Matching - $12,885.

e. Scope of Impact - Eastern Arkansas

Contact Information -

Name: Dr. Joseph G. Burleigh
Title: Professor
Affiliation: Department of Agriculture
Address: 1200 No. University Drive
Mail Slot 4913
Pine Bluff, AR 71601
E-Mail: burleigh_j@vx4500.uapb.edu
Phone Number: 870-575-8151
Fax Number: 870-543-8543

Goal 4 - Research Program 9 - Small Ruminant Nutrition/Management

a. Situation - With the current world population at six billion people, there is worldwide stress on producing enough food for human consumption. Small ruminants, such as sheep and goats 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, goat and sheep are becoming increasingly attractive to limited-resource farmers in southern Arkansas. Goats and sheep can also utilize low-quality crop by-products to produce high-quality protein. In the U.S., most sheep and goat farmers have small flocks or herds (50 or fewer animals). The nature of small ruminant production systems results is an environmentally friendly alternative enterprise for small and limited-resource farmers. Specifically, this area of research is designed to increase understanding of utilizing crop by-products as animal feed to reduce production costs and protect the environment, develop strategies to determine the level of dietary supplementation required when feeding crop by-products to sheep and goats, and document grazing efficiency incurred in a mixed grazing system.

b. Impact(s) - development of this research program is in process. Research protocols and procedures are being refined for project start-up.

c. Stakeholder Input Process - Program responds to the need to evaluate alternative animal enterprises to integrate into small-scale farming systems identified during the 1998 focus group discussion with 2501 program participants.

d. Source of Federal Funds - Evans-Allen 1890 Research $26,223.
Source of other Funds - N/A

e. Scope of Impact-Eastern Arkansas

Contact Information -

Name: Dr. Dennis Balogu
Title: Professor
Affiliation: Department of Agriculture
Address: 1200 No. University Drive
Mail Slot 4913
Pine Bluff, AR 71601
E-Mail: balogu_d@vx4500.uapb.edu
Phone Number: 870-575-8154
Fax Number: 870-543-8035

Summary of Financial Resources expended in support of Agricultural programs related to goal 4.

CSREES Federal Formula - $143,889

Other Federal - N/A

State Matching - $12,885

Total - $156,774

Goal 5

Executive Summary

Enhanced economic opportunity and quality of life for Americans. Quality of life is a complex concept affected by many variables including education, skills, place of residence, and others. While economic opportunity is but one factor in quality of life, the University recognizes the importance of "Opportunity" to limited resources audiences. Two research programs and one Comprehensive Extension Program support this goal.

With the rapid decline of minority farms in the nation, one rese arch program seeks to document the economic behavior and status of minority farmers in the 3 -state lower Mississippi Delta (selected regions of Arkansas, Mississippi and Louisiana). A through understanding of challenges and opportunities surrounding minority farmers can improve Agricultural policies as will as decision making of minority operators. The research was initiated in FY 2000.

The adolescent years can be a challenging time for some families, with increased conflict between youth and parents. Parents often lack information about adolescent development and the parenting skills necessary to respond to challenges of this developmental stage. Society is also confronted with a number of social issues related to adolescents - juvenile delinquency; teen a lcohol and drug usage; early sexual activity; teen pregnancy; school dropouts; conduct problems; and, more recently, an increase in violence as evidenced by the reoccurring school shootings. Family functioning is often associated with these social concerns, and more specifically, the nature and quality of the parent/adolescent relationship. Current responses to these concerns focus more on intervention than prevention. Research findings suggest that young adolescents do well when they have a healthy positiv e family life characterized by parents who model effective parenting practices. A new research program that addresses some of these problems is under development. Specifically the research will explore the impact and usefulness of parental involvement in the school and school work of their children and will ultimately result in a planned model for increasing parental involvement.

Strong families are the foundation for quality communities and a nation with a positive future. Regardless of their resources, families want to spend wisely, save for tomorrow, raise children to be productive citizens, and experience positive interaction within the family and the community. The ability of families

to function in a supportive economic and social environment is increasingly challenged by poverty; inadequate and costly housing, a lack of money-management skills, personal financial insecurity and poorly informed consumers. The Young Scholars Program was developed to attain a greater economic independence and enhance family well being. It targets low-income minority children, ages 6-15 and their families. Special emphasis is placed on boys and their fathers/grandfathers and/or male surrogates. Through and after-school program which meets five days a week, the children are taught math and science concepts as they related to consumer sciences and agricultural subjects. Modules include horticulture and other agriculture areas, nutrition, consumer education, clothing and housing with an awareness of science and math skills in these areas. The parents, organized into small groups, meet once per week and serve as volunteers for the program. The educational component for parents include the curriculum for the children as well as information on parent education, child development (including strategies for preventing violence in children); financial and resource management; problem solving and conflict resolution skills; job related skills, career and personal development; family relationships, stress management, coping skills and self-esteem; housing to improve the home and neighborhood environments; and nutrition, diet and health.

Goal 5 - Research program 10 - Economic behavior of minority farmers

a. Situation - Minority farm operations in the U.S. are declining at an alarming rate. The rate of decline in Arkansas is higher than the national rate and there is little or no knowledge of the economic behavior and status of minority farmers in Arkansas. This research seeks to provide a better understanding of the factors that contribute to the fast decline of minority farm operations and to form and apply appropriate, economic and agricultural policies to make farming an economically viable option for present and future farm operators.

b. Impact(s) - this project was initiated in FY2000 and is still in the data collection phase.

c. Stakeholder Input Process - This research program were developed in response to problems identified by limited-resource farmers during the July 1998 Focus Group discussion.

d. Source of Federal Funds - Evans-Allen 1890 Research $89,875.
Source of Other Funds - State Matching $12,885.

e. Scope of Impact - Three-state Lower Mississippi Delta region (AR, MS & LA)

Contact Information -

Name: Ari Mwochofi
Title: Assistant Professor
Affiliation: Department of Agriculture
1200 No. University Drive
Mail Slot 4913
Pine Bluff, AR 71601
E-Mail: mwochofi_a@vx4500.uapb.edu
Phone Number: 870-575-8532
Fax Number: 870-543-8543

Goal 5 - Research Program 11 - Improving Quality of Life

a. Situation -. Research that evaluates the effectiveness of parent education programs to improve the quality of interpersonal relationships between parents and their adolescent children as well as studies that document the importance of parental involvement in their children's school and schoolwork may lead to positive changes in family dynamics and school performance of youth.

b. Impact(s) - Because of personal changes, this program is in the early stages of development and has not been implemented to date. A new faculty member has the responsibility of continued program development and implementation.

c. Stakeholder Input Process - Stakeholder Input is an integral component of the planned research methodology. Focus group discussions with parents and school personnel to determine the scope and nature of problems youth are experiencing in school. Each group of respondents will be quarried as to their skills in and willingness to further engage in the research initiative. Those participants who indicate a willingness to participate in focus group interviews will be contacted about the schedule. The researcher will develop a list of general questions for the focus group interviews that will include questions abo ut home life and questions about school. Participants will take turn answering particular questions. During the process, the researcher will ask participants particular questions so as to uncover rooted issues from the topics they discuss. The interviews will be recorded (with consent of the participants) with a cassette recorder accompanied by hand written notes. Data from the focus group interviews will be analyzed both by a qualitative software analysis program and by a manual analysis.

Impact of the stakeholder input is the foundation for the research program that is planned. In addition to establishing excellent school -university relations and partnerships through this approach, the research study will be among very few parent involvement programs tha t are research-based. Intervention plans are to be directly related to the needs of the parents and

youth.

From a national perspective, the research project will aid in the development of models to assist parent educators in working with parents.

d. Source of Federal Funds - Evans-Allen 1890 Research - $10,173.
Source of other Funds - State Matching - $1,074.

e. Scope of Impact - Southern Arkansas

Contact Information -

Name: Dr. Shandra Terrell
Title: Assistant Professor
Affiliation: Department of Human Sciences
1200 No. University Drive
Mail Slot 4971
Pine Bluff, AR 71601
E-Mail: terrell_s@vx4500.uapb.edu
Phone Number: 870-575-8824
Fax Number: 870-543-8823

Goal 5-Extension Program 7-Family and Youth

a. Situation- More children today are being raised without the support and presence of a father in the home. As a result, many will grow up with a deficit of the emotional and financial support they need to succeed in life. Research indicates that a number of factors put children at greater risk of violent crime - living in extreme poverty, experiencing violence and adult discord in the home, and the absence of a male authority figure. Children growing up in these circumstances face tough odds. Research predicts that these youngsters are at greater risk of using drugs and being incarcerated before they reach the age of 18. Many of them will reach adulthood without the necessary skills to be contributing members of society. The vast majority of children in single-parent families are in female-headed households where they are more likely to be poor. This is especially true of minority children. Children from low-income, minority families frequently experience inadequate readiness for school and are at risk of repeating grades early in their school years. Many will later become school dropouts.

The Extension family and youth programs address these myriad issues. People for generations have used education as the vehicle for improving the economic and social status of children and families. Because of changes in the economy and workforce demands, education today is more important than every before. Research powerfully links school completion and academic success to children's ability to move out of poverty, f orm

strong families of their own and raise children who become productive citizens. The Young Scholars Program, University of Arkansas at Pine Bluff through parental and community support is designed to reverse the poor academic trends of low-income, minority children, fortify their futures and fuel their family dreams. The parenting program empowers parents and child care providers to enhance the growth and development of children and adolescents. The 1890 adolescent pregnancy and drug abuse prevention programs which have an abstinence-based focus are designed to stem the incidence of negative behaviors experienced by some adolescents.

The Young Scholars Program is an after-school program that targets low-income, minority children and their families. It was implemented in Monroe County in FY 96 and expanded to Lee County in FY 98. The program promotes male responsibility with special emphasis on boys and their fathers/grandfathers and other male role-models. Ninety-three (93) children: referred to as Young Scholars, meet five days a week, year-long. Sixty-three children and 54 parents are enrolled in the Monroe County Program, while 35 children and 30 parents are involved in Lee County project. The children, ag es 6-15 are taught math and science concepts as they relate to horticulture, agronomy, nutrition, consumer education, clothing and textiles and housing and environment. The program is implemented in housing projects for low-income families. Activities are provided to build social skills, reduce conflict, increase self-esteem and develop strong character. Each year the children participate in a week-long summer day camp to refine the math and science skills learned in the after-school program. They are taught by scientists from the University of Arkansas at Pine Bluff who set up mobile labs in the counties. Day camp closes with an awards banquet to recognize the achievements of the children and the support of volunteers. The progra m reaches the entire family. The parents (75) organized into groups, meet once a week for one hour and must serve one hour per month as volunteers to the after-school program. Their educational component includes the curriculum for the children as well as information on parenting, job related skills, career and personal development, stress management and coping skills, family relationships and economic and self-sufficiency. The Young Scholars Program is on-going. When the children reach age 16, they continue in the program as mentors for the other children.

1890 Extension faculty trained 400 child care providers through a cooperative venture with Penn State University. The Arkansas Department of Human Services supported the program with a grant for two-thousand dollars ($2000). Participants attended eight workshops that included: 1) Secrets of How to get Parents Involved; 2) Active Kids are Learning Kids; 3) Hot Topics for Center Directors-Legal Issues; 4) How to Make and Use Puppets; 5) How to Take the Stress Out of Caregiving; 6) What Brain Research Tells Us About Infant Care; 7) When is Behavior Ok or not Ok?; 8) Taking a New Look at Dramatic Play.

b. Impact(s) - *School Performance* - School teachers report that many of the children in the Young Scholars Program are doing better in school subjects, especially math, reading and science. Program faculty report a major transformation in the children and families enrolled in

the program. Fifty-seven percent of the children in the Young Scholars Program in one center were on the honor
roll last year.

More effective social skills. The children have achieved a high degree of maturity. They are well behaved and respectful of peers and adults and they are developing strong character traits including being dependable and trustworthy. Community leaders attribute the decline in the community crime rate to this program.

Increased sense of self worth and community involvement of the children and families. Before the program, there was little community participation by the children and families. Today the children participate in a number of school and community organizations and activities. Many of the parent are now leaders in the school PTA and faith-based organizations.

Evaluations of the child care workshops indicated that 95 percent of the participants have implemented two or more Extension recommendations. Eighty-five percent indicated that they are incorporating a number of best practices in child care in their curr iculum. Ninety percent are involving parents in their centers through serving as volunteers, attending special programs such as eating breakfast at the centers with their children. Directors are using family pictures to help parents feel a part of the program and to help the children to adjust to being away from their parents.

c. Stakeholders Input Process - A task force is formed in each county where the program operates to get stakeholder input. The role of the task force includes-identifying concerns at the community level; reviewing curriculum in reference to needs of the community; identifying target areas; referring participants to the program; identifying resources for carrying out the p rogram; publicizing and promoting program; identifying funding sources; and the implementation and evaluation process.
The stakeholders on the task forces represent a broad, cross section of the impacted clientele. A number of ways were used to identify stakeholders to ensure that diversity is achieved. Contact was made with a number of community persons who represent various racial and ethnic groups A file of news articles showcasing potential participants is maintained to encourage participation. Task force meetings are held at times when stakeholders can attend and in locations where they feel comfortable. Minutes are written of each meeting that denote input given and actions considered. Stakeholder input is also received through follow-up surveys and evaluations.

d. Merit Review - An external panel of individuals with the educational or Extension knowledge and skills to conduct the work reviewed the programs during the fall of 2000. The review team includes a CSREES national program leader who served as chair. This review addressed multiple areas that cut across all programs representative of Goal 5. The final copy of the review team report is being processed by the Review Team Chair.

e. Source of Federal Funds -1890 Extension Program - $295,099.
Source of other Funds - State Matching - $42,255.

Private Gifts - $25,375.

Contact Information -

Name: Dr. Irene K. Lee
Title: Associate Administrator-Programs
Affiliation: Cooperative Extension Program
Address: 1200 N. University Drive
Mail Slot 4966
Pine Bluff, AR 71601
E-Mail: lee_i@vx4500.uapb.edu
Phone Number: (870) 575-7216
Fax Number: (870) 543-8166

Summary of Financial Resources expended in animal and Plant Agricultural Programs related to goal 1.

CSREES Federal Formula - $395,147
State Matching - $56,214
Private Gifts - 25,375

APPENDIX C

U.S. Department of Agriculture
Cooperative State Research, Education and Extension Service
Supplement to the Annual Report of Accomplishments and Results
Multi-state Extension Activities and Integrated Activities
(Attach Brief Summaries)

Institution University of Arkansas at Pine Bluff
State Arkansas – 1890

Check one: X **Multi-state Extension Activities**
_____ **Integrated Activities (Hatch Act Funds)**
_____ **Integrated Activities (Smith-Lever Act Funds)**

Actual Expenditures

Title of Planned Program/Activity	**FY 2000**
Families First: Nutrition Education and Wellness System (FF:NEWS)	$456,548

Jacquelyn W. McCray — Director

3-1-01 — Date

Summary

The Families First: Nutrition Education and Wellness System (FF:NEWS) program in collaboration with Southern University (Louisiana), Langston University (Oklahoma), Lincoln University (Missouri), South Carolina State University and Prairie View A&M University (Texas) is designed to help food stamp recipients enhance the health status of family members and effectively utilize food resources. This culturally sensitive nutrition education program pays specific attention to nutritional problems associated with southern, soul food, and Tex-Mex diets. The 44-week program encompasses four modules.

The multi-state initiative, managed by a consortium of participating institutions has grown from four to six institutions since its organization three years ago. Five additional 1890 institutions (Tennessee State, Alabama A&M, Virginia State, West Virginia State and Tuskegee University) have attended consortium meetings and are seeking USDA:FNS funding to deliver the FF:NEWS program in their state. Kentucky State University currently receives FNS funding and plans to join the consortium in FY 2002.

Program delivery is based on the content and strategies outlined in the FF:NEWS curriculum developed by the consortium. A data management system developed by the Southern Rural Development Center (under contract to the consortium) guide data collection and impact assessment strategies.

Because of the innovative content and delivery strategies outlined in the curriculum and because of the level of interest in the curriculum from both 1890 and 1862 institutions, the consortium is planning a national training conference to train potential uses of the curriculum. The conference is scheduled for October 29 - November 1, 2001 in Memphis, Tennessee.

ANNUAL REPORT OF ACCOMPLISHMENTS AND RESULTS

Part II - Aquaculture Research and Extension

PROGRAMS

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

Executive Summary

Aquaculture/Fisheries Center research and Extension activities were developed in the two areas of catfish and baitfish production and management under Goal 1. Specific output from the 2000 programs included the following: 5 refereed journal articles on c atfish and 6 refereed journal articles on improved baitfish production and management. There were 2 proceedings and book chapters on catfish and 4 on baitfish. There were an additional 11 catfish abstracts and 7 baitfish abstracts and 16 catfish research presentations and 18 baitfish research presentations. Four farms, four county agents and seven ponds were enrolled in the catfish yield verification program. There were an additional 2,529 hits on the Catfish Yield Verification web site. More than 300 catfish producers and an additional 300 baitfish producers who participated in demonstration activities. Of the producers who participated in educational meetings and listened to educational presentations, 285 were in catfish sessions and an additional 90 were in baitfish sessions. Extension personnel further published 6 catfish articles in trade association publications and 6 baitfish articles in trade association publications. There were 11 Extension presentations related to catfish issues and 3 on bai tfish issues.

In all, the fish health program provides services to regions that produce more than $150,000,000/yr of food, bait, ornamental, and sportfish with customers worldwide. The diagnostics services saved the catfish and baitfish industries over $7 million in 2000. The successful identification of the cause of high chloride toxicosis in catfish ponds has paved the way to develop management protocols for its prevention. This should result in the prevention of losses to this syndrome that has plagued catfish farmers with high chloride concentrations for several years. Identification of the optimal size of catfish fingerling to understock in catfish ponds will reduce costs of produ cing catfish by improving survival and growth rates and increasing pond yields. Improved understanding of the economic interactions between stocking density and feeding rate provide guidelines for catfish farmers to reduce cost by producing at the profit-maximizing rate. Improved fish grading technologies will reduce costs both for growers and for processors. New feed formulations resulted in far superior spawning performance over an extended period of time. This development will provide a mechanism to improve farm management by having additional options for spawning fish later in the season.

STAKEHOLDER INPUT PROCESS

Stakeholder input is a continuous process in the Aquaculture/Fisheries Center. In the early part of 2000, 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 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.

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. The active 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 is composed of local, state, and national representatives, to provide advice and guidance to the program. The Council members are selected to be certain to have adequate representation from all sectors of the aquaculture industry and to have representation of 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 November, 1999, Drs. Robert P. Romaire, 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 of the Merit and Peer Review process of the Plan of Work of the Cooperative State Research, Education, and Extension Service (CSREES). Drs. Romaire and Simco were responsible for reviewing the research and teaching programs of the Department of Aquaculture and Fisheries and Aquaculture/Fisheries Center at the University of Arkansas at Pine Bluff. Drs. Avery and Durborow reviewed Extension programs and activities in the Aquaculture/Fisheries Center. Their report is appended to this annual report.

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 is under expansion and will include more research summaries and information.

SUMMARY OF GOAL 1 - Program Initiatives and Impacts

Research and Extension Projects

Research Program 4 - Extension Program 3 – Catfish Production and Management

Overview

Research

Catfish research in 2000 focused on five main problem areas identified by stakeholder groups: fish health, aquaculture engineering, production economics of catfish production and of treatment alternatives for pond effluents, water quality management, and fish nutrition. Specific studies conducted in 2000 included:

1 High chloride toxicosis of channel catfish;
b. The development of in-pond grading technology for commercial aquaculture;
c. The economics of producing and understocking different sizes of catfish fingerlings on growout farms;
d. Economics of alternative treatment options for effluents from catfish ponds;
e. The effect of row crop herbicides on phytoplankton communities in catfish ponds.

Overview

Extension

Catfish Extension programs conducted in 2000 included programs in the areas of fish health, catfish yield verification, technical assistance for new catfish producers, and demonstration of the new in -pond grading technology for fingerling producers.

The catfish industry in southeast Arkansas continues to grow at a rate of approximately 20% a year. Much of the growth in recent years is from new farmers who are switching from row crop production to catfish production to take advantage of the greater profit potential from catfish production. Since catfish production is a highly capital and management intensive production activity, there are high levels of yield and financial risk involved in catfish production. Access to technical assistance to help new gro wers overcome the difficulties inherent in moving up the learning curve on catfish production technology is critical and essential to their ability to develop a viable and successful catfish farming business. The UAPB Extension program assisted over 40 in dividuals develop business loan proposals for catfish production in 2000 and provided 4,500 individual contacts with new and existing growers.

Project 1. High chloride toxicosis of channel catfish

Impact Area: Extension, Research

a. **Situation** – For the last two years, farmers culturing catfish in high-salt water (greater than 1 part per thousand) have experienced sporadic, catastrophic fish losses in isolated ponds. Total losses have amounted to nearly $1,000,000/yr. The UAPB Fish Disease Diagnostic Laboratories initiated a research project that discovered the cause of these loses (toxins released from certain blue-green algal blooms) and devised a method of prevention. The laboratories now offer an algal monitoring service that identifies pot entially toxic blooms as they develop and advises farmers on preventing the production and release of algal toxins.

b. **Impact(s)** – In the first season of this project, no fish have been lost to this syndrome. Although climate variations may have made this problem less common this year, several potentially toxic blooms have been identified and treated.

Cooperating Institutions

University of Arkansas at Pine Bluff: Andrew Goodwin and Larry Dorman
USDA-ARS: Harry K. Dupree, Stuttgart National Aquaculture Research Center;
Don Freeman provides an assistantship for UAPB Student Scott Snyder.

Contact Information –

Name:	Dr. Andrew E. Goodwin
Title:	Associate Professor
Affiliation:	Department of Aquaculture and Fisheries
Address:	1200 North University Drive
	Mail Slot 4912
	Pine Bluff, Arkansas 71601
E-Mail:	agoodwin@uaex.edu
Phone Number:	870/543-8137
Fax Number:	870/543-8162

Project 2. Development of in-pond grading technology for commercial aquaculture

Impact Area: Research and Extension

Issues/national goals: Competitive agricultural systems

a. **Situation –** Grading socks and nets with various mesh sizes are commonly used in commercial aquaculture to selectively separate sub-harvestable fingerling and food-size fish at harvest. This passive grading technique is limited by mesh size, is often unpredictable, and does not allow producers the option of retaining both the large and small-sized fish at harvest. It has been estimated that improper sizing of food-size channel catfish costs the catfish industry over $100 million annually.

A new type of fish grader was designed. Fish contained in traditional holding nets are loaded into the grader in a continuous fashion through an eductor-style pump system powered by a 5.5 hp gas powered water pump. Small fish escape downward through the grading surface and fish too large to pass through the grading surface work their way off the end of the grader. Both small and large fish can be captured in separate socks with a single pass across the grader. The grader is transported between ponds with a boat-style trailer designed for commercial pond use.

b. **Impact(s)** – The new grader has been adopted by a number of fingerling producers who report significant reductions in fish damage and labor requirements. The foodfish model currently nearing completion is especially important as the processing industry has recently increased the stringency of their fish grading requirements. Tests conducted in fall of 2000 indicated that the fingerling grader will grade 100 fingerlings/second within 0.6 cm of the split point 96% of the time.

Contact Information –

Name:	David Heikes
Title:	Extension Specialist
Affiliation:	Department of Aquaculture and Fisheries
Address:	1200 North University Drive

Mail Slot 4912
Pine Bluff, Arkansas 71601
E-Mail: dheikes@uaex.edu
Phone Number: 870/543-8143
Fax Number: 870/543-8162

Project 3. The economics of producing and understocking different sizes of catfish fingerlings on growout farms

Impact Area: Research

Issues/National Goals: Competitive Agricultural Systems

a. **Situation –** Catfish growers understock fingerlings in multiple batches to be able to meet cash flow obligations. Larger fingerlings are thought to survive better, grow faster, and reach market size sooner, but are more expensive. Small fingerlings cost less but grow more slowly, take longer to reach market size, and are thought to have lower survival in multiple-batch ponds. In order to determine the most profitable size of fingerlings to understock, both the costs and the value of different sizes of fingerlings must be determined.

Three pond production studies were conducted. The first two studies provided data with which to estimate the costs of producing different sizes of fingerlings either with or without thinning. The third study was designed to provide data to estimate the relative value of different sizes of fingerlings when understocking growout ponds.

b. **Impact(s)** – The fingerling studies documented the much lower costs and lower risk of producing smaller fingerlings at higher stocking densities. It was less expensive to produce larger fingerlings with thinning than in the system without thinning. Nevertheless, in growout ponds, 5-inch and 7-inch fish survived better than 3-inch fish. Overall production costs per pound of fish grown in growout ponds were similar for 5- and 7-inch fish, but much higher for 3-inch fish. Given that risks associated with producing 5-inch fish were less, stocking 5-inch fish is the most profitable production strategy. This strategy will reduce the cost of producing channel catfish.

Contact Information –

Name: Dr. Carole R. Engle
Title: Professor/Chairperson
Affiliation: Department of Aquaculture and Fisheries
Address: 1200 North University Drive
Mail Slot 4912
Pine Bluff, Arkansas 71601
E-Mail: cengle@uaex.edu mailto:cengle@uaex.edu
Phone Number: 870/543-8537

Project 4. Economics of alternative treatment options for effluents from catfish ponds

a. **Situation –** During the last decade, increasing concerns on the potential impact of effluents discharged from aquaculture operations have been continuously expressed by members of environmental organizations, which has motivated further involvemen t of the United States Environmental Protection Agency (EPA) in the regulation of aquaculture effluents. The EPA announced in February 2000 that a formal rulemaking process for aquaculture would be initiated. As a consequence of this action, there is a renewed interest in economically effective technologies with the potential to achieve meaningful reductions in the quantity of released effluents and/or concentrations of pollutants, primarily nutrients. This study takes a preliminary look at the economics of settling basins for the treatment of effluents from pond aquaculture operations. Thirty-six different scenarios for the treatment of harvest and overflow effluents were identified for each one of three farm sizes: 160, 320, and 640 acres. Farm situations considered in the analysis included varying pond sizes (10 and 15 acres), farm drainage layouts (existence of one or two main drainage canals), and the option of using existing ponds as sedimentation basins as opposed to the use of additional land for basin construction. Treatment of either all effluents discharged or only the last 20% of the discharge and minimum particle sizes of either 1 or 5 microns were considered.

b. **Impact(s) –** Catfish growers understock fingerlings in multiple batches to be able to meet cash flow obligations. Larger fingerlings are thought to survive better, grow faster, and reach market size sooner, but are more expensive. Small fingerlings cost less but gro w more slowly, take longer to reach market size, and are thought to have lower survival in multiple-batch ponds. In order to determine the most profitable size of fingerlings to understock, both the costs and the value of different sizes of fingerlings mu st be determined. Three pond production studies were conducted. The first two studies provided data with which to estimate the costs of producing different sizes of fingerlings either with or without thinning. The third study was designed to

provide data to estimate the relative value of different sizes of fingerlings when understocking growout ponds.

d. **Scope of Impact** – National

Contact Information –

Name: Dr. Carole R. Engle
Title: Professor/Chairperson
Affiliation: Department of Aquaculture and Fisheries
Address: 1200 North University Drive
Mail Slot 4912
Pine Bluff, Arkansas 71601
E-Mail: cengle@uaex.edu mailto:cengle@uaex.edu
Phone Number: 870/543-8537

Project 5. Fish health

Impact Area: Extension

a. **Situation –** The UAPB Fish Health Diagnostics Services handled over 750 cases of catfish health problems and water quality samples from catfish ponds. In all, the services responded to problems identified on 119 farms that represented over 23,000 acres of catfish production. In response to the newly identified high chloride toxicosis of channel catfish, an algal monitoring service was developed that identified potentially toxic blooms as they develop and advises farmers on preventing the production and release of algal toxins.

b. **Impact(s) –** The fish health program provided services to regions that produce more than $100,000,000/yr of catfish. Savings to the catfish industry through diagnostics assistance is estimated to be over $2.5 million. Perhaps more significantly, easy access to quality diagnostic laboratory services gives Arkansas farmers the confidence to continue to increase fish density thereby maintaining profit margins in an increasingly competitive environment. In the first season of the high chloride toxicosis project, no fish have been lost to this syndrome. Although climate variations may have made this problems less common this year, several potentially toxic blooms have been identified and treated.

c. **Scope of Impact** – National

Contact Information –

Name: Dr. Andrew E. Goodwin
Title: Associate Professor
Affiliation: Department of Aquaculture and Fisheries
Address: 1200 North University Drive
Mail Slot 4990
Pine Bluff, Arkansas 71601
E-Mail: agoodwin@uaex.edu
Phone Number: 870/543-8137
Fax Number: 870/543-8162

Project 6. Catfish Yield Verification

Impact Area: Extension

a. **Situation** – Catfish yield verification is an extension program designed to transfer technology more rapidly to the private sector by verifying research and Extension recommendations on commercial farms. In 2000, catfish yield verification was carried out on four different farms with seven ponds enrolled in the program. Both foodfish and fingerling production systems were enrolled in verification in both the northeast and southeast sections of the state.

b. **Impact(s) –** The fingerling production verification ponds verified that the recommended stocking densities reliably produced market-sized fingerlings faster than other stocking densities; in fact on one fingerling verification farm, the only market-sized fingerlings available early in the season were from the verification pond. The farmer switched all ponds in 2000 to the verification management protocol to take advantage of the production benefits.

c. **Scope of Impact** – National

Contact Information –

Name: David Heikes

Title: Extension Specialist
Affiliation: Department of Aquaculture and Fisheries
Address: 1200 North University Drive
Mail Slot 4912
Pine Bluff, Arkansas 71601
E-Mail: dheikes@uaex.edu
Phone Number: 870/543-8143
Fax Number: 870/543-8162

Research Program 5 - Extension Program 4 - Baitfish Production and Management

Overview

Baitfish research in 2000 focused on five main research areas: hatchery methods, fish nutrition, fish health, pond management, and development of best management practices for baitfish. Specific projects conducted in 2000 include the following:

1. Developing hatchery methods for bait and feeder fish.
2. Utilization of carbohydrates by golden shiners.
3. Molecular techniques for the rapid diagnosis of viral diseases in cyprinids.
4. Use of natural zooplankton in the indoor culture of sunshine bass.
5. Developing Best Management Practices to minimize effluents from aquaculture.

Project 1. Developing hatchery methods for bait and feeder fish

Impact Area - Research

a. **Situation –** The main objective of this study was to document daily egg production by golden shiners over the entire spawning season. Four plastic-lined pools were stocked March 15, 2000 with 50 golden shiners each (average weight per fish=9 g), a rate equivalent to 81,500 fish/ha and a weight of 751 kg/ha. A sample of the stocked population was found to be 72% female. Fish were fed once daily at 5% body weight per day with a 40% protein, 9% fat, extruded (pelleted) feed. A spawning mat on a floating rack was placed in each pool. The study was continued through July 4 for a total of 111 days. Broodfish in the study spawned for the entire season with no apparent decline in egg production. Eggs were found in at least one of the four pools every day with only four exceptions. On average, a kilogram of brood fish (72% female) produced 1.06 million eggs over the season. Broodstock condition was significantly better at the end of the spawning season than it was at stocking. In addition, by

harvest, broodfish had nearly doubled in weight despite having spawned for more than 3 months.

b. **Impact(s)** – Golden shiner producers usually cease collecting eggs from a brood pond after 3 to 4 weeks due to declining egg production. If eggs could be obtained for a longer period, fewer brood fish would be required and less pond space would be needed for brood stock. The results of this study demonstrate that it is possible to maintain egg production for the entire spawning season if broodfish are fed an adequate amount of a high quality diet.

c. **Scope of Impact** – National

Contact Information –

Name:	Dr. Nathan Stone
Title:	Extension Specialist
Affiliation:	Department of Aquaculture and Fisheries
Address:	1200 North University Drive
	Mail Slot 4912
	Pine Bluff, Arkansas 71601
E-Mail:	nstone@uaex.edu
Phone Number:	870/543-8138
Fax Number:	870/543-8162

Project 2. Utilization of carbohydrates by golden shiners

a. **Situation** – Carbohydrates are inexpensive energy sources whose utilization varies widely among fish species. Golden shiners use starch efficiently for growth in feeding trials, but additional information on carbohydrate assimilation is needed to optimize diets. Previously, utilization of starch by golden shiners was compared quantitatively using conventional and stable carbon isotope methods. Both lipid and carbohydrate assimilation were evident from isotope data, especially at higher levels (30-45%) of lipid or carbohydrate inclusion. An additional feeding trial is planned to determine the assimilation of starches containing different ratios of amylose and amylopectin by golden shiners. Different types of starch are known to have differential effects on growth, blood chemistry and body composition in mammals. In fish, the results could be quite different due to their relatively inefficient carbohydrate metabolism.

However, improved assimilation of carbohydrates by golden shiners would allow increased use of carbohydrates in practical feeds, reducing feed costs and increasing production profitability.

b. **Impact(s) –** Increased use of carbohydrates in production feeds for golden shiners without sacrificing fish performance or environmental integrity would decrease feed cost and increase production efficiency in a sustainable manner. However, research is in its infancy, thus it is much too early to identify impacts.

c. **Scope of Impact** – National

Contact Information –

Name:	Rebecca Lochmann
Title:	Professor
Affiliation:	Department of Aquaculture and Fisheries
Address:	1200 North University Drive
	Mail Slot 4912
	Pine Bluff, Arkansas 71601
E-Mail:	rlochamann@uaex.edu
Phone Number:	870/543-8143
Fax Number:	870/543-8162

Project 3. Molecular techniques for the rapid diagnosis of viral diseases in cyprinids.

a. **Situation –** The first year of a 5-year study has been completed. Thus far, cyprinid viruses have been characterized and quantities of each virus have been produced and purified that should be sufficient to do the rest of the work. This step was laborious and involved several hundred tissue culture flasks and purification of the virus using sucrose gradient centrifugation. Because the viral material is so expensive to produce, reagents and protocols that will be involved in the rest of the study have been thoroughly tested. Development of PCR assays for these RNA viruses involves RNA purification, reverse transcription, cloning, and sequencing.

All of the protocols and reagents and their effect on purified catfish mRNA has been verified before moving on to the viral material. Cloning of the viral RNA's will be accomplished in the early months of 2001.

b. **Impact(s) –** Current tissue culture-based methods for diagnosing baitfish viruses require 2-4 weeks and only indicate that a virus is present. New PCR techniques will allow us to diagnose a viral infection in one day and will also identify the virus involved. This will allow us to study the incidence of viral diseases in the industry and help farmers to prevent outbreaks.

d. **Scope of Impact** – National

Contact Information –

Name:	Dr. Andrew E. Goodwin
Title:	Associate Professor
Affiliation:	Department of Aquaculture and Fisheries
Address:	1200 North University Drive
	Mail Slot 4912
	Pine Bluff, Arkansas 71601
E-Mail:	agoodwin@uaex.edu
Phone Number:	870/543-8137
Fax Number:	870/543-8162

Project 4. Use natural zooplankton in the indoor culture of sunshine bass

Impact Area - Research

a. **Situation –** A study was conducted to examine the effect on zooplankton production with increases in fertilization rates. The study showed that fry do not fare well in ponds at the

enhanced fertilization rates, but that enhanced fertilization rates do consistently increase zooplankton production. The control rate of fertilization was 250 lb/ac during the first week with diminished levels thereafter. Three treatment rates included 2, 3, and 4 times the control rate. This study showed that sunshine bass fingerling survival was inversely related to fertilization rate. Water quality problems arose at the high fertilization rates. Also, growth rate was inversely related to survival.

b. **Impact(s) –** This work demonstrates the concept of increased fertilization up to four times what is currently being used. It also shows that fingerling production in the over-fertilized ponds is not an option. However, using zooplankton from over-fertilized ponds to feed tank-reared sunshine bass is viable.

c. **Scope of Impact** – National

Contact Information –

Name:	Dr. Steve Lochmann
Title:	Associate Professor
Affiliation:	Department of Aquaculture and Fisheries
Address:	1200 North University Drive
	Mail Slot 4912
	Pine Bluff, Arkansas 71601
E-Mail:	slochmann@uaex.edu
Phone Number:	870/543-8165
Fax Number:	870/543-8162

Project 5. Developing best management practices to minimize effluents from aquaculture impact area: Research and Extension

a. **Situation** – Research and Extension scientists at the University of Arkansas at Pine Bluff Aquaculture/Fisheries Center are working together with farmers and other scientists to minimize any environmental impacts from aquaculture. The U.S. Environmental Protection A gency will issue new regulations on effluents from aquaculture operations by June 2004. Nationally, potential costs associated with aquaculture effluent treatment and monitoring have been estimated at up to $50 to $100 million per year. The Aquaculture/Fisheries Center is participating in a regional project to conduct research and extension activities leading to the development and adoption of appropriate Best Management Practices (BMPs) for pond aquaculture. In other areas of agriculture and in forestry , BMPs have been used successfully to improve environmental conditions without costly monitoring requirements or unreasonable treatment technologies.

b. **Impact(s) –** Center scientists conducted research studies on water quality in baitfish ponds and to characterize effluents from ponds at draining. Changes in effluent quality along vegetated ditches and the impact of baitfish pond effluent discharges on receiving stream water quality were also monitored. Research was conducted on methods to reuse water in the baitfish industry. Techniques to start zooplankton blooms in pond water held from previous production operations were evaluated. Economics research developed partial enterprise budgets for effluent management strategies and a linear programming mo del to evaluate the economics of the various potential treatment options. In cooperation with the baitfish farmers association and based on consultations with aquaculture researchers, Best Management Practices were developed for baitfish aquaculture and educational activities have been conducted to encourage adoption of BMPs.

c. **Impact(s) –** A set of Best Management Practices (BMPs) was developed to minimize any possible environmental impact from aquaculture farms. Proactive adoption of these BMPs by fish farmers provides the EPA with the opportunity to control aquaculture effluents without unreasonable regulations or costly monitoring requirements that could lead to the loss of additional family farms. Census data indicates that 93% of baitfi sh farmers are small businesses, and over half of all farms gross less than $25,000 annually. Economics research developed partial enterprise budgets for effluent management strategies and alinear programming model to evaluate the economics of the various potential treatment options.

d. **Scope of Impact** – National

e. **Contact Information** –

Name: Dr. Nathan Stone
Title: Extension Specialist
Affiliation: Department of Aquaculture and Fisheries
Address: 1200 North University Drive
Mail Slot 4912
Pine Bluff, Arkansas 71601
E-Mail: nstone@uaex.edu
Phone Number: 870/543-8138
Fax Number: 870/543-8162

Program 5 - Fish Health

Impact Area: Research and Extension

a. **Situation –** The fish health program provided services to regions that produce more than $50,000,000 of baitfish. Diagnostics services generally include water quality testing and isolation of fish diseases. Savings to the baitfish industry through this diagnostic assistance is estimated to be over $4.5 million.

b. **Impact(s) –** At least 5 farms have adopted recommended aeration techniques and strategies that were demonstrated. These farms are expected to have fewer fish health problems in the coming year due to adoption of the aeration strategies. According to one baitfish farmer, "There were numerous times this year that we were able to identify ponds experiencing an increased build up of ammonia. We took steps to reduce the levels and never had any fish die. Ponds that we did not include in the monitoring had more problems with unhealthy fish, and increased mortality. The same results were noted in monitoring increased pH levels, blue greens, nitrites, and water hardness. it made the management decisions easier because of having records and being able to identify changes in a timely manner to take action rather than wait for problems to occur first."

By far, the most significant impact of this work is the early detection and treatment of fish diseases.

c. **Scope of Impact** – The impacts of this effort are relevant to all states with baitfish production, but the impact will be greatest in the southern region where there is the greatest concentration of baitfish production.

Contact Information –

Name:	Dr. Andrew E. Goodwin
Title:	Associate Professor
Affiliation:	Department of Aquaculture and Fisheries
Address:	1200 North University Drive
	Mail Slot 4912
	Pine Bluff, Arkansas 71601
E-Mail:	agoodwin@uaex.edu
Phone Number:	870/543-8137
Fax Number:	870/543-8162

Summary of Financial Resources Expended in Aquaculture Programs related to Goal 1:

Research Programs 4 and 5	
Source of Funds	
CSREES	**$ 706,277**
State Matching	**269,297**
Other	**80,002**
Total Research Programs 4 and 5	**$1,055,576**
Extension Programs 3 and 4	
Source of Funds	
CSREES	**$ 401,647**
State Matching	**258,644**
Other	**71,360**
Total Extension Programs 3 and 4	**$ 731,651**
Total Research & Extension Programs	**$1,787,227**

GOAL 4: An agriculture system which protects natural resources and the environment

Extension Program 6 – Farm Pond Management and Irrigation Reservoirs

Farm pond management educational activities have been conducted to focus on the key management areas of proper fertilizing, liming, and fish population management for successful recreational fishing. A program on fish population management was presented a t a field day.

a. **Situation –** There was one book chapter written related to farm pond management and one research presentation. Over 300 producers participated in farm pond demonstration events, and 40 more in educational meetings. In addition, there were a total of over 900 individual contacts related to farm pond management in Arkansas.

b. **Impact(s) –** In all, there were 924 contacts related to farm pond management. Many individuals indicated that they were planning changes in the way that they managed their ponds as a result of the new information on proper management procedures. Given the large number of farm ponds in the state, the potential impact of improving farm pond management is high.

c. **Funding –**

Source of federal funds: 1890 Extension Program - $56,304.
Source of other funds: State Matching - $31,316.
Other - $8,640.

d. **Scope of Impact** – National

Contact Information –

Name:	Dr. John Jackson
Title:	Assistant Professor
Affiliation:	Department of Aquaculture and Fisheries
Address:	1200 North University Drive
	Mail Slot 4912

Pine Bluff, Arkansas 71601
E-Mail: jjackson@uaex.edu
Phone Number: 870/543-8136
Fax Number: 870/543-8162

Summary of Financial Resources Expended in Aquaculture Programs related to Goal 4:

Federal Formula – 1890 Extension Program $ 56,304

Other Federal	**8,640**
State Matching	**31,316**
Other Funds	**N/A**
Total Funds	**$ 96,260**

EVALUATION OF THE SUCCESS OF MULTI AND JOINT ACTIVITIES

The Catfish Yield Verification Program has evolved into a multi-state activity with regional funding in addition to state and federal resources. The multi-state approach has afforded all participants the opportunity to compare successes and problems across states. Due to the commonality of the types of problems and issues that have emerged in catfish yield verification, a joint bulletin is underway with participants from four different states. This bulletin will provide guidelines for establishing succes sful yield verification programs and will describe the potential pitfalls. Given the diverse nature of the site-specific management protocols developed in each state, the interchange among all participants has been of great use to all.

The work on Best Management Practices and on characterization and treatment alternatives for aquaculture effluents has been a national, multi-state effort. Given the magnitude of the potential impact of EPA's actions, this national effort has enabled all project participant s to take advantage of the research, experience, and insights of others across the U.S. who have had to deal with a variety of different regulatory options and positions. The collective progress of all has been enhanced by this coordinated effort.

The UAPB baitfish research program is a multi-disciplinary effort that has worked well. The successful finding that improved nutrition of baitfish broodstock allows for an extended spawning period and healthier fish was the combination of hatchery managem ent, nutrition, and fish health expertise. This successful multidisciplinary work has led to additional studies to look at the interactions among nutrition, fish health, and reproductive success for baitfish production.

INTEGRATED RESEARCH AND EXTENSION ACTIVITIES

The majority of the research and extension activities of the Aquaculture/Fisheries Center are integrated

research and extension activities. Under the planned programs related to Catfish Production and Management, the following are integrated activities:

1. High chloride toxicosis of channel catfish;
2. The development of in-pond grading technology for commercial aquaculture;
3. The economics of producing and understocking different sizes of catfish fingerlings on growout farms;
4. Economics of alternative treatment options for effluents from catfish ponds;

Under the programs related to Baitfish Production and Management, the following are integrated activities:

1. Developing hatchery methods for bait and feeder fish.
2. Molecular techniques for the rapid diagnosis of viral diseases in cyprinids.
3. Developing Best Management Practices to minimize effluents from aquaculture.

The ability of these programs to have a rapid and effective impact and to be adopted quickly by fish farmers is directly related to the fact that these were developed with an integrated research and extension approach. An individual with a joint extension -research appointment heads each of these projects. This type of appointment makes it very easy for an activity to become both a research endeavor and extension activity to implement those components of the research recommendations as quickly as they are completed.

APPENDIX

Results of Merit Review of Aquaculture Programs

I. Introduction

November 1999

Section 202 and 225 of the Agricultural Research, Extension, and Education Reform Act of 1998 (AREERA) requires all institutions eligilbe for Federal research and extension formula funds to prepare, submit, and have an approved Plan of Work (POW) for funds authorized under the Hatch Act of 1887, as amended, the Smith-Lever Act, as amended, and Sections 1444 (1890 Extension), and 1445 (1890 Research) of the National Agriculture Research, Extension, and Teaching Policy Act of 1977, as amended. The legislation specifies POW requirements for the 1862 Research, 1862 Extension, 1890 Research, and 1890 Extension funds. These institutions are required to report stakeholder input and merit and peer review procedures.

In November 1999, Drs. Robert P. Romaire, Louisiana State University, Bill Simco, University of Memphis, Jimmy Avery, Mississippi State University, and Bob Durborow, Kentucky State University, were invited by Dr. Carole Engle, Professor and Department Chair, Department of Aquaculture and Fisheries, and Aquaculture/Fisheries Center, University of Arkansas at Pine Bluff to review the research, teaching, and extension activities as a component of the "Merit and Peer Review" in the development of the "Plan of Work", Cooperative State Research, Education, and Extension Service (CSREES), United States Department of Agriculture, as mandated by the Agricultural Research, Extension, and Education Reform Act of 1998.

Drs. Romaire and Simco were responsible for reviewing the research and teaching programs of the Department of Aquaculture and Fisheries and Aquaculture/Fisheries Center, University of Arkansas at Pine Bluff (UAPB), and their review is basis of this report. Drs. Avery and Durborow reviewed extension programs and activities in the Department of Aquaculture and Fisheries and Aquaculture/Fisheries Center and their report was prepared independently of this report.

Prior to arriving in at UAPB, Pine Bluff, Arkansas, Dr. Engle provided the review team the following materials to review on the UAPB aquaculture research, teaching, and extension programs:

1. Agenda for the "Plan of Work" review team (November 16 and 17, 1999)

2. Agenda for the UAPB Aquaculture/Fisheries Center, National Fisheries Advisory Council Meeting, November 17, 2000

3. Personnel List - University of Arkansas at Pine Bluff, Department of Aquaculture and Fisheries, Aquaculture/Fisheries Center

4. 1997 University of Arkansas at Pine Bluff, Aquaculture/Fisheries Center, Annual Report
5. 1998 University of Arkansas at Pine Bluff, Aquaculture/Fisheries Center, Annual Report

6. 1995-1998 Publications List, University of Arkansas at Pine Bluff, Aquaculture/Fisheries Center
7. Aquaculture/Fisheries Center Quarterly Reports, January 1, 1999-March 31, 1999 (Vol 11, No 1) and April 1, 1999-June 30, 1999 (Volume 11, No 2)

8. UAPB Aquaculture/Fisheries Center, Aquaculture Projects, 1999 Studies

9. UAPB Aquaculture/Fisheries Center, Extension Initiatives

10. 1999 Research Highlights, UAPB Aquaculture/Fisheries Center

11. Report on Aquaculture/Fisheries Center Field Day, October 1, 1998

12. Aquaculture/Fisheries Center, University of Arkansas at Pine Bluff "Plan of Work" submitted June 4, 1999

13. Proposal to Re-structure Aquaculture/Fisheries Center of Excellence (Approved November 16, 1999)

14. Statistics on the commercial aquaculture industry in Arkansas

II. **Activities of Review Team**

November 16, 1999

The four person review team met with Dr. Engle at 1:30 PM Tuesday at the S.J. Parker Agricultural Research Center, to review the team's agenda. The team was introduced to Dr. Jacquelyn W. McCray, Dean/Director, 1890 Research and Extension Programs, UAPB, at the 1890 Extension Building. Dr. McCray welcomed the review team to UAPB and provided the team with an overview of history and program activities of the Aquaculture/Fisheri es Center, UAPB. Following the interview with Dr. McCray, the team broke up into two sub-groups consisting of Drs. Romaire and Simco, to review the research and teaching programs and activities, and Drs. Avery and Durborow to review extension programs and activities.

Following the meeting with Dean/Director McCray, Drs. Romaire and Simco met individually with Dr. Rebecca Lochmann, aquaculture nutrition, Dr. Peter Perschbacher, water quality and production systems, Dr. Tim Pfeiffer, aquaculture engineeri ng, USDA-Agricultural Research Service, and Dr. John Jackson, natural fisheries. Drs. Romaire and Simco discussed with each faculty member (1) their individual teaching and research programs, (2) interaction and cooperation with their research and extension colleagues within the UAPB program, (3) their relationship with the commercial aquaculture sector in Arkansas or their and relationship with the Arkansas's Game and Fish Commission, and (4) perceived strengths and weaknesses in the Department of Aquacul ture and Fisheries and

Aquaculture/Fisheries Center, UAPB. Drs. Romaire and Simco toured Drs. Lochmann and Perschbacher research laboratories.

In late afternoon after faculty interviews were completed, Dr. Engle took Drs. Romaire and Simco on a tour of the field aquaculture research facilities adjacent to UAPB campus.

November 17, 2000

Drs. Romaire, Simco, Avery and Durborow met with Dr. Steve Lochmann, natural fisheries, early Wednesday morning to discuss his research and teaching activities. The review team then traveled to Little Rock, Arkansas with UAPB aquaculture and fisheries faculty and staff to attend the National Fisheries Advisory Council Meeting, at the University of Arkansas Systems building. Following the advisory council meeting and lunch, various members the team departed for home.

III. Assessment of Research and Teaching Programs, Department of Aquaculture and Fisheries, Fisheries/Aquaculture Center, University of Arkansas, Pine Bluff

Strengths

Administrative Leadership

Based on discussions with faculty, higher administration, and review of materials provided the review team it is clear that the Department of Aquaculture and Fisheries and Aquaculture/Fisheries Center receives outstanding leadership and program direction from Dr. Carole Engle, Professor and Department Chair. Dr. Engle is a highly respected scientist and administrator and is highly respected by her aquaculture research and extension peers at 1862 and 1890 land-grant institutions in the southern USA. Dr. Engle has long been held in extremely high regard by catfish and baitfish commodity organizations, both within and outside the state of Arkansas. Although the review team had little time to visit with higher administration at UAPB, conversations with Dr. Engle revealed that the administration, from the Dean/Director's office through the office of the Chancellor, is highly supportive of the aquaculture/fisheries research center which is essential to further growth and enhancement of the UAPB's aquaculture program.

Faculty and Staff

UAPB's aquaculture program has an exceptionally strong faculty and support staff addressing the three core areas - research, extension, and education (teaching). The faculty, which consist of 12 Ph.D.s and 1 DVM, have job responsibilities that address all major program areas in aquaculture and natural fisheries, including economics and marketing, nutrition, water quality, engineering, fish health, food science, and natural fisheries and resource conservation. Several faculty have split appointments in

which they have both extension and research responsibilities. Others hold traditional research and teaching appointments. Faculty productivity is high, as reflected by grantsmanship, publication record, and participation and leadership activities in regional, national, and internationally recognized professional aquaculture and fisheries organizations. The working relationships and interactions between aquaculture faculty and natural fisheries faculty in research, teaching, and extension appeared to be exceptionally good and better than we have seen at other 1862 and 1890 land-grant institutions. UAPB aquaculture and fisheries faculty are highly respected by their peers in the southern region. The faculty spoke highly of the productivity of their support staff (B.S. and M.S. research associates/specialists).

Federal and Industry Partnership

The formal relationship of UAPB's aquaculture/fisheries center with Agriculture Research Service (ARS) aquacultural scientists with the USDA housed at UAPB is excellent and strengthens the program immensely. Furthermore, a strong working relationship exists with the nearby USDA aquaculture laboratory in Stuttgart.

UAPB aquaculture/research center has an outstanding working relationship with Arkansas's aquaculture industry, particularly the baitfish and catfish farming industries. UAPB has established a strong National Fisheries Advisory council to assist it in the direction of research, extension, and educational activities. The council is broad, including members from industry, government, and academia. It was very evident that there is excellent dialogue and two-way communication between UAPB's aquaculture/fisheries scientists and the advisory boards providing a strong linkage to industry problems and needs in Arkansas. The national fisheries faculty indicated that they have a good working relationship with the Arkansas Game and Fish Commission in areas of fisheries management and natural resource conservation.

Research and Extension

Research and extension programs in aquaculture and natural fisheries at UAPB are highly relevant and are highly focused to address industry and state needs. UAPB research and extension faculty are highly recognized by their peers throughout the southern region for their research and extension programs in fish health, economics, nutrition, and development of production systems for baitfish and catfish. In addition to research conducted at field facilities in Pine Bluff, outfield research activities are implemented at commercial sites with cooperating producers. As previously mentioned, the linkage of UAPB's aquaculture program with the USDA-ARS strengthens the overall program immensely. Extension programs are strong and addressed in a separate report written by team member Drs. Jimmy Avery and Bob Durborow. The review team was very impressed by the degree of cooperation among scientist and industry.

Teaching and Public Service

Aquaculture and fisheries faculty teach a number of undergraduate and graduate level courses that

address all major core areas of aquaculture and fisheries necessary for a strong undergraduate and graduate degree program. UAPB faculty have an on-going recruitment program to attract students into the program and conduct many educational tours for prospective students. Exceptional undergraduate students participate in research activities. The relatively recent establishment of a Master of Science graduate program in aquaculture/fisheries has significantly strengthened UAPB's aquaculture/fisheries program and will enhance productivity of an already productive faculty.

UAPB aquaculture/fisheries faculty are heavily involved in many public service activities including news interviews and articles with broadcast and written media, working with secondary and elementary schools, and other public service venues.

Research Facilities

UAPB has very good field facilities including a large number of replicated experimental earthen pond and above-ground tanks/pools. Construction work on new earthen experimental ponds and a new water well had just been completed at the time of our visit. The field station has laboratories including a hatchery, and a processing laboratory that was under construction. Ancillary support building and farm maintenance equipment appeared to be adequate with no major deficiency noted or observed. Because of UAPB's strategic location in the heart of Arkansas's aquaculture industry and nearby USDA aquaculture facilities at Stuttgart, numerous opportunities exist for faculty to conduct outfield research at commercial sites and federal facilities, and UAPB's faculty have taken advantage of these opportunities.

Weaknesses

Two significant weaknesses were identified by the faculty and administration.

The lack of adequate laboratory space and scientific equipment on the UAPB campus for faculty to conduct research and teach was a common theme among all faculty. We had an opportunity to visit the research laboratories on campus and the lack of space was clearly evident and well-founded. In addition, there is need for a new aquaculture research wet laboratory building with climate control capability at the pond research facility to increase versatility in research projects that can be conducted by UAPB aquaculture and fisheries faculty. Although teaching space was also identified as a constraint, Dr. Engle noted that the aquaculture/fisheries faculty were soon to be assigned a significant amount of teaching laboratory and lecture space in a new building that was currently under construction on campus. Assignment of this anticipated space to aquaculture/fisheries should significantly alleviate the teaching space problem, but will have less impact on availability of research laboratory space.

Another weakness pointed out by several faculty was the lack of resources in the university library in the form of scientific journals, textbooks, and other resource information in the fields of aquaculture, aquatic sciences, and natural resource management. This area was clearly a concern, particularly with the establishment of the graduate program in aquaculture and fisheries and the need to have current and

timely resource information available to faculty and students.

Summary

The Department of Aquaculture and Fisheries and Aquaculture/Fisheries Center, University of Arkansas at Pine Bluff, has an excellent research, extension, and educational program addressing needs of Arkansas's aquaculture, natural and recreational fishing industries. The program has excellent leadership and program direction under Dr. Carole Engle, and receives strong support from UAPB higher administration. The faculty and staff is sufficiently large such that a critical mass exists to address major industry needs in such program areas as economics and marketing, processing, nutrition, aquatic animal health, water quality, aquaculture production systems, and fisheries conservation and natural resource management. The academic program, which is relatively new, is strong and has potential to be much better in the future with further recruitment of high quality undergraduate and graduate students.

The faculty are productive and appear to work well with each other as well as with other scientists at federal and state agencies. The UAPB aquaculture program has established an excellent fisheries advisory council to assist it in identifying industry constraints and industry needs. Research programs address needs that are not only important to Arkansas's aquaculture and fisheries industries, but have important regional impact as well.

Summary of Expenditure (FY 2000)

(October 1, 1999 - September 30, 2000)

1890
Research and Extension Programs

University of Arkansas at Pine Bluff

	CSREES	STATE	OTHER	TOTAL
GOAL 1. An agricultural system that is highly competence in a global society				
Research Programs				
1. Poultry Production and management	116,240	12,885		129,125
Research Sys	2.5	0	0	2.5
2. Crop protection systems	93,741	12,885		106,626

Research Sys	1.9	0	0	1.9
3. Alternative crop production	110,498	12,885		123,383
Research Sys	2.6	0	0	2.6
4. Catfish production and management	340,681	124,504	36,987	502,172
Research Sys	3.5	0.7	3.0	7.2
5. Baitfish production and management	365,596	144,793	43,015	553,404
Research Sys	7.7	0.7	0	8.4
Expenditure Total:	1,026,756	307,952	80,002	1,414,710
Sy Total:	18.2	1.4	3.0	22.6
Extension Programs				
1. Small farm/Horticulture management	104,646	50,783	0	155,430
Extension FTEs	2.1	0.5	0	2.6
2. Livestock management	143,992	16,880		160,872
Extension FTEs	2.4	0	0	2.4
3. Catfish production/management	211,513	136,571	37,680	385,764
Extension FTEs	4.8	0.2	0	5.0
4. Baitfish production/management	190,134	122,073	33,680	345,887
Extension FTEs	4.5	0.2	0	4.6
Expenditure Total:	650,286	326,307	71,360	1,047,952
Sy Total:	13.8	0.9	0.0	14.6

GOAL 2. A safe and secure food and fiber system

Research Programs/NA

Extension Program

5. Nutrition education and wellness system	31,948	55,715	39,878	127,541
(Food Safety)				
Extension FTEs	0.3	0.1	1.0	1.4
Expenditure Total:	31,948	55,715	39,878	127,541
Sy Total:	0.3	0.1	1.0	1.4

GOAL 3. A healthy, well-nourished population

Research Programs

6. Herbs and vegetable production	41,530.00	1,074.00	0.00	42,604.00
Research Sys	0.80	0.00	0.00	0.80
	CSREES	**STATE**	**OTHER**	**TOTAL**

GOAL 3. A healthy, well-nourished population (Cont'd)

Research Programs (Cont'd)

7. Human nutrition and health	147,306	12,885	0	160,191
Research Sys	3.2	0.0	0.2	3.4

Expenditure Total:	147,306	12,885	0	160,191
Sy Total:	3.2	0.0	0.2	3.4
Extension Program				
5. Nutrition education and wellness system (Diet and Health)	48,609	146,894	133,504	329,007
Extension FTEs	0.3	0.1	1.0	1.4
Expenditure Total:	48,609	146,894	133,504	329,007
Sy Total:	0.3	0.1	1.0	1.4

GOAL 4. An agricultural system which protects natural resources and the environment

Research Programs

8. Integrated pest management	117,666	12,885.00	0.00	130,551
Research Sys	2.2	0.00	0.00	2.2
9. Small ruminant nutrition/management	26,223	0.00	0.00	26,223
Research Sys	0.5	0.00	0.00	0.5
Expenditure Total:	143,889	12,885	0	156,774
Sy Total:	2.7	0.0	0.0	2.7
Extension Program				
6. Farm pond management and irrigation reservoirs	56,304	31,316	8,640	96,260
Extension FTEs	1.9	0.3	0	2.2
Expenditure Total:	56,304	31,316	8,640	96,260
Sy Total:	1.9	0.3	0	2.2

GOAL 5. Enhanced economic opportunity and quality of life of Americans

Research Programs

10. Economic behavior of minority farmers	89,875	12,885	0	102,760
Research Sys	1.5	0	0	1.5
11. Improving quality of life	10,173	1,074	0	11,247
Research Sys	0.2	0	0	0.2
Expenditure Total:	100,048	13,959	0	114,007
Sy Total:	1.7	0.0	0.0	1.7
Extension Program				
7. Family and Youth Programs Extension 5 (Juvenile crime prevention); Extension 7 ( ); Adolescent pregnancy prevention; Drug abuse prevention; Parenting; Child care training	295,099	42,255	25,375	362,729
Extension FTEs	5.9	1.5	0	7.4

Expenditure Total:	295,099	42,255	25,375	362,729
Sy Total:	5.9	1.5	0	7.4

	CSREES	STATE	OTHER	TOTAL
EXTENDED TOTAL RESEARCH EXPENDITURE	1,459,529	348,755	80,002	1,888,286
EXTENDED TOTAL EXTENSION EXPENDITURE	1,082,245	602,487	278,756	1,963,489
GRAND TOTAL EXPENDITURE	2,541,774	951,242	358,758	3,851,775
TOTAL - Research Sys	26.6	1.4	3.2	31.2
TOTAL - Extension FTEs	22.2	2.9	2.0	27.1