

University of Arkansas at Pine Bluff University Combined Research and Extension Plan of Work 2020-2024

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I. Plan Overview

1. Executive Summary

The University of Arkansas at Pine Bluff (UAPB), School of Agriculture, Fisheries and Human Sciences is comprised of three academic departments, the 1890 research and Extension programs, the Aquaculture/Fisheries Center of Excellence and the Regulatory Science Center of Excellence. Research faculty are integrated into the academic departments. Personnel with a majority Extension appointment are under the supervision of assistant Extension administrator. The Department of Aquaculture and Fisheries and the Aquaculture/Fisheries Center of Excellence and the Regulatory Center of Excellence are administered by department heads who are also center directors. Under this structure, academic, research and/or extension responsibilities are integrated. The department chairs and center directors are supervised by the dean/director of the School of Agriculture, Fisheries and Human Sciences.

The primary clientele served by the University of Arkansas at Pine Bluff are the socially disadvantaged, limited resource farmers and underserved famers, rural families, underserved and vulnerable youth, the Arkansas aquaculture industry, and individuals and agencies with an interest in fisheries and fish habitats. Eastern and Southwestern Arkansas are the geographic beneficiary of these programs. The Critical Issues included in UAPB's Plan of Work are Agricultural Production & Processing; Environment, Energy & Climate; Access to Safe & Nutritious Food; Increasing Opportunities for Youth, Families & Communities; Agriculture and Natural Resources Economics and Marketing. The Aquaculture/ Fisheries Center of Excellence is the only one of its kind at an 1890 institution and the research and Extension components of the program work closely with aquaculture and fisheries leadership in the state. Faculty in the department of agriculture and in the Regulatory Science Center of Excellence have research and extension responsibilities to address agricultural production issues faced by the university's clientele. UAPB's Sweet Potato Foundation Seed Program works closely with sweet potato producers in the state and is only one of its kind at an 1890 institution. It is also recognized as one of the six centers in the nation that are part of USDA-APHIS National Clean Plant Network on sweet potato.

Many of the research scientists in the Agriculture Department have a 5% extension assignment to facilitate the dissemination of research-based information to the citizens of Arkansas. Extension appointments are intended to assist targetted audience with knowledge and skills that include, risk management, record keeping and developing the needed knowledge base for completing loan applications and participation in conservation programs. The Horticulture Program works with many of the same clientele, introducing on-farm research and demonstrations with horticultural crops. The Water Management Center located at Lonoke and Agriculture Demonstration and Outreach Center in Marianna are also utilized in the aforementioned outreach activities.

Arkansas is a leading catfish-producing state. Priority areas include developing improved recommendations for stocking, grading, and harvesting catfish. Rigorous comparison of performance of hybrids with channel catfish, in-pond raceways and split pond systems, and pond evaluation of feeding strategies are also priorities. Arkansas leads the nation in baitfish production, one of the top five segments of U.S. aquaculture. Programs are designed to improve profitability through improving management and production efficiencies for the baitfish industry, improve disease control and developing hatchery management techniques.

Five Critical Issues are submitted for your review from the University of Arkansas at Pine Bluff. These Critical Issues are in line with NIFA National priority areas. Several Critical Issues are aimed at increasing profitability of small farm enterprises to help rural farm families maintain economic vitality and to remain on the farm.

Under Agricultural Production & Processing horticultural activities will examine new fruit and vegetable crops suited to small farm operations and production practices for yield enhancement. Food animal production and management, breeding and biotechnology, alternative crop production and value-added product development are also included in Agricultural Production & Processing. Animal production activities are directed at lowering feed cost using alternative feeds for goats and swine, and improving the performance and health of livestock. Breeding and biotechnology work is directed at selection of improved cowpea cultivars, production of virus-indexed sweet potato cultivars, and development of genetic markers for development of sweet potato with novel genes. Alternative crop production activities will examine new fruit and vegetable crops suited for small farm operations, novel production management practices for maintenance of soil health and quality. Value added product activities are also included in Agricultural Production & Processing. These activities will explore new and safe methods of processing vegetables and fruits, and investigate nutritional qualities of vegetable and fruit plant parts consumed by special population groups to support new marketing avenues to further enhance income for small farm operators. New agricultural engineering faculty members will have investigations related to power and machines, agricultural systems, and soil and water systems.

Agriculture and Natural Resources Economics and Marketing emphasizes livestock management, cropping systems and farm management. Our small farm initiatives are a combination of small farm outreach training and technical assistance, with an emphasis on agronomy. The outreach effort is focused on 18 counties in eastern and southwestern Arkansas. Another focus in this critical issue is on modelling production of alternative crops and investigation on sustainable financing and operation of community and urban gardens.

Increasing Opportunities for Youth, Families & Communities activities addresses youth as young scholars with an aim to increase STEM proficiency. This is accomplished by engaging students through in-school and after-school programs that enhances youth and teen goal setting and decision making. Also, the need for increased financial literacy among low income African American youth and their parents is being addressed with SAFHS outreach efforts. Agriculture awareness is emphasized among urban youth with workshops, camps and tours of the Small Farm Outreach and Demonstration Farm.

Access to Safe & Nutritious Food activities will be undertaken by the School of Agriculture, Fisheries and Human Sciences. Arkansans face serious issues when it comes to obesity and food insecurity. Hypertension, diabetes and limited physical activity are major health concerns for low-income and minority populations. The Cooperative Extension Program at UAPB plays an important role in addressing obesity through the Expanded Food and Nutrition Education Program (EFNEP) and the Supplemental Nutrition Assistance Program-Education (SNAP-Ed). The Aquaculture and Fisheries Department will conduct research on how the barrier function is regulated in response to bacterial, parasitic and viral pathogens. The Department of Agriculture will study the effect of using the probiotics (live microbes) in food animals, particularly small ruminants to enhance the gut and fecal microbiome (microbial diversity) to force out the pathogenic foodborne microbes which are the potential source of microbial contamination of food and environment. Also, vegetables, herbs and medicinal plants will be evaluated for nutritional and medicinal attributes.

The School of Agriculture, Fisheries, and Human Sciences will address the Environment, Energy & Climate Critical Issue through a variety of activities. The Sustainable Forestry and Land Retention Program specifically supports African-American forestland owners with educational meetings, legal assistance, one-on-one visits, forest management plans, and

advice regarding heir-property issues. The Department of Agriculture will focus on developing an interdisciplinary research program to transfer agriculture waste to biochar as a soil amendment then maximize its ability for pollution retention and toxicity reduction. The Aquaculture and Fisheries Department will work with aquatic organisms, aquatic habitats, stakeholders, and natural resource agencies to preserve ecosystem health and biodiversity, while simultaneously supporting management of recreational and commercial fisheries for the enjoyment and benefit of the public.

2. FTE Estimates

Year	1890 Extension	1890 Research
2020	28.8	27.0
2021	28.8	27.0
2022	28.8	27.0
2023	28.8	27.0
2024	28.8	27.0

II. Merit / Peer Review Process

Internal University Panel
 External University Panel
 Expert Peer Review

Brief Explanation

Our research and Extension programs are monitored annually through a performance appraisal system that assures adherence to goals planned. Each department in the School of Agriculture, Fisheries and Human Sciences has an internal peer review system that evaluates research proposals prior to their implementation and evaluates research publications prior to journal submission.

Merit review is central to the institutional goal of implementing quality programs. The Merit Review Process in the School of Agriculture, Fisheries and Human Sciences resulted in 31 journal articles published, 23 accepted for publication, nine articles in press, 19 Extension publications, 53 published abstracts and the review of 26 manuscripts that were subsequently submitted for consideration in refereed journals. Over 85 research, extension and teaching proposals were submitted to competitive programs.

An external review of the Agriculture Department was conducted for the agriculture program in 2010 and regulatory science in 2014. Reviewers mentioned student satisfaction of the personalized attention and mentoring by faculty for students and career-orientation of the agricultural program. Reviewers recognized that a strength for the regulatory science program is its multidisciplinary focus on agricultural, environmental and industrial health and safety regulatory issues and recommended to assess research and creative outcomes and utilize results to create research and internships opportunities for students. An external review of the MS in Agricultural Regulations program is underway.

A review of the Human Sciences Department was conducted in Fall 2012. The Council for Accreditation for the American

Association of Family and Consumer Sciences evaluated all programs. The department received reaccreditation through Fall 2022.

An external expert peer review of the M. Sc. Degree in Aquaculture and Fisheries Sciences in spring 2014 concluded, "The aquaculture and fisheries (M. Sc.) program at UAPB has excellent resources in both facilities and faculty, and a highly successful M.S. program can be a driving force in new aquaculture production in the region and country as well as the continued improvement in recreational fisheries." An external expert peer review of the B.Sc. degree in Aquaculture and Fisheries Sciences in spring 2015 concluded that, "...changes in the scale and scope of the domestic aquaculture industry in general, and the AR catfish industry in particular, must be considered as the (B. Sc.) program evolves." The expert reviewers also stated, "Overall, the program must remain nimble in its approach to addressing the needs of the aquaculture industry and the fisheries profession, while seeking to simultaneously seek out new opportunities." An external expert peer review of the doctoral program in the Department of Aquaculture and Fisheries Center is currently underway.

III. Stakeholder Input

1. Actions to Seek

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

Brief explanation.

Advisory committees are essential to the stakeholder input process developed by SAFHS and approved by NIFA. Stakeholder input is a core component of all 1890 research and Extension programs. Means for acquiring input varies depending upon the nature of the Research or Extension program and the diversity of relevant stakeholders. These may include local and state agencies, community groups, producers and other targeted audiences, as well as business and industry groups. Producer meetings, advisory groups, conferences, and focus group discussions are major means for gaining input. As described in previous Plans of Work, our stakeholder input process varies across departments and programs due to structural differences in the departments and differences in audiences served. This approach will be continued because the clientele needs for Research and Extension - programs other than aquaculture are broad in scope, local in nature and geographically limited.

Input from and interaction with Arkansas stakeholders occurs on a routine basis. Individual farmers, representatives of trade associations, and state and federal agency personnel interact frequently with UAPB researchers and Extension specialists. The interaction often is initiated with a request for some specific discussions as limits to the state of knowledge in particular areas become apparent.

2. Methods to Identify

- Use Advisory Committees
- Open Listening Sessions
- Use Surveys

Brief explanation.

School of Agriculture, Fisheries, and Human Sciences input collection from groups and individuals.

The stakeholder input process for research and Extension programs in the School of Agriculture, Fisheries and Human Sciences is multifaceted. The multifaceted approach allows the School to be responsive to the research and outreach needs of diverse stakeholders. Suggestions from groups and individuals have, for example, identified additional research and Extension needs regarding intercropping of cattle and goats, being careful to avoid neglecting base clientele groups because of our new focus on a state-wide sweet potato foundation seed project, and being true to the land grant mission of the School. These suggestions were heeded and incorporated into our research and extension plans. The primary advisory committee that provides feedback and input into the UAPB Aquaculture/Fisheries Program is the National Aquaculture/Fisheries Advisory Council. This committee became inactive in 2015, but will to be reconstituted. It will include representation from aquaculture farms, feed mills, Arkansas Game and Fish Commission, U. S. Fish and Wildlife Service, and other state and university programs. Some committee members typically serve as representatives for other state and national aquaculture industry organizations, so that these individuals contribute a much broader perspective to advisory committee meetings than their formal capacity might otherwise suggest. UAPB Fisheries Extension personnel meet with representatives of the Catfish Farmers of Arkansas and the Arkansas Bait and Ornamental Fish Grower's Association to plan their annual meetings. These meetings are another source of stakeholder input used to guide research and Extension activities of the Center.

3. Methods to Collect

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

Brief explanation.

Means for acquiring input varies depending upon the nature of the research or Extension program and the diversity of relevant stakeholders. These may include local and state agencies, community groups, producers and other targeted audiences, as well as business and industry groups. Producer meetings, advisory groups, conferences, and focus group discussions are major means for gaining input. Our initial stakeholder input plan required each program to develop its own input mechanism depending upon the nature of the program and the targeted clients. An annual process is established to garner stakeholder input into the continued implementation of all ongoing research and Extension programs. This second stakeholder input requirement speaks to the importance of the advisory committee structure in the SAFHS. Some formal mechanism is required to garner stakeholder input into the planning and implementation of any new research or Extension program.

4. How Considered

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

Brief explanation.

Informal input from stakeholders will be presented and discussed at formal meetings with research faculty and staff. Strategies will be developed to address identified concerns as appropriate.

Faculty are represented on all structured committees for purposes of participating in the discussion and gathering the input from stakeholders that will later be presented back to faculty and staff. One example of input from a structured committee currently being implemented is the Foundation Seed program for sweet potatoes. The February 2006 meeting of the Agriculture, Research and Extension Advisory Committee raised the issue of support for the sweet potato industry emerging in Eastern Arkansas. The input from the session was incorporated into outreach efforts (more extensive efforts with sweet potatoes, enhanced technical support for value-added processing, and expansion of the role and geographic scope of the Small-Farm Program). Each issue was addressed through program initiatives as allowed by available funding. The federal and state governments and some private funding was combined to build a sweet potato processing and storage facility in the Delta where soil conditions are ideal for growing sweet potatoes. UAPB has been involved for years in the development of production information for the crop. We met several times with various groups and individuals to determine the scope of the additional work required and determined that improving the genetics and quality of the planting material was the most feasible approach. Lacking resources to implement the program, we are exploring funding opportunities via state appropriations and private funding. Several opportunities appear promising and we anticipate program start-up as soon as funds become available. In 2019, UAPB sponsored a Arkansas Sweet Potato Growers Meeting in Forrest City, Arkansas to collect stakeholders information.

Stakeholder input received from Arkansas Game and Fish Commission and other industry groups will be used to design research studies at UAPB to address both basic and applied aspects of current and anticipated issues. Both research and Extension personnel will help disseminate research results to various stakeholder groups.

IV. Critical Issues

1 Environment, Energy, and Climate

Description:

Arkansas has an abundance of natural resources, including 19 million acres of forests, 122,312 miles of rivers and streams, and more than 600,000 acres of lakes and reservoirs. Arkansas has approximately 13,639,300 acres of agricultural land. Many African Americans do not see their forest land as an asset but as a liability. The UAPB Sustainable Forestry and Land Retention Program will help producers improve their forest land and see it as an asset, to educate and assist with heir property issues, and address the lack of government trust. Additionally, Socially Disadvantaged Producers are taught how to use sustainable agricultural practices that keep soils, nutrients, and pesticides on their land and prevent soil from silting and polluting streams.

Resource recovery and reuse are key components for reducing agriculture impact on the environment. Research at UAPB will focus on developing an interdisciplinary research program to transfer agriculture waste to biochar as a soil amendment then maximize its ability for pollution retention and toxicity reduction. A variety of local agricultural-residue-derived biochars will be produced through pyrolysis under different conditions.

The aquatic resources of the state of Arkansas are important for social, cultural, and economic reasons. Recreational fishing has an economic impact of more than \$700 million in Arkansas. Faculty will work with aquatic organisms, aquatic habitats, stakeholders, and natural resource agencies to preserve ecosystem health and biodiversity, while simultaneously supporting management of recreational and commercial fisheries for the enjoyment and benefit of the public.

Term: Intermediate

Science Emphasis Areas

Bioeconomy, Bioenergy, and Bioproducts
Education and Multicultural Alliances
Environmental Systems
Family & Consumer Sciences
Sustainable Agricultural Production Systems

2 Access to Safe and Nutritious Foods

Description:

Food Safety

Research in hospitality management will be related to food production, food safety, and disease prevention/management. This will cover areas such as hypertension, heart disease, and diabetes prevention. Additionally, our international collaborations will reach out to other government agencies. The Food Safety Modernization Act (FSMA) made food safety education mandatory for large fresh fruit and vegetable producers. However, many small grocery stores and all major grocery stores are requiring all farmers, both large and small to be Good Agricultural Practices (GAP)-certified. We will provide GAP and FSMA training required to obtain certification and we will strengthen and establish infrastructure to improve the food safety awareness and practices among the local small, medium and large sized farming operations.

UAPB's Cooperative Extension Program will address obesity, food nutrition and food security through the Expanded Food and Nutrition Education Program (EFNEP) and the Supplemental Nutrition Assistance Program-Education (SNAP-Ed). These programs improve the health and well-being of families and youth with limited incomes.

The Aquaculture and Fisheries Department will conduct research on how the barrier function in fish is regulated in response to bacterial, parasitic and viral pathogens. In this way, we can avoid the use of chemotherapy in aquaculture systems and produce.

The Evans-Allen Project will study the effect of using the probiotics (live microbes) in food animals, particularly small ruminants to enhance the gut and fecal microbiome (microbial diversity) to force out the pathogenic foodborne microbes which are the potential source of microbial contamination of food and environment.

Term: Intermediate

Science Emphasis Areas

Education and Multicultural Alliances
Family & Consumer Sciences
Food Safety
Human Nutrition

3 Increasing Opportunities for Youth, Families, and Communities

Description:

UAPB's Research and Extension activities on increasing opportunities for youth, families, and communities will target the family with the desire to serve the community at large. 4-H, Family and Consumer Science (FCS), Aquaculture/Fisheries, Agriculture, and Human Sciences' and Extension professionals will address issues that impact youth, families and communities. Experiential learning curricula and programs that reinforces collaboration with youth and community businesses will ensure a competent workforce for the community.

GOLDEN priorities: Growing our capacity through creating campus and community partnerships. Optimizing the opportunities for our youth and community. Learning together through research initiatives, community events and

in youth adult partnerships. Diversifying programs through seeking various grants for research and programing. Enriching the lives of youth and adults by using research based, peer reviewed curricula while also utilizing asset-based community assessment and program delivery which prepares them to be positive contributors in the local community as well as globally. Nurturing minds and guiding discovery through experiential and project-based learning that teaches metacognition and encourages lifelong learning. The area of FCS will seek to understand the physical, social, psychological, growth and development and interpersonal relationships in family environmental settings. Additionally, FCS will address consumer preference pertaining to merchandising, textile and design.

Term: Intermediate

Science Emphasis Areas

Education and Multicultural Alliances

Family & Consumer Sciences

Youth Development

4 Agriculture Production and Processing

Description:

Arkansas (AR) agriculture is worth over \$20 billion/year. UAPB-SAFHS research and Extension activities support and improve agriculture. AR is first in bait and sportfish production; third in ornamental fish and catfish; and sixth in sweet potatoes (SP). Critical challenges include production efficiency, adequate water, soil health, resistant pests, climate, environmental concerns, energy, rising production costs, and food safety. Aquaculture/Fisheries (AQFI) research includes fish health, nutrition/feeding, marketing/economics, water quality, fish production/production systems and natural fisheries. The fish disease diagnostics labs save farmers thousands of dollars per year. The APHIS-certified lab inspects fish so that farmers can sell disease-free fish out-of-state. Specialty crop research will produce virus-indexed SP for AR growers, develop cultivars with novel genes for the SP improvement program, and improve its production efficiency, nutritional quality and medicinal value. UAPB is one of six centers developing virus-indexed slips within the National Clean Plant Network-SP. We study the role of summer and winter cover crops in soil health restoration and sustainable vegetable cropping systems for socially disadvantaged farmers. Related field demonstrations are held annually for stakeholders. Nutrition and health research on livestock (ruminants, layer birds) is improving their overall performance. The Small Farm Program (SFP) raises crop yields and income on socially disadvantaged farms . Producers must use USDA, NRCS and Cooperative Extension recommendations to implement conservation practices that improve profitability. The SFP also help producers improve their forest land.

Term: Intermediate

Science Emphasis Areas

Environmental Systems

Food Safety

Human Nutrition

Sustainable Agricultural Production Systems

5 Agriculture and Natural Resources Economics and Marketing

Description:

Small Farm Outreach: Farm Financial Planning

Many small and socially disadvantaged producers (SDPs) come to the University of Arkansas at Pine Bluff (UAPB) each year for assistance with their USDA loan applications. To meet the financial planning needs of this group of existing and beginning producers, the UAPB Small Farm Program (SFP) will continue to offer farm financial planning and technical assistance to producers. This will be the only farm business training that producers can obtain in the area.

Aquaculture Economics, Marketing and Natural Resources Management

The Aquaculture Economics, Marketing and Natural Resources Management program area goal is to promote sustainable growth of aquaculture and fisheries sectors in Arkansas as well as national and international levels through generation of new knowledge, insights and facilitation of evidence-based decision making by fish farmers, seafood manufacturers, traders and policy makers. Research studies will enhance profitability and sustainability of fish farm; develop better management of lakes, reservoirs and other water bodies; and improve competitiveness of U.S. aquaculture in the global seafood system.

Agricultural Economics/Business: Economic and Environmental Sustainability.

To help aspiring, beginning or new farmers and existing farmers, the Small Farm Program at UAPB has been encouraging farmers to diversify their operations with alternative crops, especially vegetables, to increase their income. A Linear Programming Model will be developed and used to simulate optimal production under various scenarios based on resource availability. The Model will be adjusted to analyze the sensitivity of the results to changes in quantity and price of labor and capital as well as in market prices.

Term: Intermediate

Science Emphasis Areas

Bioeconomy, Bioenergy, and Bioproducts
Education and Multicultural Alliances
Environmental Systems
Family & Consumer Sciences
Sustainable Agricultural Production Systems