

## Report Status: Approved as of 07/08/2022

### Contributing Organizations

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University of Arkansas at Pine Bluff

### Executive Summary

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#### Overview

The University of Arkansas at Pine Bluff (UAPB), School of Agriculture, Fisheries and Human Sciences, comprises three academic departments, the 1890 Research and Extension programs, the Aquaculture and 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 the Assistant Dean for Extension and Outreach. The Department of Agriculture, the Department of Aquaculture and Fisheries, and the Department of Human Sciences are administered by department heads. Our Regulatory Science Center of Excellence and the Aquaculture and Fisheries Center of Excellence is housed in the Department of Agriculture and the Aquaculture and Fisheries, respectively. Each Center of Excellence is administered by a center director who has teaching, research, and extension responsibilities within the department. Under this structure, academic, research, or extension responsibilities are integrated. The department chairs and center directors are supervised by the interim dean/director of the School of Agriculture, Fisheries, and Human Sciences.

Consistent with the land grant mission, UAPB Research and Extension faculty have a long history of providing leadership in developing and disseminating innovative practices and emerging technologies. UAPB researchers and Extension educators deliver research-based education to their clientele. Our Extension educators employ diverse educational methods to their clientele, including educational face-to-face and virtual forums, landowner visits, individual consultations, demonstrations, and field days and tours. Although the information is readily available in the Digital Age, UAPB remains a data provider independent of financial or philosophical interests. The focus of work conducted by UAPB is guided by input from a diverse range of clientele including, the small scale, socially disadvantaged, limited resource farmers and underserved farmers, rural families, underserved and vulnerable youth, the Arkansas aquaculture and fisheries industry, and individuals and agencies with interest in this clientele.

#### Critical Issue: Access to Safe and Nutritious Foods

UAPB researchers have discovered four sweet potato varieties (Burgundy, Covington, Beauregard, and Orleans) exhibit chymase inhibitory and free radical scavenging effects in vitro. The ethanol extracts of sweet potato varieties exhibit more significant chymase inhibitory and free extreme scavenging activities than the aqueous extracts. Sweet potato Burgundy shows remarkable chymase inhibitory properties compared to other types. The preliminary data obtained from this project supports seeking extramural grant funds to translate this research to in vivo experiments. This study will significantly impact nutrition and food science research and the development of nutraceuticals or functional food ingredients to control salt-induced hypertension. Natural foods with known antioxidative and anti-inflammatory defense could be an added advantage besides chymase inhibitory properties to effectively improve hypertension and associated complications. Since the chymase inhibitor, the generic drug, is still not approved yet for human hypertension, searching for foods or food compounds that exhibit chymase inhibitory properties will be helpful.

It can be advocated as a natural remedy to control the development of hypertension caused by high salt intake. This study would pave the way for path-breaking research and support underrepresented students to excel at the state, regional, national, and international level(s) through a novel and evidence-based research.

#### Critical Issue: Agriculture and Natural Resources Economics and Marketing

Fish diseases cause significant economic loss to fish producers. Detection of diseases in farmed raised fish is not as readily visible as in other animals. Proper diagnosis of fish diseases prevents significant economic loss to fish producers and the aquaculture industry.

UAPB's Fish Health labs in Pine Bluff and Lonoke, Arkansas, conducted fish disease diagnostics, water quality analysis, fish and pond water microbial analysis, and algal ID analysis. In Fall 2020, Pine Bluff lab personnel participated in APHIS certified Fish Health inspection program and processed 11,200 fish samples. From January 2021 to June 2021, Pine Bluff and Lonoke

labs processed 159 fish health cases, 156 disease diagnostic cases, 197 water quality analyses, 355 plankton/algal identification analyses, and 382 microbial case analyses. We also provided technical assistance to clientele through farm visits, phone consultations, and office visits.

African American forest landowners received a limited amount of educational and technical assistance from the UAPB. This was due to the small amount of funding received for forestry education, the lack of a forestry program at UAPB, and a forester at UAPB. As a result, most Socially Disadvantaged Producers (SDPs) did not receive education on forestry management, forest management plans, forestry conservation programs from the Arkansas Department of Agriculture, Forestry Division. Consequently, most SDPs did not know how to access the forestry infrastructure to plant, manage, or sell their woodland. With funding from the American Forest Foundations and others, services such as forestry educational meetings, heir's property education, assistance with obtaining titles to heir's property, forestry site visits, assistance in obtaining forest management plans, and assistance in using USDA Programs were provided. The Sustainable Forestry African American Land Retention Program has directly assisted 279 landowners and impacted 12,742 forest acres. The Keep It in The Family (KIITF) Team provided forest management and estate planning education to over 1,500 participants. Eighty-four (84) site visits were conducted by the KIITF team. The team includes the UAPB forester and conservation consultants.

Approximately \$283,612 of the Environmental Quality Incentive Program Funds were obligated to cover 662.6 acres of African American forestland.

#### **Critical Issue: Agriculture Production and Processing**

Sweet potato is propagated by stem cuttings, making the crop susceptible to virus accumulation. More than 30 viruses are known to infect sweet potatoes. The use of virus-infected slips can ultimately affect the yield and quality of sweet potato roots. Problems with yield reduction can be solved by providing virus-free planting slips to farmers. Planted acreage of sweet potatoes within Arkansas has increased during the last decade. The market demand for sweet potatoes and products made from the crop has continued to grow the need for high-quality, virus-indexed planting material. Limited availability within the state and the high cost of acquiring these planting materials from neighboring states are significant constraints in producing sweet potatoes in Arkansas. Growers have purchased generation 2 (G-2) roots from commercial producers outside Arkansas for years. Translates into a high cost of production, delayed planting time due to shipping challenges, occasionally compromised quality of planting materials, and the potential for disease and insect transmission across state boundaries. In 2009, the University of Arkansas at Pine Bluff (UAPB) received \$400,000 from the Arkansas Congressional Representatives and legislatures to develop the sweet potato Foundation Seed Program. This allowed the renovation of a greenhouse to meet the standard for sweet potato clean plant multiplication and equipping the tissue culture laboratory and purchasing a tractor, a sweet potato planter, and a sweet potato harvester. UAPB also constructed two new high tunnel hoop houses to provide additional space for more sweet potato slip multiplication.

Funding from the state and the National Clean Plant Network for Sweet potatoes (NCPN-SP) helped propagate 1,984 tissue culture sweet potato plants used to produce 25,000 slips during the summer of 2021. UAPB worked with 25 growers from Arkansas, supplying virus free sweet potato slips and technical assistance. UAPB's sweet potato program is now responsible for about 90 percent of the acreage under sweet potato production in Arkansas. A commercial grower in Arkansas planted 9 acres using UAPB virus-indexed generation zero (G-0) slips through this program. This will provide a significant number of slips for the 2022 growing season in Arkansas. Four hundred and fifty pounds of generation 1 (G-1) roots were also supplied as seed material to small-scale growers in Arkansas, including three state Extension agents responsible for servicing approximately 60 clients in sweet potato production. This included school children. This timely access to affordable, high-quality planting material has reduced the transportation cost associated with acquiring the same from neighboring states and yielded loss from the use of poor-quality planting material. It has also diminished the potential for pest and disease transmission across state boundary lines. As Arkansas sweet potato growers develop new products and diversify their marketing strategies, the program plans to include different sweet potato varieties requested by the growers.

#### **Critical Issue: Environment, Energy, and Climate**

Previously, African American forest landowners in Arkansas received a limited amount of educational and technical assistance from the

University of Arkansas at Pine Bluff (UAPB) due to limited funding for forestry education and the lack of a forestry program or forester at UAPB. Consequently, most socially disadvantaged producers did not receive any education about forestry management, forest management plans, forestry conservation programs, or the Arkansas Department of Agriculture, Forestry Division. Therefore, most of these producers did not know how to access the forestry infrastructure to plant, manage or sell their woodland. UAPB's Small Farm Program teamed up with eight programs from other states and made up the Sustainable Forestry and African American Land Retention (SFLR) Network. UAPB's SFLR program, known as the "Keeping it in the Family," assisted 279 landowners and positively impacted 12,742 acres of forestland. Approximately \$283,600 of Environmental Quality Incentive Program funds enhanced 662.6 acres of African American forestland in Arkansas.

#### **Critical Issue: Increasing Opportunities for Youth, Families, and Communities**

According to the Arkansas Department of Health, most parents in our service areas who apply for childcare services are single persons with limited educational backgrounds and limited access to resources. Research conducted at the University of Utah

Health reveals that a significant gap persists between children born into wealthy and low-income families and children of different races/ethnicities. The objective has been to strengthen the ability of teachers and families in the areas of physical, social-emotional, and health development as measured by the Desired Results Developmental Profile (DRDP) Assessment Tool, Ages and Stages Questionnaire (ASQ) Assessment Tool scores, and the Child Plus System data. Action steps included consistently providing individualized, responsive, and inclusive educational activities for children of all abilities and cultures while maintaining the highest level of health and safety in the classroom environment. Of the children enrolled, 90% (based on the DRDP and Child Plus data) have entered their next educational opportunity with a solid physical, social-emotional, and health development foundation. Since March 2015, the UAPB EHS-CCP project has served more than 500 children (birth to 3) and their families; provided more than \$3.5 million to sustain qualified teaching staff, with an additional \$1.2 million in layer funding to ensure that teachers get the training and support needed to help young children meet their individual maturational needs.

**Critical Issue: UADA- Access to Safe and Nutritious Food**

Counties in southeast Arkansas, especially those along the Mississippi River, have an alarming level of food insecurity. Rural and urban communities commonly lack access to fresh, healthy, and affordable food. A project was initiated at the University of Arkansas at Pine Bluff to aid local community leaders in developing sustainable community garden operations. Project personnel is creating a strategic management program that will give concise and easy-to-understand strategies to assist in the proper management of community gardens. The survey helped identify 86 community gardens across the state of Arkansas, 12 of which are in the eastern part of the state. The ongoing project will provide insight and data for setting up community gardens in Arkansas. Most importantly, community members will better understand producing fresh fruit and vegetables for local populations through sustainable garden management. The project will help residents of rural Arkansas have access to fresh produce and bolster local economies.

**Critical Issue: UADA- Agricultural & Forestry Production & Processing**

African American forest landowners received a limited amount of educational and technical assistance from the UAPB. This was due to the small amount of funding received for forestry education, the lack of a forestry program at UAPB, and a forester at UAPB. As a result, most Socially Disadvantaged Producers (SDPs) did not receive education on forestry management, forest management plans, forestry conservation programs from the Arkansas Department of Agriculture, Forestry Division. Consequently, most SDPs did not know how to access the forestry infrastructure to plant, manage, or sell their woodland. With funding from the American Forest Foundations and others, services such as forestry educational meetings, heir's property education, assistance with obtaining titles to heir's property, forestry site visits, assistance in obtaining forest management plans, and assistance in using USDA Programs were provided. The Sustainable Forestry African American Land Retention Program has directly assisted 279 landowners and impacted 12,742 forest acres. The Keep It in The Family (KIITF) Team provided forest management and estate planning education to over 1,500 participants. Eightyfour (84) site visits were conducted by the KIITF team. The team includes the UAPB forester and conservation consultants.

Approximately \$283,612 of the Environmental Quality Incentive Program Funds were obligated to cover 662.6 acres of African American forestland.

**Critical Issue: UADA- Building Communities and Strengthening Economies**

A project was initiated at the University of Arkansas at Pine Bluff to aid local community leaders in developing sustainable community garden operations. Project personnel is creating a strategic management program that will give concise and easy-to-understand strategies to assist in the proper management of community gardens. The project, which commenced in 2018, is expected to be complete by 2023. In 2018, UAPB faculty and undergraduate students built a database of community garden operators in the state of Arkansas. A brief survey was conducted via phone interview with community garden operators. Information related to their operation was collected, although this data included the name of the operator/organizer, location of the community garden, email address, and other information. This data was used to populate the database and serve in subsequent research projects. The UAPB survey helped identify 86 community gardens across Arkansas, 12 of which are in the eastern part of the state. The project's overall goal is to contribute to a network of community gardens, which will generate economic value in local communities.

Community gardens are valuable resources for addressing food security and nutritional needs. The ongoing UAPB project will provide insight and data for setting up community gardens in Arkansas. Most importantly, community members will better understand producing fresh fruit and vegetables for local populations through sustainable garden management. The project will help residents of rural Arkansas have access to fresh produce and bolster local economies.

**Critical Issue: UADA- Natural Resource Conservation and Management**

To help SDPs use the EQIP Program to improve their land, the UAPB Small Farm Program (SFP), with the assistance of the NRCS Outreach Liaison, submitted a proposal to the NRCS Arkansas State Office to do EQIP Outreach to SDPs. The proposal sought funding for UAPB Agents in northeast, southeast, southwest, and central Arkansas (UAPB Campus) to explain the EQIP Program to SDPs, assist SDPs in selecting conservation practices, and assist SDPs in completing EQIP program applications. The SFP was also responsible for conducting EQIP outreach meetings and disseminating information about the outreach program.

Approximately 2348 Socially Disadvantaged individuals were made aware of the EQIP Program, its eligibility requirements, and the benefits it provided to the soil, land, and water through 12 Zoom Outreach Meetings conducted by the SFP. The staff also met one-on-one with approximately 600 SDPs and informed them about the EQIP program and its benefits. The team helped around 291 SDPs select EQIP conservation practices for their operations using the conservation practices selection sheets developed by the SFP. An estimated 20 SDPs received EQIP funding for approximately \$250,000. In addition, an estimated 500 acres of cropland that had conservation practices installed reduced their soil loss from erosion and improved the water quality from runoff. In addition, it enhanced grazing and pasture management on at least 100 acres of pastureland.

#### **Critical Issue: UADA- Strengthening Arkansas Families**

The UAPB's Expanded Food and Nutrition Education Program (EFNEP) Extension program aides partnered with agencies and schools to provide sound, research-based nutrition practices through hybrid educational sessions to address how families can stay healthy during the pandemic. During the sessions, participants were taught ways to choose healthier food options and incorporate physical activity while working and schooling their children from home. Extension program aides provided hybrid (virtual and face-to-face), educational classes, following the Center for Disease Control and Prevention COVID-19 safety protocols. During the sessions, participants learned ways to choose healthier food options and incorporate physical activity while working and schooling their children from home. The participants were provided easy, healthy recipes they could prepare along with user-friendly exercises for the family. During EFNEP's 2021 program year in Jefferson County, 89 percent of adult and 78 percent of youth participants reported improved nutrition practices (eating more fruits and vegetables, drinking less sugary drinks, and cooking dinner at home). Seventy-Six Percent of adult participants are now more physically active.

#### **Merit and Scientific Peer Review Processes**

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#### **Updates**

Nothing to report

#### **Stakeholder Input**

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#### **Actions to seek stakeholder input that encouraged their participation with a brief explanation**

The University of Arkansas at Pine Bluff action taken to see stakeholders' inputs that encourage their participation were the following:

1. Formed an official advisory committee that meets at least every six months via zoom that encourage them to give their inputs to our goals and objectives for our critical areas, and the communities that we serve.
2. Ensured that the stakeholder participate with the university during annual program events such as Annual Rural Life Conferences, FarmField Day and at Annual Sweet Potato Growers meetings.

#### **Methods to identify individuals and groups and brief explanation**

Updates to the content of the methods to identify section of the FY2020-2025 for the University of Arkansas at Pine Bluff's Research and Extension Plan of Work include the following:

- Means for acquiring input varies depending upon the nature of the Research or Extension program and the diversity of relevant stakeholders.
- These include local and state agencies, community groups, producers, families and youth, and other targeted audiences. Producer meetings, workshops, field days, conferences, and focus group discussions are principal means for gaining input.
- Our stakeholder input process is structured individually by programs to represent the differences in audiences served. This approach is taken because the clientele's needs for research and Extension assistance in programs are broad in scope, local in nature, and geographically limited.

#### **Methods for collecting stakeholder input and brief explanation**

The University of Arkansas at Pine Bluff methods for collecting stakeholders inputs are the following:

- 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



## A statement of how the input will be considered and brief explanation of what you learned from your stakeholders

The University of Arkansas at Pine Bluff inputs from stakeholders were utilized to assist in setting priorities, identify key emerging issues, and develop and action plan, that will be related to our budget process. What has been learned is that key stakeholders input is important to our support base and them telling our story, as well as promoting our brand.

## Highlighted Results by Project or Program

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### Critical Issue

Agriculture Production and Processing

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### Monitoring and Modeling Water and Nutrient Use Efficiencies In the Arkansas Delta

Project Director

Blessing Masasi

Organization

University of Arkansas at Pine Bluff

Accession Number

1026658



### Monitoring and Modeling Water and Nutrient Use Efficiencies In the Arkansas Delta

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#### **In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

The continued groundwater declines of the Mississippi River Valley Alluvial Aquifer (MRVAA), droughts, and water quality issues in the Arkansas Delta will result in devastating impacts on the state of Arkansas's agricultural economy. This project is evaluating strategies that will ensure efficient utilization of water resources for irrigation in the Arkansas Delta while increasing crop productivity and minimizing environmental degradation.

#### **Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

A review article that highlights the groundwater challenges in the Arkansas Delta and puts forward lessons from other regions facing the same challenges was written. The paper is under review in the journal of Water Conservation and Management (WCM), and its preprint is available online. Agricultural Engineering senior students at the University of Arkansas at Pine Bluff received training on measuring and monitoring groundwater flow using the Ultrasonic flowmeter. An undergraduate student hired through the grant acquired skills to prepare and install soil moisture sensors and data loggers to monitor crop water use. Two abstracts by the PD and the student were accepted for presentation at the 2022 1890 Association of Research Directors (ARD) Research Symposium.

#### **Briefly describe how your target audience benefited from your project's activities.**

The produced review article and preprint adds to the growing literature on better irrigation management strategies that farmers and water managers in the Arkansas Delta may adopt, considering the dwindling groundwater resources. This knowledge will enhance the farmers' knowledge and ultimately increase the adoption of precision irrigation technologies to conserve water in the region. Undergraduate students at UAPB, particularly those studying Agricultural Engineering, are acquiring skills in precision agriculture that they will apply when they enter the workforce.

#### **Briefly describe how the broader public benefited from your project's activities.**

From now and beyond the project lifetime, it is anticipated that adopting efficient irrigation strategies by farmers in the Arkansas Delta will increase and lead to the conservation of energy and groundwater resources. Reducing these production inputs in the Arkansas Delta Region will increase agricultural profitability and enhance farmers' livelihoods. Furthermore, reducing agricultural water use will also decrease the pressure on water resources

necessary for human consumption and the environment. Additionally, the undergraduate students involved in this project are gaining skills that will help them contribute to the agricultural economy and society at large.

**Describe and explain any major changes or problems encountered in approach. Additionally, note opportunities for training and professional development provided, how results have been disseminated to communities of interest, and any new details regarding what the project or program plans to do during the next reporting period to accomplish the goals.**

During the 2022 summer cropping season, soil moisture probes and rain gauges will be installed at research sites to monitor crop water use. A modeling study will also be conducted to evaluate the impact water management on crop yield.

#### **UAPB Sweetpotato Foundation Seed Program: Improving Sweetpotato Production in Arkansas**

Project Director

Shaun Francis

Organization

University of Arkansas at Pine Bluff

Accession Number

7002500



#### **UAPB Sweet potato Foundation Seed Program Facilitates Sweet potato Industry Expansion in Arkansas**

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**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

Sweet potato is propagated by stem cuttings, making the crop susceptible to virus accumulation. More than 30 viruses are known to infect sweet potatoes. The use of virus-infected slips can ultimately affect the yield and quality of sweet potato roots. Problems with yield reduction can be solved by providing virus-free planting slips to farmers.

During the last decade, the planted acreage of sweet potatoes within Arkansas has increased. The market demand for sweet potatoes and products made from the crop has continued to grow the need for high-quality, virus-indexed planting material. Limited availability within the state and the high cost of acquiring these planting materials from neighboring states are significant constraints in producing sweet potatoes in Arkansas. For years, growers have purchased generation 2 (G-2) roots from commercial producers outside Arkansas. Translates into a high cost of production, delayed planting time due to shipping challenges, occasionally compromised quality of planting materials, and the potential for disease and insect transmission across state boundaries.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

In 2009, the University of Arkansas at Pine Bluff (UAPB) received \$400,000 from the Arkansas Congressional Representatives and legislatures to develop the sweet potato Foundation Seed Program. This allowed for the renovation of a greenhouse to meet the standard for sweet potato clean plant multiplication and equipping the tissue culture laboratory and for the purchase of a tractor, a sweet potato planter, and a sweet potato harvester. UAPB also constructed two new high tunnel hoop houses to provide additional space for more sweet potato slip multiplication.

**Briefly describe how your target audience benefited from your project's activities.**

Arkansas' sweet potato industry comprises large-scale commercial growers and small-scale, limited-resource farmers. In addition, many gardeners, schools and youth, and community organizations raise sweet potatoes in their gardens. By having access to high-quality planting material within the state, Arkansas' farmers could complete their production cycle promptly, thereby benefitting from premium early season market prices. These farmers also reduced the transportation cost of sourcing planting material outside the state. This, plus the reduction of yield loss from poor use of quality planting material, translated into higher profit margins.

**Briefly describe how the broader public benefited from your project's activities.**

Funding from the state and the National Clean Plant Network for Sweet potatoes (NCPN-SP) helped propagate 1,984 tissue culture sweet potato plants used to produce 25,000 slips during the summer of 2021. UAPB worked with 25 growers from Arkansas, supplying virus-free sweet potato slips and technical assistance. UAPB's sweet potato program is now responsible for about 90 percent of the acreage under sweet potato production in Arkansas. A commercial grower in Arkansas planted 9 acres using UAPB virus-indexed generation zero (G-0) slips through this program. This will provide a significant number of slips for the 2022 growing season in Arkansas.

### Estimating Survival of Stocked Hybrid Striped Bass

Project Director

Steve Lochmann

Organization

University of Arkansas at Pine Bluff

Accession Number

1024990



#### Population characteristics of hybrid Striped Bass

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**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

Angler conflicts between hybrid Striped Bass anglers and Largemouth Bass anglers are an issue in DeGray Lake, Arkansas. We study the hybrid Striped Bass population in DeGray Lake to allow science-informed management decisions and reduce angler conflicts.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

Understanding the survival of stocked fingerling hybrid Striped Bass helps inform virtual population analyses and answer the question, "How many hybrid Striped Bass are there in DeGray Lake?"

**Briefly describe how your target audience benefited from your project's activities.**

The lake managers, black bass tournament anglers, guides, and recreational anglers benefit from knowing vital rates and population characteristics of hybrid Striped Bass in DeGray Lake

**Briefly describe how the broader public benefited from your project's activities.**

This work supports the management of fisheries in DeGray Lake. Well managed fisheries are more popular and draw more anglers. There are physical and mental health benefits to outdoor recreation. Furthermore, recreational fishing brings tourism dollars to the local economy.

### Nuisance Aquatic Vegetation Control

Project Director george selden

Organization

University of Arkansas at Pine Bluff

Accession Number

7002446



#### Nuisance Aquatic Vegetation Control

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**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

There is a need for research-based information and advice for the control of nuisance aquatic vegetation. A lack of this information can lead to wasted time, effort, and money when stakeholders attempt to control aquatic plants. By providing fact sheets, work shops and one-on-one expertise, pond owners, aquaculture producers and water body managers can more efficiently employ their available resources while obtaining maximum use of the water body.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

Fifteen years ago, there were essentially no extension fact sheets or other information available from University of Arkansas extension that covered any aspects of aquatic vegetation. At present there are now eight publications that either partially or a wholly dedicated to some aspect of aquatic vegetation. While there is still much to be done, there

is now enough information available to stakeholders to enable them to formulate plan for nuisance aquatic vegetation control. In addition, through workshops and in-services conducted for pond owners, county extension agents and state agencies, stakeholders have become informed on formulating a control plan and who to contact for advice and guidance. These activities have led to less wasted money and effort, and better results.

**Briefly describe how your target audience benefited from your project's activities.**

By having research-based information and expertise advice to access, the target audience of fish farmers, pond owners and state natural resource agencies can make informed decisions that can allow them to control their nuisance vegetation while also protecting the environment and minimizing their inputs.

**Briefly describe how the broader public benefited from your project's activities.**

There are many consequences of nuisance aquatic vegetation. One is that they can act as habitat for mosquitoes. Providing guidance on the control of some aquatic plants, leads to a decrease in mosquito habitat, leading to a decrease in the irritation they cause and possibly decrease in some of the disease they can spread.

**Critical Issue**

Increasing Opportunities for Youth, Families, and Communities

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**Promoting Personal and Social Health and Wellness among the underrepresented Communities in Rural Arkansas using Creative Designing, Sewing and Crafting Skills**

Project Director

Jane Opiri

Organization

University of Arkansas at Pine Bluff

Accession Number

1026669



**Project Report**

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**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

Mental health is a major concern among seniors especially those from underrepresented populations who are more likely to have experienced stress and anxiety as a result of police brutality and violence, racism and racial profiling. With this in mind, the goal of this research project is to explore the effectiveness of creative sewing and crafts skills in improving the personal mental health well-being of the seniors. This research project is seeking to explore, understand, and promote ways in which self-care activities, complemented with creative sewing and crafts, can be used to improve and manage personal mental health of seniors.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

The major activities at this phase of the project have been (1). training the participants to acquire self-care activities mindfulness, focusing, and deep breathing, and encouraging them to use these skills in their everyday life (2). teaching participants the creative skills - sewing, knitting, and crocheting. Participants are learning the new skills before they can create items of choice. These two activities are a major step towards achieving part one of objective 1 (Objective 1. Engage the community in personal self-care activities, creative sewing designs, and crafts skills.) of the project. After acquiring the necessary skills, participants will then create items of their choice.

**Briefly describe how your target audience benefited from your project's activities.**

Target audience (seniors) have acquired self care skills such as mindfulness, focusing, deep breathing. They are using these skills in their daily lives and report feeling good, calm, and relaxed thus improved personal health. Additionally, they are learning new creative skills- crocheting, knitting and sewing that they can use outside the project. Participants are reporting a positive sense of self, and reinvention of self as they learn the creative skills. Participants reported that staying home alone had affected their social skills so this project has improved their social skills, communication skills and interpersonal skills as they relate with each other in the group. All these have improved the seniors personal mental health and well being.



**Briefly describe how the broader public benefited from your project's activities.**

So far at this stage of the project, the broader public has not benefited.

**Describe and explain any major changes or problems encountered in approach. Additionally, note opportunities for training and professional development provided, how results have been disseminated to communities of interest, and any new details regarding what the project or program plans to do during the next reporting period to accomplish the goals.**

1. Due to Covid 19 pandemic, most seniors are scared of engaging in activities that will expose them to the virus, therefore recruitment of the targeted number of participants has been difficult. The project has recruited 5 and the target was 10 -15, hopefully as life begins to go back to normal more participants can sign up.
2. Preliminary results will be disseminated in the upcoming ARD conference that will be held in Atlanta, GA in April.
3. In the next reporting period, the project will move on to accomplish the other objectives. Participants will use the acquired skills to make creative designs and display these products to the community in a scheduled event.

**Healthy People Healthy Planet, A Food Desert Program At The University Of Arkansas At Pine Bluff And Fayetteville, AR**

Project Director

Karleah Harris

Organization

University of Arkansas at Pine Bluff

Accession Number

7002402



**Healthy People Healthy Planet, A Food Desert Program At The University Of Arkansas At Pine Bluff And Fayetteville, AR**

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**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

Research has shown that food deserts are present across and in every county in Arkansas. This project aims to strengthen the University of Arkansas at Pine Bluff and Fayetteville's capacity to build partnerships in the food desert community. Specifically, to teach students to cook healthy food and grow their own vegetables to provide them and their families with a healthy lifestyle.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

Food deserts have significantly impacted the United States population. Individuals living in food desert areas are at risk for impaired cognitive development, nutrition inequality, obesity/overweight, chronic diseases, and poor academic performance.

This project has established partnerships with PreK-12 schools, administrators, teachers, staff, students, and the community. Students had the opportunity to engage in educational activities and hands-on learning. This project showed students how important gardening is to eating healthily, including sustainably growing food. This project helped students to learn how to plant, maintain, and harvest their vegetables. Also, curriculum is being developed for PreK-12 students in Arkansas. A project logo was designed, teachers were interviewed who are working on the project, pre and posttest data has been collected, an undergraduate research office was established, and undergraduate students are employed.

**Briefly describe how your target audience benefited from your project's activities.**

The PreK-12 schools, administrators, teachers, staff, and students engage in educational activities, hands-on learning, and interacted with nature. They learned how to plant, maintain, and harvest their vegetables. Students planted vegetables such as tomatoes, bell peppers, cabbage, and lettuces through monitored community gardens and training. Students are more aware of where their food comes from and more educated about food deserts.

**Briefly describe how the broader public benefited from your project's activities.**

An article was published in the University of Arkansas Pine Bluff (UAPB) newsletter, on the UAPB website, in the Arkansas Democrat-Gazette, and Newz Group. Students had the opportunity to learn and interact with university faculty about gardening and eating healthy.

**Describe and explain any major changes or problems encountered in approach. Additionally, note opportunities for training and professional development provided, how results have been disseminated to communities of interest, and any new details regarding what the project or program plans to do during the next reporting period to accomplish the goals.**

Dr. Kieu Le, a Co-PI on the grant, is no longer at The University of Arkansas - Fayetteville, and Dr. Di Fang took over the grant at the Fayetteville's campus. The Fayetteville campus was unable to work in the elementary schools due to the impact of the Coronavirus (COVID-19) pandemic and is working with students at Apple Seeds to carry out the project's objectives. Dr. Di Fang provided two letters explaining the situation, and they were emailed to our program leader.

**Family and Consumer Sciences (FCS) Nutrition Programs Help Families Stretch Their Food Dollars**

Project Director

Teresa Henson

Organization

University of Arkansas at Pine Bluff

Accession Number

7002409

 **Family and Consumer Sciences (FCS) Nutrition Programs Help Families Stretch Their Food Dollars**

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**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

The country came to a complete halt due to the global COVID-19 pandemic stay-at-home mandates. The mandates of the pandemic caused the United States to go into an economic recession, which led to people losing jobs and work hours declining. According to Feeding America, at the end of March 2020, the unemployment rate claims had increased to nearly 7 million, and the unemployment rate rose to 14.7%. Feeding America estimates that 42 million people (1 in 8), including 13 million children (1 in 6), may face food insecurity in 2021 due to financial setbacks. With the challenges of lack of food access and limited financial resources, families struggle to feed their families with a limit or no income.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

The University of Arkansas at Pine Bluff Family and Consumer Sciences (FCS) Expanded Food and Nutrition Education Program (EFNEP) and the Supplemental Nutrition Assistance Program (SNAP-Ed) partnered with local community organizations and agencies to give low-income families the knowledge and skills needed to make healthy behavior changes toward a healthy diet/lifestyle, save money and feed their families with a limited budget.

**Briefly describe how your target audience benefited from your project's activities.**

The programs offered hybrid (face-to-face and virtual) nutrition education classes to help families prepare meals at home and stretch their food dollars during the pandemic while following the Centers for Disease Control and Prevention COVID-19 safety protocols.

**Briefly describe how the broader public benefited from your project's activities.**

Extension program aides with both FCS nutrition programs provided participants with tips and healthy recipes they could prepare for their families while saving money in the process. For the 2021 program year, 82 percent of participants showed improvement in one or more food resource management practices (i.e., cooking dinner at home, comparing food prices, and planning meals before shopping) at the end of the class sessions. Participants also learned ways to take pantry inventory, create a grocery list and research local advertisement circulars to save money. One class participant praised an Extension program aide for her "superb teaching" and spoke about two curriculum lessons that focused on Plan: Know What's for Dinner and Shop: Get the Best for Less. The participant report, both lessons taught him how to regularly check his pantry and make an accurate shopping list of what he needed to purchase. The participant learned it's better to check the unit prices to see what food items a better buy for him and his family without going over budget. Overall, the program helped the participant to apply what he learned to make wise spending choices to feed his family.

## Expanded Food and Nutrition Education Program (EFNEP) Improves Participants Behavior and Contributes To Weight Loss

Project Director

Teresa Henson

Organization

University of Arkansas at Pine Bluff

Accession Number

7002410



### Expanded Food and Nutrition Education Program (EFNEP) Improves Participants Behavior and Contributes To Weight Loss

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#### **In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

While dealing with the COVID-19 pandemic over the last several months, people have struggled to stay healthy. The pandemic has influenced health behaviors such as unhealthy eating habits and a lack of physical activity due to the COVID-19 restrictions. According to the Centers for Disease Control and Prevention (CDC), more than 42% of American adults are obese or overweight. Being overweight or obese can lead to health-related conditions such as stroke, heart disease, and diabetes.

#### **Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

The University of Arkansas at Pine Bluff Expanded Food and Nutrition Education Program (EFNEP) Extension program aides partnered with agencies and schools to provide sound, research-based nutrition practices through hybrid educational sessions to address how low-income families can stay healthy during the pandemic.

#### **Briefly describe how your target audience benefited from your project's activities.**

During the program sessions, participants were taught ways to choose healthier food options and to incorporate physical activity while working and schooling their children from home.

#### **Briefly describe how the broader public benefited from your project's activities.**

The UAPB Extension program aides provided hybrid (virtual and face-to-face) educational classes, following the Center for Disease Control and Prevention COVID-19 safety protocols. During the sessions, participants learned ways to choose healthier food options and incorporate physical activity while working and schooling their children from home. The participants were provided easy, healthy recipes they could prepare along with user-friendly exercises for the family. During EFNEP's 2021 program year in Jefferson County, 89 percent of adult and 78 percent of youth participants reported improved nutrition practices (eating more fruits and vegetables, drinking less sugary drinks and cooking dinner at home). Seventy-Six percent of adult participants are now more physically active. At the end of the program, one participant reported, all the lessons were essential. The program aide taught the participant ways to include healthier food options and portion control with what he eat daily. As a result, the participant lost 15 pounds. He went from a 3XL to 2XL in shirts, and he was a 40 in the waistline and now he's a 38. Participating in the classes has built his confidence and he continues to eat healthy.

#### **Critical Issue**

UADA- Agricultural & Forestry Production & Processing

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#### **Sustainable Forestry African-American Land Retention Program**

Project Director

Henry English

Organization

University of Arkansas at Pine Bluff

Accession Number

7002449



## Sustainable Forestry and African-American Land Retention Program "Keeping it in the Family."

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**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

African American forest landowners have received a limited amount of educational and technical assistance from the University of Arkansas at Pine Bluff (UAPB). This was basically due to the small funding received for forestry education, the lack of a forestry program at UAPB, and the lack of a forester at UAPB. As a result, most Socially Disadvantaged Producers received no education on forestry management, forest management plans, forestry conservation programs, or the Arkansas Department of Agriculture, Forestry Division. Consequently, most SDPs did not know how to access the forestry infrastructure to plant, manage, or sell their woodland.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

To address the situation, the UAPB Small Farm Program (SFP) responded to a request for proposal in 2012 that sought community-based organizations or institutions to provide forestry assistance to African American (A.A.) forest landowners. The first proposal (2012) was not funded, but the second proposal was funded. This project was funded in 2016, and funding has been continuous. The project, along with seven other projects in other states, is funded and managed by the American Forest Foundations (AFF) and others. Some of the services provided by the projects include forestry educational meetings, heir's property education, assistance with obtaining titles to heir's property, forestry site visits, assistance in securing forest management plans, assistance in using USDA Programs to install conservation improvement practices on forest land, and service in connecting A.A. farmers to loggers and other forestry vendors.

**Briefly describe how your target audience benefited from your project's activities.**

The SFLR "KIITF Project" has directly assisted 279 landowners and impacted 12,742 forest acres. During the 2020-2021 fiscal year, the KIITF Team provided forest management and estate planning education to over 1,500 participants. Eighty-four (84) site visits were conducted by the KIITF Team, which includes the UAPB forester and conservation consultants, and approximately \$283,612 of the Environmental Quality Incentive Program Funds were obligated to cover 662.6 acres of African American forestland.

**Briefly describe how the broader public benefited from your project's activities.**

KIITF landowners are currently actively engaging in educational sessions, and 3 attend the Arkansas Forestry Association (ASA) annual education conference. Several "champion" landowners have presented during educational workshops and referred potential clients to the project for assistance. In addition, several landowners held Zoom meetings with likely landowners to educate them about the KIITF program.

### Understanding the effect of elevated water hardness in catfish aquaculture

Project Director

Amit Sinha

Organization

University of Arkansas at Pine Bluff

Accession Number

7002586



### Understanding the effect of elevated water hardness in catfish aquaculture

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**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

Elevated ammonia levels and iron are two prime problems in catfish aquaculture systems. This project aimed to explore the potentiality of bentonite (a low-cost natural clay with superior adsorption properties) to mitigate the adverse effect of these two issues in catfish aquaculture.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

Iron (Fe) is an essential element for fish, however, higher doses in the water or feed could exert toxic effects in fish including growth retardation and damage to vital organs. There is currently no viable therapeutic agent in catfish farming that could effectively alleviate toxic effects of excessive iron. Bentonite is reportedly a strong chelating agent

to various heavy metals including iron. Hence, the current research was designed to determine the impact of bentonite alone and in combination with increasing iron in the diets of channel catfish. Six diets 0% bentonite (Con), 2% bentonite (LB), 4% bentonite (HB), 0.25% iron as FeSO<sub>4</sub> (Fe), Fe+2% bentonite (LBFe), or Fe+4% bentonite (HBFe) were fed to catfish in quadruplicate for 8 weeks. Significantly lower fish growth was observed in fish fed the Fe diet compared to the control, however bentonite supplementation (at both doses) improved growth performance. Liver showed infiltration with inflammatory cells and necrosis in Fe and HB groups whereas LBFe group appeared normal. Hepatic iron accumulation was significantly higher in Fe group compared to other dietary groups. Furthermore, the Fe group showed oxidative stress based on a significant reduction in catalase (CAT) and superoxide dismutase (SOD) activities, whereas activities of these enzymes increased significantly in the dietary bentonite treatments (i.e. LB, HB, LBFe, and HBFe). However, irrespective of the dietary treatments no impact was noticed in the muscle fatty acid composition. Overall dietary bentonite supplementations can be an effective approach to mitigate iron toxicity in catfish, which should help improve aquaculture production especially when offering high iron-based diet.

**Briefly describe how your target audience benefited from your project's activities.**

Based on the parameters examined in this project, it was clear that the dietary bentonite (2000 mg/kg via feed) could mitigate the adverse effects of iron on the growth, antioxidant status and histopathology in the liver of channel catfish. This was likely due to dietary bentonite adsorbing and facilitating the excretion of Fe in the digesta. Thus, dietary bentonite (2%) supplementation can be a viable approach for boosting growth as well as mitigating negative effect of iron in catfish aquaculture.

**Briefly describe how the broader public benefited from your project's activities.**

Mitigating the toxic effects of iron overload is a major challenge to fish farmers, toxicologists and water quality managers. In view of the increasing importance of water quality management, and the emerging problems of water borne metals toxicity, this research is of interest beyond the community of aquaculturists. This study recommends that bentonite can be applied as a potential tool to bind and reduce iron load from channel catfish culture units, and thereby reduce iron induced toxicity.

**Describe and explain any major changes or problems encountered in approach. Additionally, note opportunities for training and professional development provided, how results have been disseminated to communities of interest, and any new details regarding what the project or program plans to do during the next reporting period to accomplish the goals.**

Feed preparation typically incorporating bentonite inside feed was a challenge. After consulting with some experts on feed formulation, stable feeds were prepared. We have published a part of this work = in a peer-reviewed journal and an extension article. The instrumentation part (Atomic Absorption Spectrophotometry) for measuring iron in water, feed and fish samples, has also been used for training students and other staffs.

**Type**

**Projects / Programs without a Critical Issue: 4**

Closing Out (end date 09/06/2023)

**Improving egg production and egg quality by supplementing peppermint in hens diet**

Project Director

Jayant Lohakare

Organization

University of Arkansas at Pine Bluff

Accession Number

1014405



**Improving egg production and egg quality by supplementing peppermint in hens' diet**

**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

Herbs and several bioactive phytochemical components including plant extracts are being studied these days as an alternative to antibiotic growth promoters (AGPs) in animals. AGPs were used earlier for growth promotion and improving performance in food producing animals. But ban on AGPs in several countries including USA has challenged animal nutritionists and scientists to look for alternative options. Our study was an attempt in this direction.



**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

Incremental dietary peppermint oil linearly increased egg weight, egg production, egg mass and feed intake from 32–44 weeks of age. Moreover, feed conversion ratio was significantly decreased with increasing levels of peppermint oil in laying hens diet. Overall, inclusion of peppermint oil at the levels tested had improved productive performance, eggshell quality, and decreased serum cholesterol levels.

In addition, we conducted similar studies to evaluate the effect of the addition of *Moringa oleifera* leaves to laying hen diets on laying performance, egg quality, excreta ammonia concentrations and blood biochemical parameters. The findings showed that the egg production, weight and mass and eggshell quality of laying hens fed with *Moringa oleifera* leaves during the late laying period were significantly improved in comparison with those of the hens in the control group. *Moringa oleifera* leaves supplementation decreased excreta ammonia concentration and serum cholesterol and triglycerides as well as serum liver enzymes, uric acid, and creatinine levels compared to those of the control group.

**Briefly describe how your target audience benefited from your project's activities.**

Poultry farmers, researchers, and students get information about the beneficial effects of peppermint and *Moringa oleifera* leaves fed to laying hens in their diets and its effect on laying performance and egg quality.

**Briefly describe how the broader public benefited from your project's activities.**

The results from these research were compiled in the form of manuscripts and submitted to journals for publication. The article from this research got published in "Animal Feed Science and Technology" journal. The scientific community, farmers, and students get benefits after reading these articles.

A.A.A. Abdel-Wareth and J.D. Lohakare\*. 2020. Productive performance, egg quality, nutrient digestibility, and physiological response of Bovans Brown hens fed with various dietary inclusion levels of peppermint oil. *Animal Feed Science and Technology*, Volume 267, 114554. <https://doi.org/10.1016/j.anifeedsci.2020.114554>

**The article from the other research on *Moringa oleifera* leaves supplementation in layers got published in "Animals" journal.**

A.A.A. Abdel-Wareth and J.D. Lohakare\*. 2021. *Moringa oleifera* Leaves as Eco-Friendly Feed Additive in Diets of Hy-Line Brown Hens during the Late Laying Period. *Animals*. 11, 1116. <https://doi.org/10.3390/ani11041116>.

Closing Out (end date 09/06/2023)

## **Screening the Chymase Inhibitory Potential of Different Varieties of Sweet Potato (*Ipomoea batatas* Linn.)**

Project Director

Sankar Devarajan

Organization

University of Arkansas at Pine Bluff

Accession Number

1018163



### **Screening the chymase inhibitory potential of different varieties of sweet potato**

**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

Hypertension affects one in two adults in the United States and is more common in non-Hispanic Black adults than in non-Hispanic white adults. Because hypertension is a severe medical condition that can increase a person's risk of developing other chronic diseases and cause damage to vital organs, there is a national call to action to establish hypertension control. Usually, reducing daily high salt consumption is recommended for controlling hypertension. Chymase, a serine protease, upregulation in tissues is a causative factor in salt-induced hypertension. Its inhibition by a novel chymase inhibitor drug or foods with chymase inhibitory action reduced high blood pressure. The future goal of this project is to determine the chymase inhibitory potential of natural foods for the depressor effect in salt-induced hypertension.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

This study by the University of Arkansas at Pine Bluff (UAPB) aims to identify and determine the in vitro chymase inhibitory action of different sweet potato varieties. This research will have implications for improving health and

support the translation approaches in human chronic diseases, thus enhancing the quality of life of individuals with hypertension. Moreover, this research will provide opportunities for undergraduate students to gain invaluable knowledge through hands on research, such as laboratory precision techniques and replication and the use of the latest technological equipment.

**Briefly describe how your target audience benefited from your project's activities.**

UAPB researchers have discovered four sweet potato varieties (Burgundy, Covington, Beauregard, and Orleans) exhibit chymase inhibitory and free radical scavenging effects in vitro. The ethanol extracts of sweet potato varieties exhibit more significant chymase inhibitory and free radical scavenging activities than the aqueous extracts. Sweet potato Burgundy shows remarkable chymase inhibitory properties compared to other types. The preliminary data obtained from this project supports seeking extramural grant funds to translate this research to in vivo experiments. This study will significantly impact nutrition and food science research and the development of nutraceuticals or functional food ingredients to control salt induced hypertension.

**Briefly describe how the broader public benefited from your project's activities.**

Natural foods with known antioxidative and anti-inflammatory defense could be an added advantage besides chymase inhibitory properties to effectively improve hypertension and associated complications. Since the chymase inhibitor, the generic drug, is still not approved yet for human hypertension, searching for foods or food compounds that exhibit chymase inhibitory properties will be helpful. It can be advocated as a natural remedy to control the development of hypertension caused by high salt intake. This study would pave the way for path-breaking research and support underrepresented students to excel at the state, regional, national, and international level (s) through novel and evidence-based research.

**Describe and explain any major changes or problems encountered in approach. Additionally, note opportunities for training and professional development provided, how results have been disseminated to communities of interest, and any new details regarding what the project or program plans to do during the next reporting period to accomplish the goals.**

We continue the project to determine the chymase inhibitory action of different sweet potato varieties. We have difficulties procuring many sweet potato varieties as planned for the project. We are interested in extracting sweet potatoes with organic solvents to determine the chymase inhibitory action over the aqueous extracts.

**Sustainable Development and Operation of Community Gardens in Arkansas**

Project Director

Ranjitsinh Mane

Organization

University of Arkansas at Pine Bluff

Accession Number

1018427



**Sustainable Development and Operation of Community Gardens in Arkansas**

**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

The purpose of this project is to aid local community leaders in the development of sustainable community garden operations and to enhance healthy eating habits. This project will develop a strategic management program that will give concise and easy to understand strategies to aid in the proper management of community gardens.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

The current project is on-going project (funded by USDA Evans Allen Grant) that has started in December, 2018. We expect to complete the entire project by 2023. The first part of the project is to build database of community garden operator in state of Arkansas. In summer 2018, with assistance from undergraduate students at UAPB we have developed a database of community garden operators in Arkansas. A brief survey was conducted via phone interview with community garden operators. The information collected was related to their operation, such name of operator / organizer, location of community garden, email address and other information was gathered to build a database for future proposed research.

**Briefly describe how your target audience benefited from your project's activities.**

The project has multiple objectives; such as addressing food security at local level, providing access to fresh fruits and vegetables to local population. The most important objective is to develop a sustainable community garden that operates and creates economic value in the local community. As a result of our initial survey we have identified about 86 community gardens in Arkansas. To add further, there are 12 community gardens in eastern Arkansas. We will use the above mentioned databased for the proposed future research. In 2020-2021 a facebook page was created to reach potential community garden operators. (<https://www.facebook.com/Community-Gardens-of-Arkansas-113537000299869>)

**Briefly describe how the broader public benefited from your project's activities.**

The project has multiple objectives; such as addressing food security at local level, providing access to fresh fruits and vegetables to local population. The most important objective is to develop a sustainable community garden that operates and creates economic value in the local community. As a result of our initial survey we have identified about 86 community gardens in Arkansas. To add further, there are 12 community gardens in eastern Arkansas. We will use the above mentioned databased for the proposed future research. In 2020-2021 a facebook page was created to reach potential community garden operators. (<https://www.facebook.com/Community-Gardens-of-Arkansas-113537000299869>)

**Describe and explain any major changes or problems encountered in approach. Additionally, note opportunities for training and professional development provided, how results have been disseminated to communities of interest, and any new details regarding what the project or program plans to do during the next reporting period to accomplish the goals.**

Due COVID-19 Pandemic - in person surveys of participants (different stakeholders) have been on hold due to pandemic related travel restrictions at the institute. However, In 2022 We are planning to conduct in person surveys.

Closing Out (end date 09/06/2023)

**THE EFFECT OF PROBIOTICS USE IN FOOD ANIMALS ON GUT AND FECAL MICROBIOME AND ANTIMICROBIAL RESISTANCE OF FOODBORNE PATHOGENS**

Project Director  
Yasser Sanad  
Organization  
University of Arkansas at Pine Bluff  
Accession Number  
1018220



**THE EFFECT OF PROBIOTICS USE IN FOOD ANIMALS ON GUT AND FECAL MICROBIOME AND ANTIMICROBIAL RESISTANCE OF FOODBORNE PATHOGENS**

**In 2-3 sentences, briefly describe the issue or problem that your project addresses.**

For better understanding and finding ways to combat the spread of MDR and to improve the food safety measures in small ruminants (goats) farms, we need to have more studies focusing on the probiotics in goat and their effect on the gut and fecal microbiome.

**Briefly describe in non-technical terms how your major activities helped you achieve, or make significant progress toward, the goals and objectives described in your non-technical summary.**

We conducted an animal (goat) experiment. Fecal and rumen juice samples were collected every two weeks. The fecal samples are being processed immediately right after the sample collection following the standard microbiological protocols and the FDA-BAM protocol to isolate Campylobacter spp, Salmonella spp, E. coli (mainly STEC O157-H7 serotype), and Listeria spp.

Our primary results data show a significant reduction in the microbial loads of the pathogenic bacterial foodborne microbes. Work is still in progress with further microbiological identifications and molecular characterizations. Our work is mainly focused on isolation of Salmonella, Campylobacter, Listeria, and E. coli. Once the identifications and characterizations of the microbial isolates done, a whole genome sequencing will be conducted on selected subset of these isolates and microbial diversity (microbiome) analysis using metagenomics.

**Briefly describe how your target audience benefited from your project's activities.**

The local, state, and national consumer's, food animal producers, local farmers, food industry, scientists and researchers. Further, our research projects are strategically placed to train minority students (undergraduate and graduate) to help fulfilling careers within the food safety and agricultural careers in general.

**Briefly describe how the broader public benefited from your project's activities.**

We are sharing our primary results with our colleagues through internal and students' seminars. We also participate in different regional and national meetings such as AR-BIC and the ARD. These activities help sharing our preliminary data with broader audience and benefited broader public audience.

**Describe and explain any major changes or problems encountered in approach. Additionally, note opportunities for training and professional development provided, how results have been disseminated to communities of interest, and any new details regarding what the project or program plans to do during the next reporting period to accomplish the goals.**

The COVID-19 pandemic has significantly influenced our progress rate. Additionally, this is a long-term project, and we are mainly dependent on master's students. When it is the time for graduate students to graduate, it slows down our progress.