2018 Tuskegee University and Auburn University and Alabama A&M University Combined Research and Extension Annual Report of Accomplishments and Results

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I. Report Overview

1. Executive Summary

Overview. The annual report represents the combined efforts of the three land-grant institutions in the state of Alabama; Alabama A&M University (AAMU), Auburn University (AU), and Tuskegee University (TU).
The Universities...
AAMU is an 1890 land-grant institution with a comprehensive university Carnegie classification, functioning in the areas of teaching, research, and Extension including public service. AAMU is a doctoral degree granting institution with strong graduate programs in the science, technology, engineering, and mathematics (STEM) disciplines. AU is an 1862 land-grant institution with high research activity; comprehensive doctoral programs with medical/veterinary Carnegie classification. AU's mission is defined by its land-grant traditions of service and access. The TU mission, together with specific acts of the United States Congress and the state of Alabama defines Tuskegee as an 1890 land- grant university with a Master's degree Carnegie classification, including Ph.D. and DVM degrees. Through integrative teaching/learning, research/discovery, and Extension/engagement programs TU addresses contemporary societal challenges as opportunities to advance agriculture, science, engineering, veterinary medicine, health, education and community development.
Research and Cooperative Extension....
Research at each Alabama land-grant institution (LGU) has distinct programs based on clientele needs. Each component of the Alabama Agricultural Research Program works closely and cooperatively to enhance partnerships among the universities in all areas of Research and Extension; with other universities in the region, nationally, and internationally; and with state and federal laboratories and agencies. Alabama's three land-grant universities have played key roles in the development of agricultural enterprises in Alabama. The agricultural research programs of these universities have formed a partnership, the Alabama Agricultural Land-Grant Alliance (AALGA), to better address critical issues in food, agriculture, rural sustainability, environment, bioenergy, and natural resources in the state, region, and nation through multidisciplinary, multi-institutional, science-based teams that focus on the opportunities and the challenges facing farmers, consumers, and agribusinesses. AALGA also seeks to provide quality education that prepares professionals for career opportunities in food, agriculture, environment, and natural resources. Research programs at each of our institutions are closely linked to Extension programs, which seek the largest possible positive social, economic, and environmental impact. AAMU and AU provide Extension educational outreach as a unified Alabama Cooperative Extension System (ACES). The AAMU-funded portion of the System focuses its resources on serving urban clientele; the AU-funded portion of the System focuses its resources on serving statewide clientele. The ACES employs a highly collaborative program development and delivery process that allows for the integrative and collaborative application of the resources from both AAMU and AU to serve and meet the needs of all Alabamians in all 67 counties within the state. Agents from the two institutions are jointly located in county Extension offices and function as a county Extension teams. Tuskegee University Cooperative Extension (TUCE) in partnership with the Evans Allen Research Program, Carver Integrative Sustainability Center (USDA 1890 Center of Excellence) and other research, teaching and outreach units, carries out a comprehensive Extension Plan of Work (POW). TUCE continues its historical focus in Alabama Black Belt and adjacent counties that include Native American and Hispanic populations and span rural, urban, and

peri-urban communities. Many TUCE agents share the same facility as ACES agents assigned to that county and cooperate on Extension programs of mutual interest.
The world is facing major challenges with food, energy, environmental sustainability, natural resources, climate change, and economic development in all sectors, as well as, human health and well-being and related issues. In order to address issues related to these major local, national and international challenges, integrative and collaborative Research and Extension programs have been designed to address most of these challenges. The Alabama Land-Grant Institutions are cognizant of the necessity to continue to address the National Institute of Food and Agriculture (NIFA) priorities. Indeed, those programs are priorities for Alabama residents as well. The Combined Alabama A&M University, Auburn University, and Tuskegee University Research and Extension POW is founded on the following planned programs: 1) Global Food Security and Hunger, 2) Food Systems and Food Safety, 3) Natural Resources Conservation Environmental Sustainability and Climate Change, 4) Human Nutrition, Well-being, Health and Obesity, 5) Community Development, 6) Family, Home and 4-H and Youth Development, and 7) Sustainable Energy.
The annual report for FY 2018 is fully descriptive of the program activities from the state's Plan Of Work. The planned program areas are fully described in the remainder of this annual report. What follows is a brief summary of some of the program activities. The Global Food Security and Hunger program addressed issues related to sustainability of small-scale farmers and rural communities.
More than 170 beef producers with tall fescue pastures reported that information from ACES meetings increased their profitability by $11,146 per farm or $1.4 million for the group; actual stakeholder ROI of 406:1. 85% of the Black Belt produce farmers who adopted social media techniques learned from ACES direct marketing increased their sales by at least 25%. 1,120 plant samples analyzed by the ACES Plant Diagnostics Laboratory network saved Alabama agriculture $2.2 million with a program ROI= 4:1. 1,122 adults and 484 youth learned to manage invasive plants on 3.5 million acres saving $441,000 in damages; ROI= 22:1. 260 pest control operators reported the value of ACES training of $793 per attendee; actual stakeholder ROI = 7:1. 592 expecting mothers had an average birth weight of 1.6 lbs above the low birth weight threshold of 5.5 lbs because of ACES nutrition and weight management education. 9,107 youths from 26 schools learned of the harmful effects of e-cigarette, vaping, and hookah use. 32% of these youth reported increased confidence to avoid nicotine products.
This is a small sampling of program activities and impacts for this annual report. The full report details activities and impacts for each of the program areas.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2018	Extension		Research	
	1862	1890	1862	1890
Plan	364.0	56.5	326.0	44.3
Actual	368.6	63.7	128.0	35.4

II. Merit Review Process

1. The Merit Review Process that was Employed for this year

- Combined External and Internal University Panel

2. Brief Explanation

Process
Alabama Cooperative Extension, Tuskegee University Integrated Research and Extension, and Auburn

University Agricultural Experiment Station implement a 5 phase merit review process. The process is designed for discussion and to gather data at each phase.
Phase 1 was conducted by Extension and Research program or project teams. Teams were instructed to review and discuss program data. This process ensured report information clearly represented critical needs identified by Alabama residents, stakeholders and partners. Upon completion of the team reviews data was submitted to Assistant/Associate Directors and Administrators and Deans/Associate Deans.
Phase II was conducted by Extension Assistant/Associate Directors and Administrators and Research Deans/Associate Deans. All data shared by program/project teams was reviewed to ensure:

- Relevant and impactful information
- Alignment of measurable impacts and outcomes with established national standards
- multistate/integrated research and extension activities reported

Phase III was conducted by Extension and Research administrative teams. Consideration was given to the following criteria:

- University mission
- Inclusion of approved programs and projects
- Adequate allocation of fiscal/human resources to successfully implement programs and projects
- The capacity to offer educations programs and services to a broad spectrum of Alabama residents, rural/urban and across diverse demographic parameters
- The degree to which the plan-of-work adequately reflects the consideration and inclusion of stakeholder and advisory input

Phase IV involved Extension administrators, deans and department heads. In Alabama, several system program specialists are housed in academic departments. Therefore, academic heads are included in the program/project review process for educators and scientists in their respective departments.
Phase V solicited reviews from various state-wide advisory councils to ensure:

- citizens' needs were addressed
- Extension programs and Research efforts/accomplishments were articulated
- collaboration and network opportunities were incorporated
- visibility of statewide support for extension and research

III. Stakeholder Input

1. Actions taken to seek stakeholder input that encouraged their participation

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

Brief explanation.

The Alabama Cooperative Extension System and Tuskegee University Cooperative Extension (ACES/TUCE) utilize a comprehensive grass-tops and grassroots needs assessment process.

State-level constituent or consensus building groups, non-governmental agencies, community-based organizations, and governmental agencies are encouraged to participate in grass-tops needs assessment activities by inviting both traditional and non-traditional stakeholder groups. Individuals representing diverse socio-economic and racial groups, new client groups, networks, youth groups, and potential community partners are encouraged to participate in grassroots needs assessment activities by inviting both traditional and non-traditional stakeholder individuals. Media are used to announce and encourage individuals to participate in various activities.

In addition, college-level research advisory committees and advisory boards were established for Alabama A&M University, Auburn University, and Tuskegee University within The Alabama Agricultural Land Grant Alliance (AALGA) to actively seek stakeholders' input and provide advice to Deans and Research Directors. In addition, Auburn University College of Agriculture has recently established 12 Collaborative Research Teams to help facilitate interdisciplinary research collaborations and provide input/feedback on research programs and initiatives. Throughout the year, research and extension faculty interface with 17 commodity groups and their clientele. Primary interaction occurs during semi-annual conferences organized by the Alabama Farmers Federation (ALFA) where faculty and administrators meet with commodity groups that hold forums to discuss issues, needs, and concerns. In addition to the ALFA groups, college and experiment station leadership, the department heads, and extension and research faculty work closely with several major commodity-based organizations outside of ALFA. They are the Alabama Cattlemen's Association, Alabama Poultry and Egg Association, Alabama Nursery and Landscape Association, Alabama Turfgrass Association, and the Black Belt Small Farmers Cooperative.

AALGA and its partners hosted "listening sessions" at key locations across the state. These sessions were advertised in varying ways to reach as broad an audience as possible and were open to the general public. Participants identified several strategic areas in need of additional resources and effort (i.e., research and extension). These areas are noted in this plan of work. Regular input is also received from stakeholders through commodity group leaders, from advisory boards, formal and informal surveys, focus groups, field days, conferences and through discussions and feedback from state leaders on agricultural boards. Most Extension faculty have research appointments, and they work closely with the commodity groups and the public in general to bring back their concerns and feedback.

2(A). A brief statement of the process that was used by the recipient institution to identify individuals and groups stakeholders and to collect input from them

1. Method to identify individuals and groups

- Use Advisory Committees
- Use Internal Focus Groups
- Use External Focus Groups
- Open Listening Sessions
- Needs Assessments
- Use Surveys

Brief explanation.

ACES/TUCE program leaders lead respective program teams, consisting of Extension specialists, agents, resource specialists, and farm management specialists to identify state-level constituent or consensus building groups, non-governmental agencies, community-based organizations, and governmental agencies. Methods for identifying these groups included existing advisory committees

and interagency directories.
Grassroots stakeholders are identified by Extension coordinators, agents, and resource specialists who lead community conversations in the state's 67 counties. Methods included existing advisory committees, 4-H youth councils, contacts with other agency partners, and staff knowledge of individuals representing diverse socio-economic and racial groups, new client groups, networks, youth groups, and potential community partners. A grassroots web-based survey is marketed in all 67 counties through the media and directly via ACES/TUCE webpages. Citizens are offered the opportunity to participate in the survey via public access computers at county Extension offices. For the hard-to-reach communities in the Black Belt and with new immigrant populations, special county and state advisory councils have been established for engagement to secure a diversity of stakeholder input. County 4-H youth councils are asked for direct input and feedback and are asked to solicit input and feedback from other peer youth groups.

Moreover, several groups such as advisory committees which encompass growers and consumer groups have been established. Surveys are conducted through various Alabama Agricultural Experiment Station (AAES) newsletters. Other means of seeking input from the general public are employed. Commodity groups are well organized through participation in the Alabama Farmers Federation and other such groups. Needs assessments are conducted through strategic planning, SWOT analysis, based on input from the agricultural industries and assessments from the faculty, their department heads, and college and experiment station leaderships.

2(B). A brief statement of the process that was used by the recipient institution to identify individuals and groups who are stakeholders and to collect input from them

1. Methods for collecting Stakeholder Input

- Meeting with traditional Stakeholder groups
- Survey of traditional Stakeholder groups
- Meeting with traditional Stakeholder individuals
- Survey of traditional Stakeholder individuals
- Meeting with the general public (open meeting advertised to all)
- Meeting specifically with non-traditional groups
- Meeting specifically with non-traditional individuals
- Survey of selected individuals from the general public

Brief explanation.

A comprehensive approach to needs identification is utilized given the complexity of issues facing the citizens of Alabama. For ACES/TUCE, the comprehensive needs assessment begins with engagement of key external 'grass-tops' stakeholders to determine priority needs affecting Alabamians.
Program leaders and their respective program teams conduct the grass-tops needs assessment by engaging groups through direct telephone contacts, focus groups, advisory committees, networking, or short surveys. Each stakeholder group is asked 1) what priority initiatives are included in their strategic plan or plan-of-work, 2) what issues do they envisioned
affecting the economic and physical wellbeing of Alabamians across the state, 3) what priority needs of their clientele connect with ACES/TUCE's educational programming expertise, and 4) what linkages do they envision that would strengthen the working relationship with ACES/TUCE's educational programming. Results gleaned from the grass- tops needs assessment activities are summarized to determine what major themes emerge.

The second major component of the comprehensive needs assessment involves engagement of

'grassroots' stakeholders. Extension coordinators, agents, and resource specialists organize grassroots community conversations to confirm, prioritize, or regionalize the grass-tops needs assessment results. Objectives are to engage a cross section of citizens, including youth, to 1) discuss and understand the facts regarding significant issues facing the state and the opportunities for positive change and 2) dialogue about significant issues and the potential for local programs that acknowledge and address the current changes in the way citizens think, live, and function in their daily lives, families, communities and businesses. A companion grassroots survey is administered via the ACES/TUCE homepage.

For limited-resource and low-asset communities, their representation on the special county and state advisory councils in the Black Belt and adjacent service areas are invited and given the opportunity to use regularly scheduled conferences in order to collect input and feedback. The conferences include: The Annual Farmers Conference, the Booker T. Washington Economic Summit, the Youth Empowerment Summit, and the Professional Agricultural Workers Conference. In addition, a number of stakeholder groups have previously been identified, and input is collected through regular meetings with discussions and feedback. For example, at Auburn, several commodity groups have committees to evaluate on-going research and new research proposals. Direct feedback to researchers and administration is through the projects that get funding and through discussion about new and emerging issues. At Tuskegee, input is also sought from workshops and special sessions during the Professional Agricultural Workers Conference and Farmers Conference that are organized annually. At Alabama Agricultural and Mechanical University, input is sought through workshops, 1890 Association of Research Directors, various departments, conferences and new research proposals. Influential industry leaders are consulted for their input and feedback.

3. A statement of how the input will be considered

- To Identify Emerging Issues
- Redirect Extension Programs
- In the Staff Hiring Process
- In the Action Plans
- To Set Priorities

Brief explanation.

Strategic program initiatives are identified from the comprehensive grass-tops and grassroots needs assessment activities. Program leaders collaborate on the development of a logic model for each strategic program initiative focusing on specific objectives, outputs, and outcomes that allow for application across various program areas. Each logic model includes an evaluation plan.
Program leaders assist their respective program teams, consisting of Extension specialists, agents, resource specialists, and farm management specialists, prepare a plan-of-work. Steps include: 1) to determine which strategic program initiatives fit with the team's capabilities and resources and to develop a programmatic response consistent with the objectives, outputs, and outcomes of the respective strategic program initiative logic model and 2) to complete the program team plan-of-work to include ongoing programs or special funded projects. A quarterly staff conference is used to process stakeholder input from the special and state advisory councils as a special effort on behalf of limited-resource and low-asset communities in the Black Belt.

Team plans-of-work are shared with Extension coordinators, agents, and resource specialists to

align program alternatives and to make mutual decisions regarding programs, staff involved, dates, locations. With respect to research, input from stakeholders is used to set program priorities and for identifying emerging issues relevant to agricultural activities. Their inputs are considered in the long term plan for hiring faculty members and staff members. Input concerning urgent and serious issues will be used to redirect research funds and used in the budget processes as well. Priorities identified from stakeholders' input are used as guides for solicitation of research grant applications. Annual Hatch and Evans Allen funded internal grants are selected competitively (awards are made based on merit and relevance to the priority areas). Because of the small size of the funding, such research funding has to be considered as seed grants. Leveraging of additional funding is essential to carry the research priorities forward.

Brief Explanation of what you learned from your Stakeholders

The following Planned Program Areas were established to focus educational programs and research projects:

- Global Food Security and Hunger
- Natural Resource Conservation and Management
- Environmental Sustainability and Climate
- Food Systems and Food Safety
- Human Nutrition, Well-being, Health and Obesity
- Sustainable Energy
- Community Development Family, Home, and 4-H and Youth Development

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
{No Data Entered}	{No Data Entered}	{No Data Entered}	{No Data Entered}

Institution Name: Alabama A&M University

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	0	1624491	0	0
Actual Matching	0	1624491	0	0
Actual All Other	0	0	0	0
Total Actual Expended	0	3248982	0	0

Institution Name: Auburn University

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	8850425	0	5066442	0
Actual Matching	7220714	0	5107103	0
Actual All Other	51673980	0	22704924	0
Total Actual Expended	67745119	0	32878469	0

Institution Name: Tuskegee University

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	0	2190285	0	2683562
Actual Matching	0	1807443	0	2448343
Actual All Other	0	0	0	0
Total Actual Expended	0	3997728	0	5131905

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous				
Carryover	0	0	0	0

V. Planned Program Table of Content

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Global Food Security and Hunger

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
101	Appraisal of Soil Resources	0%	0%	0%	5%
102	Soil, Plant, Water, Nutrient Relationships	4%	4%	2%	13%
111	Conservation and Efficient Use of Water	10%	10%	0%	5%
123	Management and Sustainability of Forest Resources	10%	10%	0%	5%
125	Agroforestry	5%	5%	0%	9%
132	Weather and Climate	5%	5%	0%	3%
201	Plant Genome, Genetics, and Genetic Mechanisms	0%	0%	0%	4%
202	Plant Genetic Resources	0%	0%	8%	8%
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%	0%	0%	2%
205	Plant Management Systems	10%	10%	0%	2%
206	Basic Plant Biology	2%	2%	3%	2%
211	Insects, Mites, and Other Arthropods Affecting Plants	5%	5%	17%	2%
212	Pathogens and Nematodes Affecting Plants	0%	0%	36%	3%
213	Weeds Affecting Plants	2%	2%	13%	1%
216	Integrated Pest Management Systems	10%	10%	4%	6%
302	Nutrient Utilization in Animals	5%	5%	14%	8%
311	Animal Diseases	10%	10%	0%	2%
402	Engineering Systems and Equipment	2%	2%	0%	0%
502	New and Improved Food Products	5%	5%	0%	10%
601	Economics of Agricultural Production and Farm Management	15%	15%	3%	10%
	Total	100%	100%	100%	100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2018	Extension		Research	
	1862	1890	1862	1890
Plan	60.0	13.5	174.0	15.1
Actual Paid	61.0	12.3	27.0	14.7
Actual Volunteer	0.0	0.0	0.0	0.0

2. Institution Name: Auburn University

Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
1825311	0	1203878	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1740182	0	1213540	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
9868456	0	5545400	0

2. Institution Name: Alabama A&M University

Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	237545	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	237545	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

2. Institution Name: Tuskegee University

Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	614558	0	1114361
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	507139	0	1016685
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

AAMU- Small Ruminant Production-The goal is to increase the sustainability of pasture-based meat goats and sheep production in a loblolly pine based silvopasture system and conventional open grazing system, to increase the productivity and quality, and extend production duration.
AAMU Biochar derived from pyrolysis of biomass substrates is a promising soil amendment to sequester atmospheric carbon and enhance crop productivity by improving soil properties. Biochar might mitigate the adverse effects of climate change.
AAMU Ext- Parasite and Health Management to Promote Goat and Sheep Herd Sustainability The goal of this program is to train farmers to recognize problems in their herd so that they can reduce parasites, produce healthier herds of goat, and, thereby, yield higher prices at the market. 3,148 persons were educated regarding ruminant health needs and potential problems, emergency procedures and possible causes, parasites and fungi, infections diseases, hoof trimming, vaccination and testing for illness/disease.
AU Ext- Sustainable Livestock Production Systems -based management education can be used to improve land use efficiency, animal management, and economic returns in these operations. The goals of are to create awareness and enhanced knowledge of improved forage management practices, reduce the reliance on stored forage and feed inputs, and develop targeted supplementation strategies for cattle producers.
AU Ext- Alabama Beginning Farmer Project educates beginning farmers and military veterans interested in agriculture and networks with nonprofit agencies and producer organizations to provide trainings
TU-Sustainable Livestock Production Researcher- conduct to promote the sustainable use of woodlands for expanding grazing opportunity for small ruminants and increasing the overall benefits of the whole system. Research findings published and disseminated to the scientific community, Extension professionals, students, farmers, and landowners. Five educational events were conducted to educate the target audience on improving and sustainably utilizing grazing lands (pastures, species, silvopastures, and woodlands).
TU Peanut Growth Efficiency -Peanut is an important oilseed crop that is grown extensively over three continents and has economic importance to the crops of southern Alabama. Research conducted on improving the genetics and productivity of peanuts was the major target of this research. Cutting edge genetic tools such as genotyping by sequencing (GBS), optimizing peanut gene transfer efficiency by Agrobacterium tumefaciens, and utilizing CRISPR technology to edit genes.
AU Integrated Pest Management: Researchers are developing methods to manage plant pests and diseases. **AU Crop Production Systems**: Using breeding, cultivar evaluation, nutritional approaches and training systems to improve crop production efficiencies. **AU Sustainable Aquaculture Systems**: Sustainable and economic production of multiple species. **AU Integrated Poultry Production Systems**:

Poultry housing for improved efficiencies in water and energy usage. **AU Livestock Production Systems**: Production strategies for beef cattle.

2. Brief description of the target audience

AAMU Biochar study targets soil and environmental scientists, graduate and undergraduate students in Biology and Environmental & Soil Science disciplines. This project involves the training of graduate/undergraduate students in soil analysis methods and techniques, extraction of DNA from soil samples, microbial culture methods and use of bioinformatics methods in microbial identification and characterization.
AAMU Ext-Parasite and Health Management to Promote Goat and Sheep Herd Sustainability- The target audience included limited-resource farmers in Choctaw, Dallas, Greene, Hale, Lowndes, Marengo, Sumter, Wilcox, and Perry Counties.
AU Ext Sustainable Livestock Production Systems Internal: Regional Extension agents, County Extension coordinators, Animal Science and Forage Graduate Students, Crop, Soil, and Environmental Sciences Graduate Students, Auburn College of Veterinary medicine students and faculty, Auburn research and extension center directors External: New and/or beginner beef cattle producers or land owners, stocker cattle operators, cow-calf producers, forage growers, federal agencies such as NRCS and FSA,
AU Ext- Alabama Beginning Farmer Project targets beginning farmers, including those in underserved communities and military veterans interested in agriculture.
Tuskegee Sustainable Livestock Production- Historically disadvantaged and limited resource livestock producers in Alabama, especially in the Black Belt Region.
Tuskegee Peanut Growth Efficiency- Agricultural professionals and workers engaged in peanut production
AU Integrated Pest Management/ AU Crop Production Systems: Agriculture producers and allied industries, extension agents, state and federal agencies, and general public. **AU Sustainable Aquaculture Systems**: Aquaculture producers and allied industries, extension agents, state and federal agencies, and general public. **AU Integrated Poultry Production Systems/ AU Livestock Production Systems**: Livestock producers and allied industries, extension agents, state and federal agencies, and general public.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	120336	10992	103590	0

2. Number of Patent Applications Submitted (Standard Research Output)
Patent Applications Submitted

Year: 2018

Actual: 4

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	91	176	267

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of peer reviewed publications
  Not reporting on this Output for this Annual Report

Output #2

Output Measure

- Number of patents and disclosures

Year	Actual
2018	4

Output #3

Output Measure

- Number of plant varieties developed and improved.

Year	Actual
2018	4

Output #4

Output Measure

- Number of animal breeds developed and improved
  Not reporting on this Output for this Annual Report

Output #5

Output Measure

- Number of vaccines developed and/or tested
  Not reporting on this Output for this Annual Report

Output #6

Output Measure

- Number of graduate students completed

Year	Actual
2018	19

Output #7

Output Measure

- Number of technologies developed/evaluated

Year	Actual
2018	2

Output #8

Output Measure

- Number of technical and poster presentations

Year	Actual
2018	74

Output #9

Output Measure

- Number of training events

Not reporting on this Output for this Annual Report

Output #10

Output Measure

- Number of demonstrations

Not reporting on this Output for this Annual Report

Output #11

Output Measure

- Number of exhibitions and tradeshows

Not reporting on this Output for this Annual Report

Output #12

Output Measure

- Number of participants

Not reporting on this Output for this Annual Report

Output #13

Output Measure

- Number of educational publications developed or improved
  Not reporting on this Output for this Annual Report

Output #14

Output Measure

- Number of social media information interactions
  Not reporting on this Output for this Annual Report

Output #15

Output Measure

- Number of in-service training sessions for Extension and Research personnel
  Not reporting on this Output for this Annual Report

Output #16

Output Measure

- Number of training curricula or modules developed
  Not reporting on this Output for this Annual Report

Output #17

Output Measure

- Number of National Poultry Technology Center workshops

Year	Actual
2018	7

Output #18

Output Measure

- Number of TU peer reviewed publications

Year	Actual
2018	11

Output #19

Output Measure

- Number of TU research studies conducted

Year	Actual
2018	3

Output #20

Output Measure

- Number of TU graduate thesis

Year	Actual
2018	1

Output #21

Output Measure

- Number of TU Training sessions and field days conducted

Year	Actual
2018	5

Output #22

Output Measure

- Number of participants in TU educational events

Year	Actual
2018	233

Output #23

Output Measure

- Number of TU technical and poster presentations

Year	Actual
2018	23

Output #24

Output Measure

- Number of TU on- and off-site demonstrations

Year	Actual
2018	5

Output #25

Output Measure

- Number of participants in TU demonstrations

Year	Actual
2018	233

Output #26

Output Measure

- Number of TU exhibitions and tradeshows

Year	Actual
2018	7

Output #27

Output Measure

- Number of participants in TU exhibitions and tradeshows

Year	Actual
2018	373

Output #28

Output Measure

- Number of TU flyers developed and shared

Year	Actual
2018	1700

Output #29

Output Measure

- Number of methods developed and evaluated in Alabama by TU researchers

Year	Actual
2018	2

Output #30

Output Measure

- Number of TU graduate theses

Year	Actual
2018	4

Output #31

Output Measure

- Number of TU Genome datasets deposited in GenBank

Year	Actual
2018	2

Output #32

Output Measure

- Number of TU Local and national presentations

Year	Actual
2018	4

Output #33

Output Measure

- Number of Parasite and Health Management to Promote Goat and Sheep Herd Sustainability participants

Year	Actual
2018	3148

Output #34

Output Measure

- The number of Parasite and Health Management to Promote Goat and Sheep Herd Sustainability workshops

Year	Actual
2018	15

Output #35

Output Measure

- Number of Nutrient Management Training participants

Year	Actual
2018	238

Output #36

Output Measure

- Number of Nutrient Management Training workshops

Year	Actual
2018	8

Output #37

Output Measure

- Number of hours of continuing education units (CEU's) earned by Nutrient Management Training attendees

Year	Actual
2018	653

Output #38

Output Measure

- The number of Sustainable Livestock Production Systems followers on online extension outlets (Facebook, Twitter # of followers, # of subscribers to MailChimp electronic newsletter listserv)

Year	Actual
2018	2456

Output #39

Output Measure

- Number of Sustainable Livestock Production Systems educational publications developed or improved (includes: number of bulletins, handbooks, special products, newsletters/news releases, factsheets, eXtension factsheets, magazine, and newspaper articles)

Year	Actual
2018	33

Output #40

Output Measure

- Number of Sustainable Livestock Production Systems participants

Year	Actual
2018	4242

Output #41

Output Measure

- Number of Sustainable Livestock Production Systems technical and poster presentations

Year	Actual
2018	12

Output #42

Output Measure

- Number of Sustainable Livestock Production Systems on- and off-site demonstrations (number of participants)

Year	Actual
2018	7

Output #43

Output Measure

- Number of Sustainable Livestock Production Systems training events and conferences for target audience (includes: numbers of workshops, regional meetings, conferences, and webinars, as well as number of participants)

Year	Actual
2018	104

Output #44

Output Measure

- Number of Sustainable Livestock Production Systems individuals reached through beef cattle online programming and curriculum (online coursework, Extension website)

Year	Actual
2018	3072

Output #45

Output Measure

- Number of Sustainable Livestock Production Systems webinars and videos on livestock management topics for Extension agents and producers

Year	Actual
2018	19

Output #46

Output Measure

- Number of Sustainable Livestock Production Systems training curricula or modules developed/improved (number of viewers or people trained

Year	Actual
2018	1

Output #47

Output Measure

- Number of peach dormancy methods and technologies developed/evaluated

Year	Actual
2018	4

Output #48

Output Measure

- Number of peach dormancy exhibitions and tradeshows (number of participants reached)

Year	Actual
2018	452

Output #49

Output Measure

- Number of peach dormancy workshops

Year	Actual
2018	7

Output #50

Output Measure

- Number of on- and off-site peach dormancy demonstrations (number of participants)

Year	Actual
2018	5

Output #51

Output Measure

- Number of peach dormancy technical and poster presentations

Year	Actual
2018	27

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	The number of new variety of crops developed
2	The number of technologies developed for control and management of diseases
3	The number of best management practices adopted that ensure the sustainability of agricultural systems
4	The number of broiler producers with increased knowledge of of methods to reduce waste management issues on farms
5	The number of participants with increased knowledge of horticultural production methods and marketing
6	The number of participants who adopted row crop production practices that are sustainable
7	The number of participants who adopted integrated pest management recommendations
8	The number of pond owners with increased knowledge of pond function and management
9	The number of participants who adopt water conservation best practices
10	The number of livestock and equine farmers who adopt forage best management practices
11	The number of livestock owners with increased producer knowledge on sustainability of production
12	The number of participant with increased knowledge of Integrated Pest Management
13	The number of best management practices adopted that ensure the sustainability of forestry production systems.
14	The number of poultry producer who adopt litter management techniques
15	The number of poultry industry personnel with increased knowledge in poultry house technology and management
16	The number of catfish producers who adopt more efficient practices
17	The number of catfish producers who use hybrid catfish production

18	The number of livestock owners with increased knowledge on proper animal care
19	The number of participant with increased knowledge of Plasticulture
20	The number of participant with increased knowledge of Organic Farming
21	The number of participant with increased knowledge of Forest Management
22	The number of participant with increased knowledge of Animal Management
23	The number of pond owners who adopt pond management best practices
24	The number of participants who increased knowledge in angler education
25	The number of participants with increased knowledge of fisheries management
26	Increased knowledge of sheep selected for evaluation
27	Development of new varieties of crops, new breeds of animals and stocks of poultry or aquaculture species.
28	Development of technologies for control and management of plant diseases, pests, and animal diseases
29	Adoption of row crop production practices that are sustainable and profitable
30	Increase in knowledge of AU researchers related to integrated pest management
31	Development of new breeds of animals and stocks of poultry or aquaculture
32	Increase broiler producer awareness of methods to improve waste and litter management on farms
33	Increase the knowledge of catfish producers in more efficient practices and expand the use of hybrid catfish in production.
34	Increase knowledge and awareness of methodologies and practices used in establishing and sustaining a viable forage base on Alabama livestock farms
35	The number of TU participants with increased knowledge of improving and sustainably utilizing grazing lands
36	The number of TU participants with increased knowledge of ways to improve pastures and increasing grazing opportunity
37	The number of TU participants who increased knowledge of animal performance and health

38	The percent reduction in feeding costs as a result of adopting TU agricultural and forestry production systems recommendations
39	The number of Quantitative Trait Locus identified by TU researchers
40	Knowledge Gained in Herd Management Techniques
41	Participant adoption rate of the information over the next year
42	The number of acres impacted with increased management
43	Percent knowledge gain among in-service training participants about the use of temporary electric fencing
44	The number of On-farm adoption of the use of temporary fencing
45	Acres impacted by information presented at the 2018 Deep South Stocker Conference
46	Economic impact of Practical Ranch Management Workshop per head of cattle
47	Percentage of peach growers in Chilton County who plan to adopt measures to off set low chill accumulation

Outcome #1

1. **Outcome Measures**

   The number of new variety of crops developed

   Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

   The number of technologies developed for control and management of diseases

   Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

The number of best management practices adopted that ensure the sustainability of agricultural systems

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

The number of broiler producers with increased knowledge of of methods to reduce waste management issues on farms

Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

The number of participants with increased knowledge of horticultural production methods and marketing

Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

The number of participants who adopted row crop production practices that are sustainable

Not Reporting on this Outcome Measure

Outcome #7

1. **Outcome Measures**

The number of participants who adopted integrated pest management recommendations

Not Reporting on this Outcome Measure

Outcome #8

1. **Outcome Measures**

The number of pond owners with increased knowledge of pond function and management

Not Reporting on this Outcome Measure

Outcome #9

1. **Outcome Measures**

The number of participants who adopt water conservation best practices

Not Reporting on this Outcome Measure

Outcome #10

1. **Outcome Measures**

The number of livestock and equine farmers who adopt forage best management practices

Not Reporting on this Outcome Measure

Outcome #11

1. **Outcome Measures**

The number of livestock owners with increased producer knowledge on sustainability of production

Not Reporting on this Outcome Measure

Outcome #12

1. **Outcome Measures**

The number of participant with increased knowledge of Integrated Pest Management

Not Reporting on this Outcome Measure

Outcome #13

1. **Outcome Measures**

The number of best management practices adopted that ensure the sustainability of forestry production systems.

Not Reporting on this Outcome Measure

Outcome #14

1. **Outcome Measures**

The number of poultry producer who adopt litter management techniques

Not Reporting on this Outcome Measure

Outcome #15

1. **Outcome Measures**

The number of poultry industry personnel with increased knowledge in poultry house technology and management

Not Reporting on this Outcome Measure

Outcome #16

1. **Outcome Measures**

The number of catfish producers who adopt more efficient practices

Not Reporting on this Outcome Measure

Outcome #17

1. **Outcome Measures**

The number of catfish producers who use hybrid catfish production

Not Reporting on this Outcome Measure

Outcome #18

1. **Outcome Measures**

The number of livestock owners with increased knowledge on proper animal care

Not Reporting on this Outcome Measure

Outcome #19

1. **Outcome Measures**

The number of participant with increased knowledge of Plasticulture

Not Reporting on this Outcome Measure

Outcome #20

1. **Outcome Measures**

The number of participant with increased knowledge of Organic Farming

Not Reporting on this Outcome Measure

Outcome #21

1. **Outcome Measures**

The number of participant with increased knowledge of Forest Management

Not Reporting on this Outcome Measure

Outcome #22

1. **Outcome Measures**

The number of participant with increased knowledge of Animal Management

Not Reporting on this Outcome Measure

Outcome #23

1. **Outcome Measures**

The number of pond owners who adopt pond management best practices

Not Reporting on this Outcome Measure

Outcome #24

1. **Outcome Measures**

The number of participants who increased knowledge in angler education

Not Reporting on this Outcome Measure

Outcome #25

1. **Outcome Measures**

The number of participants with increased knowledge of fisheries management

Not Reporting on this Outcome Measure

Outcome #26

1. **Outcome Measures**

Increased knowledge of sheep selected for evaluation

2. **Associated Institution Types**

- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Three (3) consecutive grazing periods were successfully completed. At the end of each period, at least three lambs and a similar number of goats in each group were selected for slaughter and carcass evaluation.

What has been done

Throughout three (3) consecutive grazing periods, over 200 animals (sheep and goats) were used for achieving the following project objectives: (1) to study the growth and health of small ruminants in a loblolly pine based silvopasture system in comparison to a conventional open grazing system; (2) to assess environmental sustainability of small ruminant production in a loblolly pine based Silvopasture system; (3) to identify and introduce suitable combinations of cool-season grasses and legumes to enhance the traditional warm-season pastures in North Alabama; (4) to compare the productivity, quality, and production.

Results

AAMU The experimental design of the study was revised; (ii) Lack of rainfall in June, July and August in 2016 and 2017; (iii) Carcasses were not evaluated; (iv) A few animals in each group were killed by Coyotes. As a result, an additional guard dogs were used in the project to enhance security at the study's site.

4. Associated Knowledge Areas

KA Code	Knowledge Area
311	Animal Diseases

Outcome #27

1. Outcome Measures

Development of new varieties of crops, new breeds of animals and stocks of poultry or aquaculture species.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

For sustainable production, there is a need to develop new cultivars best suited for production in Alabama, including those with enhanced yield and drought-tolerance, and resistance to pests and diseases.

What has been done

Peanut genotypes and hybrids were evaluated for yield, TSWV resistance, leaf spot tolerance, oleic acid content as well as size and shelling characteristics. Foundation seeds of a new runner type peanut cultivar 'AU-NPL 17" were increased, and in 2019 certified seeds will be produced for peanut farmers for the 2020 growing season. Performance testing for two new promising advanced peanut breeding lines 'AU16-28' and 'AU18-21' concluded in 2018. Identification of QTL?s for reniform nematode resistance in cotton were initiated. On-going evaluations of cotton breeding lines and different specialty crop cultivars and selections of blackberry, blueberry, citrus, and kiwifruit were performed.

Results

Advanced breeding lines ('AU16-28' and 'AU18-21') are moving to foundation seed production for release in 2019. These lines are unique from other commercial runner-type peanut cultivars in having a high yield, high TSMK, good seed size, high oleic, medium maturity with the same maturity as Georgia Green. Two QTL's were identified from cotton varieties that contribute the most to the known reniform nematode resistance from the line GB 713. Sister lines of GB 713 developed under this project have the markers related to these QTLs, and have high yield performance, good fiber properties with some resistance to reniform nematode. Patent for ?AU Gulf Coast Gold?, the 6th kiwifruit cultivar patented from this program <10 years, was received.

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems

Outcome #28

1. Outcome Measures

Development of technologies for control and management of plant diseases, pests, and animal diseases

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	4

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

In Alabama and other parts of the humid Southern U.S., crop production is severely limited by a myriad of insect pests and pathogens. Development of effective control and management practices for pests and diseases is critical to ensure profitability of Alabama?s agricultural enterprise.

What has been done

Multiple projects evaluated isolates or strains of plant pathogens for resistance and pathogenicity. New methods for monitoring, predicting and managing insect pests were evaluated. A CRISPR/Cas9 ribonucleoprotein gene editing system for Fusarium was developed. Rhizobacteria were evaluated for growth promotion and implications for below ground pests in grasses. Multiple rhizobacteria isolates for were evaluated for biocontrol of Xanthomonas perforans in tomato.

Results

The plasmid containing the Fusarium optimized Cas9 protein has been deposited to the repository Addgene (plasmid ID 112065) for other researchers to request and use. Two patents were filed using rhizobacteria for growth promotion and pest management in turf and pasture grasses. A top-performing biocontrol agent, Burkholderia gladioli C101, was able to reduce X. perforans disease severity in tomato by about 90% compared to water-treated plants, even among copper resistant isolates of X. perforans. Cell free solutions contain secondary metabolites responsible for the biocontrol effect. Some Burkholderia species (like B. cepacia) can be opportunistic human pathogens particularly among immunocompromised individuals. Heat-treatment kills cells of B. gladioli C101 but secondary metabolites are heat-resistant.

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems

Outcome #29

1. Outcome Measures

Adoption of row crop production practices that are sustainable and profitable

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Crop rotation and nitrogen management practices can make agricultural production more efficient and profitable. There is a need for increased knowledge and adoption of row crop management practices conducive for profitability and sustainability under changing climatic conditions by Alabama producers and stakeholders.

What has been done
The CERES-Rice model was evaluated for cool season rice in North China and used to determine long term optimum nitrogen rates. A three-year crop rotation of cotton, corn, soybean was evaluated for reproductive factors of Root-knot nematode, Meloidogyne incognita.

Results
Long-term optimum nitrogen rates were found to be 60 kg/ha less than farmer?s current practices for cool-season rice production in North China. Crop rotation may reduce M. incognita race 3 population levels even though the rotation crop is a susceptible host.

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems

Outcome #30

1. Outcome Measures

Increase in knowledge of AU researchers related to integrated pest management

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	4

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Development of effective control and management practices for pests and diseases is critical to ensure profitability of Alabama?s agriculture enterprise.

What has been done
Researchers documented the impacts of pests and pathogens on row crops, turfgrass,

ornamental crops, fruits, and organic vegetables. A survey was conducted to examine parasitism and species composition of native parasitoids attacking egg masses of brown marmorated stink bugs (BMSB), a new invasive stink bug, and kudzu bugs in Alabama. Studies were conducted with Japanese beetles to investigate variation in the activities of detoxification enzymes. We made breakthrough discoveries in 2018 on the anti-microbial activities in termites, particularly the activities depressing multi-drug resistant bacteria (MDRs).

Results

Ten native parasitoids were found to attack and suppress BMSB populations with parasitism ranging from 30 to 42%. One parasitoid species found is the first known occurrence of this species attacking BMSB in North America. For kudzu bugs, one parasitoid accounts for 80% of parasitized eggs. Plant pathologists were the first to report cotton leafroll dwarf virus in 2018. This virus transmitted by cotton aphids causes loses up to 80% where it occurs in S. America. Studies with Japanese beetles provide new insights for the development of target specific controls for an invasive and polyphagous pest. We provide the first evidence that termites possess constitutive and inducible proteins against human bacterial pathogens and will contribute to development of novel drugs for MDR-diseases, the disease pathogen affecting millions of people and animals.

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems

Outcome #31

1. Outcome Measures

Development of new breeds of animals and stocks of poultry or aquaculture

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

There is need to develop new animal strains that are more robust under commercial conditions.

What has been done
Three hybrids lines had been developed that have shown promise for improved performance under commercial conditions.

Results
Three hybrids lines had been developed that have shown promise for improved performance under commercial conditions.

4. Associated Knowledge Areas

KA Code	Knowledge Area
311	Animal Diseases

Outcome #32

1. Outcome Measures

Increase broiler producer awareness of methods to improve waste and litter management on farms

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	1100

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Poultry production is a critical economic driver in Alabama and much of the Southeastern U.S. Training farmers on proper waste and litter management as well as house management is crucial.

What has been done
Researchers have examined factors such as optimal windspeed, house heating, litter management, and water utilization.

Results
Several studies have been conducted to demonstrate optimal wind speeds, heating, litter treatments to improve management practices. Off campus, one commercial poultry farm has been setup for a rainwater capture system data collected from this is still being collected.

4. Associated Knowledge Areas

KA Code	Knowledge Area
311	Animal Diseases

Outcome #33

1. Outcome Measures

Increase the knowledge of catfish producers in more efficient practices and expand the use of hybrid catfish in production.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	358

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Catfish producers in the southeast are under continuous pressure to reduce costs in the face of rising global imports. Use of hybrid catfish has been demonstrated to lead to higher filet yields, decreased loss due to disease, and improved production efficiencies in general.

What has been done
Researchers are examining specific combining abilities of the two species which are used to make the hybrid, the channel catfish and blue catfish. They are also investigating innovative systems which allow for higher per acre yields. Work is being conducted to improve efficiency of hybrid production by utilizing cryopreservation of blue catfish gametes.

Results
Use of the hybrid catfish continues to expand in the SE. Some estimates place hybrid usage at approximately 65% of the industry in 2018. Researchers continue to evaluate and work toward the release of improved broodstock for use in hybrid production. This is being further bolstered by development of a more efficient cryopreservation method for gametes.

4. Associated Knowledge Areas

KA Code	Knowledge Area
502	New and Improved Food Products

Outcome #34

1. Outcome Measures

Increase knowledge and awareness of methodologies and practices used in establishing and sustaining a viable forage base on Alabama livestock farms

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	582

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Southeastern cattle producers are working towards an ideal forage bases for cow-calf operations. Producers can command higher profits if their pastures can support longer grazing periods. In order to support this need, improved forage management is needed.

What has been done
Researchers are examining various forage bases, fertilization regimes, supplements, and rotational strategies that would reduce dependence on concentrated feedstuffs.

Results
Co planting of warm weather grasses with legumes was shown to be an alternative to current practices.

4. Associated Knowledge Areas

KA Code	Knowledge Area
302	Nutrient Utilization in Animals

Outcome #35

1. Outcome Measures

The number of TU participants with increased knowledge of improving and sustainably utilizing grazing lands

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	233

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Ruminant livestock production in Alabama is based on pastures and other grazing lands. Highly productive and quality pastures and vegetation in other grazing lands persisting throughout a year or most of the year is important for profitable livestock enterprises. However, most small and limited resource farmers are still lacking good pastures and grazing lands as well as skills and knowledge to manage their resources well to sustain their animals throughout the year. Research and research-based education are needed to improve this situation.

What has been done
Research conducted to promote the sustainable use of woodlands for expanding grazing opportunity for small ruminants and increasing the overall benefits of the whole system. Research findings published and disseminated to the scientific community, Extension professionals, students, farmers, and landowners. Five educational events (trainings, field days, site tours, demonstrations, and hands-on activities) conducted to educate the target audience on improving and sustainably utilizing grazing lands (pastures, pastures with natural and/or planted browse species, silvopastures, and woodlands). Studies conducted to assess the impact of educational events conducted over the past many years.

Results
Lowering the height of woodland vegetation (≤5 ft.) increased the light influx to the woodland floor (4-16 times) and vegetation biomass (36-106%) significantly ($p<0.0001$). This also increased the utilization of understory vegetation by small ruminants, with most utilization of vegetation present in areas where vegetation was at lower heights versus the control ($p<0.0001$). Browsing was the predominant feeding behavior of Kiko wethers (39% browsing vs. 4% grazing) and grazing was for Katahdin rams (24% grazing vs. 12% browsing). Goats browsed to the average height of 5.25 ft. and sheep to 3.67 ft. Event participants (233) increased their knowledge on improving and sustainably utilizing grazing lands (24%, $p<0.05$). Impact of the past educational events was significant on improving pastures and increasing grazing opportunity (96%), animal performance and health (67-69%), soil quality (89%), and farm incomes (67%). Similarly, respondents reported reduced feeding costs (81%) and labor (69%).

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems
311	Animal Diseases

Outcome #36

1. Outcome Measures

The number of TU participants with increased knowledge of ways to improve pastures and increasing grazing opportunity

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	223

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Ruminant livestock production in Alabama is based on pastures and other grazing lands. Highly productive and quality pastures and vegetation in other grazing lands persisting throughout a year or most of the year is important for profitable livestock enterprises. However, most small and limited resource farmers are still lacking good pastures and grazing lands as well as skills and knowledge to manage their resources well to sustain their animals throughout the year. Research and research-based education are needed to improve this situation.

What has been done
Research conducted to promote the sustainable use of woodlands for expanding grazing opportunity for small ruminants and increasing the overall benefits of the whole system. Research findings published and disseminated to the scientific community, Extension professionals, students, farmers, and landowners. Five educational events (trainings, field days, site tours, demonstrations, and hands-on activities) conducted to educate the target audience on improving and sustainably utilizing grazing lands (pastures, pastures with natural and/or planted browse species, silvopastures, and woodlands). Studies conducted to assess the impact of educational events conducted over the past many years.

Results
Impact of the past educational events was significant on improving pastures and increasing

grazing opportunity (96%)

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems
302	Nutrient Utilization in Animals

Outcome #37

1. Outcome Measures

The number of TU participants who increased knowledge of animal performance and health

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	161

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Ruminant livestock production in Alabama is based on pastures and other grazing lands. Highly productive and quality pastures and vegetation in other grazing lands persisting throughout a year or most of the year is important for profitable livestock enterprises. However, most small and limited resource farmers are still lacking good pastures and grazing lands as well as skills and knowledge to manage their resources well to sustain their animals throughout the year. Research and research-based education are needed to improve this situation.

What has been done
Research conducted to promote the sustainable use of woodlands for expanding grazing opportunity for small ruminants and increasing the overall benefits of the whole system. Research findings published and disseminated to the scientific community, Extension professionals, students, farmers, and landowners. Five educational events (trainings, field days, site tours, demonstrations, and hands-on activities) conducted to educate the target audience on improving and sustainably utilizing grazing lands (pastures, pastures with natural and/or planted browse species, silvopastures, and woodlands). Studies conducted to assess the impact of educational

events conducted over the past many years.

Results
Impact of the past educational events was significant on animal performance and health (69%).

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems
302	Nutrient Utilization in Animals

Outcome #38

1. Outcome Measures

The percent reduction in feeding costs as a result of adopting TU agricultural and forestry production systems recommendations

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	81

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Ruminant livestock production in Alabama is based on pastures and other grazing lands. Highly productive and quality pastures and vegetation in other grazing lands persisting throughout a year or most of the year is important for profitable livestock enterprises. However, most small and limited resource farmers are still lacking good pastures and grazing lands as well as skills and knowledge to manage their resources well to sustain their animals throughout the year.

What has been done
Research conducted to promote the sustainable use of woodlands for expanding grazing opportunity for small ruminants and increasing the overall benefits of the whole system. Research findings published and disseminated to the scientific community, Extension professionals,

students, farmers, and landowners. Five educational events (trainings, field days, site tours, demonstrations, and hands-on activities) conducted to educate the target audience on improving and sustainably utilizing grazing lands (pastures, pastures with natural and/or planted browse species, silvopastures, and woodlands). Studies conducted to assess the impact of educational events conducted over the past many years.

Results

Participants experienced a significant reduction in feeding costs(81%) as a results of adopting TU research and extension recommendations.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
502	New and Improved Food Products
601	Economics of Agricultural Production and Farm Management

Outcome #39

1. Outcome Measures

The number of Quantitative Trait Locus identified by TU researchers

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

As peanut is an important oilseed crop that is grown extensively over three continents and has economic importance to the crops of southern Alabama, there is importance on rendering gene altering techniques effective and efficient in mitigating disease. Late leaf spot (LLS) is a major foliar disease in peanut (A. hypogaea L.) worldwide, causing significant losses of potential yield in

the absence of fungicide applications. Because multiple genes control resistance to leaf spot diseases, conventional breeding is a time-consuming approach for pyramiding resistance genes into a single genotype.

What has been done

Research was conducted on improving the genetics of LLS resistance. The research team generated a large number of Single nucleotide Polymorphisms (SNPs) through genotyping by sequencing (GBS) and constructing a high-resolution map among 2,753 SNP markers distributed on 20 linkage groups. Also, the mutant line M14 was derived from cultivar Yuanza 9102. Yuanza 9102 was selected from an interspecific cross of cultivar Baisha 1016 with A. diogoi, and is resistant to several fungal diseases. By contrast, the M14 was highly susceptible to late leaf spot.

Results

Quantitative Trait Locus mapping (QTL) has revealed that major QTLs within a confidence interval could provide an efficient way to detect putative resistance genes. Analysis of the interval sequences has indicated that a major QTL for resistance to LLS on chromosome B05. Two major QTLs located on chromosomes A03 and B04 were associated with resistance genes for early leaf spot. Sequences within the confidence interval would facilitate identifying resistance genes and applying marker-assisted selection for resistance. Additional results suggest that down-regulated chloroplast genes, up-regulated WRKY transcription factors, and depressed plant hormones related to plant growth in the M14 might coordinately render the susceptibility though there was a significantly high level of pathogenesis-related proteins (PRs). Those negative effectors might be triggered in the susceptible plant by fungal infection and resulted in reduction of photosynthesis and phytohormones and led to symptom formation.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources
206	Basic Plant Biology

Outcome #40

1. Outcome Measures

Knowledge Gained in Herd Management Techniques

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	3148

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Herd Health Management is a issue with new and nontraditional audiences.

What has been done
Participants engaged in a series of herd management workshops

Results
Results from 25 participant responses in one meeting are as follows: 45% of the farmers began using cydectin to decrease parasite problems; 25% began routine vaccinations as a means of preventing infections; 35% reported an increase in their knowledge on herd health and parasites problems and 30% reported an increase in their knowledge of how to properly trim a goat hoof.

4. Associated Knowledge Areas

KA Code	Knowledge Area
311	Animal Diseases

Outcome #41

1. Outcome Measures

Participant adoption rate of the information over the next year

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	87

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Alabama has experienced significant growth in the poultry industry over the last several years. Currently, there are
815 large concentrated animal feeding operations (CAFO's). These 815 farms alone may produce over 1.2 million
tons of poultry litter that must be land applied correctly, utilizing the most current best management practices. These
practices will ensure that water quality is protected, to the extent possible, through the proper use of litter as a
source of nutrients.

What has been done
Growers attending the workshops/trainings in 2018 indicated on evaluations that 87% of those in attendance were likely or very likely to adopt some of the practices discussed in the training.

Results
Growers attending the workshops/trainings in 2018 indicated on evaluations that 87% of those in attendance
were likely or very likely to adopt some of the practices discussed in the training.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships

Outcome #42

1. Outcome Measures

The number of acres impacted with increased management

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	1598

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Alabama has experienced significant growth in the poultry industry over the last several years. Currently, there are
815 large concentrated animal feeding operations (CAFO's). These 815 farms alone may produce over 1.2 million
tons of poultry litter that must be land applied correctly, utilizing the most current best management practices. These
practices will ensure that water quality is protected, to the extent possible, through the proper use of litter as a
source of nutrients.

What has been done
Growers attending the 8 workshops/trainings in 2018 indicated that 15,982 acres will see an increase in management.

Results
Growers attending the 8 workshops/trainings in 2018 indicated that 15,982 acres will see an increase in management.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships

Outcome #43

1. Outcome Measures

Percent knowledge gain among in-service training participants about the use of temporary electric fencing

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	38

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Improved grazing management can increase the sustainability of livestock systems in Alabama through the reduction of stored feed use, and better land use efficiency.

What has been done
A statewide effort among Alabama Extension Animal Science and Forage Regional Extension Agents and USDA NRCS staff was initiated to increase awareness and skills related to using temporary fencing in livestock operations to improve forage utilization. Two in-service trainings were conducted at Auburn University outlying research units with Extension and NRCS staff to train-the-trainer on methods related to temporary fencing. Five temporary fencing kits were then distributed among the teams for use in on-farm demonstrations that were initiated in fall 2018.

Results
There was a 38% increase in knowledge among Alabama Extension Animal Science and Forage Agents and USDA NRCS staff regarding how to use temporary fencing after these in-service trainings.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #44

1. Outcome Measures

The number of On-farm adoption of the use of temporary fencing

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
On-farm demonstrations related to improved grazing management practices may help producer understanding and facilitate adoption of these technologies in their operations.

What has been done
Five temporary fencing kits were distributed among Alabama Extension Animal Science and Forage Regional Extension Agents and USDA NRCS staff for use in on-farm demonstrations. Producers who received a kit were allowed to use the kit for one season, and then had the option to return the kit or purchase it for replacement value. Demonstrations were initiated in fall 2018.

Three of the five participants indicated that they would like to purchase the kits, and would continue to use this technology within the first month of the demonstration.

Results
Three of the five producers who received temporary fencing grazing kits in fall 2018 indicated that they would like to purchase the kit for its replacement value, and planned to continue using this technology on their farm in the future. This decision occurred within the first month of using the kit.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #45

1. Outcome Measures

Acres impacted by information presented at the 2018 Deep South Stocker Conference

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	23920

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The Deep South Stocker Conference is a joint-effort among Auburn University, Mississippi State University, and the University of Georgia. The conference is held every year and rotates among these states. The target audience is stocker/backgrounder producers seeking up-to-date management information related to calf nutrition, health, and economics.

What has been done
The Deep South Stocker Conference was held in Greensboro, AL. This region was chosen because there is a high concentration of stocker operations in West Alabama. A one-day educational conference was held to provide health, nutrition, and marketing updates to stocker/backgrounder producers prior to peak cattle purchasing/development season.

Results
There were 115 participants at the conference with an average of 208 acres per farm represented. Total acres reached by information presented at the program was 23920 acres.

Participants tended to have larger operations and had been in the industry an average of 15 years.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems
302	Nutrient Utilization in Animals

Outcome #46

1. Outcome Measures

Economic impact of Practical Ranch Management Workshop per head of cattle

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	386

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Hands-on workshops for livestock producers may improve application of recommended management strategies for enhancing market value of weaned beef calves.

What has been done
A Practical Ranch Management Workshop was hosted in Atmore, AL to teach producers skills related to dehorning, castration, implanting, vaccinations, nutritional management, and herd decision making. Participants had the opportunity to practice each of the described techniques and learned the principles behind these best management practices.

Results
Participants reported an average economic impact of $386 per head of livestock. There were 2,050 head of cattle reached by the program, for a total economic impact of $791,300.

4. Associated Knowledge Areas

KA Code	Knowledge Area

205	Plant Management Systems
302	Nutrient Utilization in Animals
311	Animal Diseases
601	Economics of Agricultural Production and Farm Management

Outcome #47

1. Outcome Measures

Percentage of peach growers in Chilton County who plan to adopt measures to off set low chill accumulation

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	20

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Many areas lack sufficient chill hours to alleviate dormancy in peach trees. Each peach variety has a certain chill requirement that has to be satisfied in order for their to be proper bud break, flower development and fruit set. Reduced chill accumulation has become an issue and predicted to occur more regularly. In 2017, many growers sustained losses of 75%-90% of their peach crop. The most effective chemical and/or physical methods to encourage dormancy alleviation are needed. This will require research over an extended period of time to develop a protocol when the issue of lack of chilling arises.

What has been done
Research designed to determine the efficacy of rest breaking compounds to alleviate dormancy in peach continues. Research findings were presented during the peach session of the AFVGA, which was initiated during the previous year. Attendees of the peach session were informed of the most effect dormancy breaking compounds available and when to apply them. These research findings were also shared

Results
69% of the audience stated that they plan to adopt recommendations concerning issues of dormancy provided by Extension.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

TU Research: Sustainable Livestock Production: Knowledge on managing and utilizing woodlands for grazing small ruminants increased significantly, especially on lowering the vegetation heights (5 ft.) for increasing light influx, understory-vegetation biomass, and biomass utilization ($p<0.0001$). 233 participants increased knowledge and skills on improving and utilizing grazing lands ($p<0.05$). Impact was significant on improving pastures and increasing grazing opportunity, animal performance and health, and farm incomes. Respondents reduced feeding costs (81%) and labor (69%).
TU Extension: Quantitative Trait Locus mapping revealed major QTLs within a confidence interval could provide an efficient way to detect putative resistance genes. Analysis indicates a major QTL for resistance to LLS on chromosome B05. Two major QTLs located on chromosomes A03 and B04 were associated with resistance genes for early leaf spot. Down-regulated chloroplast genes, up-regulated WRKY transcription factors, and depressed plant hormones related to plant growth in the M14 might coordinately render the susceptibility.
AU Ext Sustainable Livestock Production Systems The total economic impact was $783,584 based on an estimated $194/head savings. The 2018 Deep South Stocker Conference had 115 in attendance for the program. Average farm size of participants at the meeting was 208 acres and 129 head of cattle per operation with an economic impact of $6,450/farm.
AU Ext- Alabama Beginning Farmers - Farming success rate= 64%, Business/Marketing/Food Safety Plans developed = 70 farms Service value total = $506,363, Crop value improved/saved = $2.4 million.
AAMU Ext. Parasite and Health Management to Promote Goat and Sheep Herd Sustainability Results from 25 participant responses in one meeting are as follows: 45% of the farmers began using cydectin to decrease parasite problems; 25% began routine vaccinations as a means of preventing infections; 35% reported an increase in their knowledge on herd

health and parasites problems and 30% learned how to properly trim a goat hoof.
AAMU research The Modeling the Impacts of Climate Change, Population Growth, and Land Use Change on Water Availability in Tennessee River Basin study reviewed the main feature of the present climate of the MTEW and its environment focusing on the vast area of the southeast and its variability, annual seasonal (JJA) and annual cycle timescales. Precis RCM is sensitive to the choice of driving GCM Suggesting a careful selection of driving data based on the current performance for the use of future climate impact assessment
AU Crop Production Systems: The newly released peanut cultivar, 'AU-NPL 17', is increasing the foundation seed supply in 2019, with release expected in 2020. Two drought resistant lines ('AU16-28' and 'AU18-21') will be under farm trial in 2019. .**AU Livestock Production Systems:** Work on alternative forage systems and fertilizers has demonstrated that lower cost approaches can substantially reduce cost per gain. Improved forage bases translates into longer cattle growout in the Southeast region and improved economic returns.

Key Items of Evaluation

TU Research: Sustainable Livestock Production: Knowledge on managing and utilizing woodlands for grazing small ruminants increased significantly, especially on lowering the vegetation heights (5 ft.) for increasing light influx, understory-vegetation biomass, and biomass utilization ($p<0.0001$). 233 participants increased knowledge and skills on improving and utilizing grazing lands ($p<0.05$). Impact was significant on improving pastures and increasing grazing opportunity, animal performance and health, and farm incomes. Respondents reduced feeding costs (81%) and labor (69%).
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V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Natural resource conservation and management, environmental sustainability, and climate change

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	0%	0%	15%	8%
111	Conservation and Efficient Use of Water	0%	25%	8%	5%
112	Watershed Protection and Management	5%	0%	14%	5%
122	Management and Control of Forest and Range Fires	5%	0%	0%	5%
123	Management and Sustainability of Forest Resources	5%	0%	2%	3%
125	Agroforestry	5%	25%	0%	10%
131	Alternative Uses of Land	5%	0%	0%	3%
132	Weather and Climate	5%	25%	7%	7%
133	Pollution Prevention and Mitigation	5%	0%	6%	5%
134	Outdoor Recreation	5%	0%	0%	5%
135	Aquatic and Terrestrial Wildlife	5%	0%	23%	5%
136	Conservation of Biological Diversity	5%	0%	2%	2%
201	Plant Genome, Genetics, and Genetic Mechanisms	5%	0%	10%	5%
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	5%	0%	1%	5%
304	Animal Genome	5%	0%	0%	2%
402	Engineering Systems and Equipment	5%	0%	1%	5%
403	Waste Disposal, Recycling, and Reuse	10%	0%	0%	3%
601	Economics of Agricultural Production and Farm Management	5%	10%	9%	7%
610	Domestic Policy Analysis	10%	0%	2%	5%
903	Communication, Education, and Information Delivery	5%	15%	0%	5%
	Total	100%	100%	100%	100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2018	Extension		Research	
	1862	1890	1862	1890
Plan	37.5	8.3	81.0	7.3
Actual Paid	36.3	9.4	33.0	6.3
Actual Volunteer	0.0	0.0	0.0	0.0

2. Institution Name: Auburn University

Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
1189055	0	1479924	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1044287	0	1491801	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
5860848	0	5501078	0

2. Institution Name: Alabama A&M University

Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	323461	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	323461	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

2. Institution Name: Tuskegee University

Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	170437	0	477583
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	140646	0	435722
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

TU Assessment of Global Climate Change Impacts-The Global Climate Change Impact Program (1) assessed projected magnitude of climate change on crop yields and water resources in Alabama for the years 2045 and 2075; (2) 27 extreme climate indices were computed and analyzed from daily temperature and precipitation data obtained the NOAA; (3) developed and identified adaptations strategies for Corn and Soybean production in various counties in Alabama
TU Sustainable Management of Forest and Range Land within Black Belt Counties- This program was executed to assist limited resource landowners in the sustainable management of their timber resource and provide underserved landowners with the knowledge needed to make informed decisions in managing their forest, wildlife and natural resources for profit and inheritance. Landowners were educated through workshops, conferences, and site visitations to allow for a change in knowledge and anticipated change in behavior. Youth were also targeted as future natural resource managers and professionals.
AU Forest Business Resources The focus of this project is to enhance the livelihoods of the citizens of Alabama through the betterment of forest management, business practices, and increased opportunities for producing income. Further, this project educates landowners on the benefits of healthy forests and how practicing forest management can not only enhance the health and resiliency of forests but also enhance opportunities to generate income from forests that can potentially be used to support the costs of forest management practices.
AAMU Flint Creek Water Quality -The research will establish baseline data to characterize the water quality of the FCW by determining the presence of fecal indicator bacteria and identify the impacts of physiochemical parameters, which may serve as drivers to the presence of Escherichia coli, Enterococcus faecalis, and Pseudomonas aeruginosa.
AAMU Impact of Climate Change on Tennessee River Basin water availability- The overall goal of this project is to create a scalable model for predicting the impacts of climate change, population growth, and land use change on water availability at a local level.
Urban Green- The Urban Green Program is designed to engage and educate clientele about sustainable urban best management practices, enhance management of urban landscapes, and promote practices that increase environmental sustainability.
The AAMU/ACES E-Waste Institute educates, trains, and influence public policies about safe environmental practices for electronic waste. It focuses on efforts that advance the knowledge, skills, and abilities to reduce electronic waste in the global environment.
AU Climate Variability and Change research assessed drought severity and trends in southeast US; and effects of irrigation pumping during droughts on stream-aquifer flux**. AU Harmful Algal Bloom:** Cyanobacteria abundance and toxicity in waterbodies in southeastern US were quantified. **AU Ecological Sustainability** research (1) determined impact of manure on P and N loss; and investigated biochars. **AU Aquaculture and Sportfish Production** research determined effect of liming and fertilization on sportfish

production.

2. Brief description of the target audience

Assessment of Global Climate Change Impacts targets underserved and/or limited resource landowners, farmers, well owners, students, and the general public within the Alabama Black Belt counties.
Sustainable Management of Forest and Range Land within Black Belt Counties- targets underserved and/or limited resource non-industrial forest and agricultural landowners, students, and the general public.
Forest Business Resources targets audiences are private forest landowners, natural resource professionals, educators, and citizens of Alabama.
Flint Creek Water Quality targets stakeholders, regulators and watershed coordinators
AAMU Impact of Climate Change on Tennessee River Basin research targets stakeholders, regulators and watershed coordinators.
Urban Green targets new and nontraditional urban stakeholders.
AAMU E-Waste targets youth, educators, volunteers, homeowners, business owners, citizens, other professionals and the general public.
AU Climate Variability and Change/ AU Harmful Algal Bloom (HAB)/ AU Environmental and Ecological Sustainability: Conservation planners, water resources managers, water utilities, Extension specialists, researchers, policy makers, and general public. **AU Aquaculture and Sportfish Production:** State of Alabama Marine and Freshwater Fisheries Departments, Extension specialists, researchers, aquaculture producers, sportfish pond owners, and general public.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	96831	71422	58470	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year:	2018
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	51	56	107

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- The number of peer-reviewed papers
  Not reporting on this Output for this Annual Report

Output #2

Output Measure

- The number of dissertations and thesis
  Not reporting on this Output for this Annual Report

Output #3

Output Measure

- The number of graduate students trained
  Not reporting on this Output for this Annual Report

Output #4

Output Measure

- The number of curricula developed
  Not reporting on this Output for this Annual Report

Output #5

Output Measure

- The number of graded facilities and computing cluster at the Geospatial and Climate Change Center
  Not reporting on this Output for this Annual Report

Output #6

Output Measure

- The number of workshops on climate change variability
  Not reporting on this Output for this Annual Report

Output #7

Output Measure

- The number of Rural well owners and homeowners who participate in water well quality programs
  Not reporting on this Output for this Annual Report

Output #8

Output Measure

- The number of Underserved Black Belt students who participate in natural resource management programs
  Not reporting on this Output for this Annual Report

Output #9

Output Measure

- The number of natural resources management workshops
  Not reporting on this Output for this Annual Report

Output #10

Output Measure

- Number of E-waste Institute program activities.

Year	Actual
2018	18

Output #11

Output Measure

- Number of electronic recycling drives conducted.

Year	Actual
2018	7

Output #12

Output Measure

- Number of participants in e-waste recycling events.

Year	Actual
2018	386

Output #13

Output Measure

- Number of printer cartridges recycled through small electronics recycling program.

Year	Actual
2018	354

Output #14

Output Measure

- The number of Dissertations and thesis by graduate students on the research.

Year	Actual
2018	2

Output #15

Output Measure

- Enhanced curricula development for graduate and undergraduate studies in the areas of environmental and climate change, modeling, geospatial information systems

Year	Actual
2018	6

Output #16

Output Measure

- Established environmental and climate base line conditions for assessing climate change impacts for various environmental and agricultural variables

Year	Actual
2018	3

Output #17

Output Measure

- Number of Alabama Water Watch Workshops Conducted

Year	Actual
2018	102

Output #18

Output Measure

- Number of Assessment of Global Climate Change Impacts on Water Resources and Crop Productivity enhanced curricula developed for graduate and undergraduate studies

Year	Actual
2018	3

Output #19

Output Measure

- Number of calibrated hydrologic (SWAT) model running simulations

Year	Actual
2018	1

Output #20

Output Measure

- Number of Urban Home Grounds Scheduled Activities

Year	Actual
2018	251

Output #21

Output Measure

- Number of reached with Urban Home Grounds Programming

Year	Actual
2018	22043

Output #22

Output Measure

- Number of Individuals reached with the Urban Green Program

Year	Actual
2018	10116

Output #23

Output Measure

- Number of adults engaged with Urban Green

Year	Actual
2018	4499

Output #24

Output Measure

- Number of youth engaged with Urban Green

Year	Actual
2018	5617

Output #25

Output Measure

- Number of minorities engaged with Urban Green

Year	Actual
2018	6386

Output #26

Output Measure

- The number of Sustainable Management of Forest and Range Land within Black Belt workshops

Year	Actual
2018	8

Output #27

Output Measure

- Number of Sustainable Management of Forest and Range Land within Black Belt Counties Forest camps

Year	Actual
2018	4

Output #28

Output Measure

- Number of Sustainable Management of Forest and Range Land within Black Belt Counties Conferences

Year	Actual
2018	1

Output #29

Output Measure

- Number of Sustainable Management of Forest and Range Land within Black Belt Counties onsite advice

Year	Actual
2018	18

Output #30

Output Measure

- Number of Sustainable Management of Forest and Range Land within Black Belt Counties participants

Year	Actual
2018	220

Output #31

Output Measure

- The number of community food gardens managed and/or supported by Master Gardener volunteers

Year	Actual
2018	13

Output #32

Output Measure

- number of hours on civic beautification projects (supporting local community economic development)

Year	Actual
2018	42065

Output #33

Output Measure

- number of volunteer hours spent delivering public education activities (workshops, Ask an MG, Helpline, etc.)

Year	Actual
2018	78920

Output #34

Output Measure

- Number of workshops in chainsaw safety, arborist certification, and tree care and management.

Year	Actual
2018	39

Output #35

Output Measure

- Number of people attending the community forestry workshops in 2017.

Year	Actual
2018	1812

Output #36

Output Measure

- The number of oysters produced

Year	Actual
2018	123271

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	The number of participants who adopted improved agricultural practices to reduce carbon footprint
2	The number of participants who adopt improved agricultural practices designed to increase carbon sequestration
3	The number of crop varieties identified that adapt to a changing environment
4	The number of participants who adopt organic grown fruit and vegetable production practices
5	The number of poultry farmer who increased knowledge of new housing and equipment changes and techniques
6	The number of farmers with increased knowledge of farm succession methods
7	The number of participants with increased knowledge of forages in animal production systems
8	The number of participants who adopt rainwater collection best practices
9	The number of participants who increase skills related to water conservation
10	Increase number of acres of rainwater irrigated fruits and vegetables
11	The number of urban participants who adopt electronic waste management best practices
12	The number of urban participants who increased knowledge of urban environmental management best practices
13	The number of participants who adopt IPM recommendations
14	The number of urban residents with increased knowledge on the impact of household hazards on the environment
15	The number of row crops and vegetables producers who adopt agronomic management best practices
16	The number of youth who increased knowledge of well head protection
17	The number of animal stocks identified that can adapt to a changing environment

18	The number of youth with increased knowledge of environmental stewardship best practices
19	The number of adults who adopt environmental stewardship best practices
20	Quantity of e-waste (pounds) recycled by citizens practicing improved environmental stewardship leading to a cleaner, safer environment
21	The number of Urban Green participants with increased knowledge
22	Increased knowledge of Small RNA?s as Novel Regulatory Switches in the Envelope Stress Response in Eschericia coli
23	Increase knowledge of reniform nematode infestation in cotton fields.
24	The number of black belt landowners with increased knowledge of estate planning and managing forest resources
25	The number of black belt landowners who adopted estate planning recommendations
26	Percent of interns who feel confident distinguishing between abiotic and biotic garden/landscape problems
27	Percent of interns who are using their new knowledge of plant life cycles for more efficient use of fertilizers
28	Number of participants that implement a practice or use a skill that they learned towards forest management and earning income from their forestland
29	Increase in participants who implement a practice or use a skill that they learned in one of our workshops to improve the health and productivity of their forestland and their quality of life.
30	Number of forage (hay/pastureland) acres impacted by Alabama Grazing Academy
31	Percent increase in knowledge of Alabama Grazing Acadmey participants
32	Acres of oyster reef restored
33	the increase in oyster larvae generated from planting oysters grown by the program

Outcome #1

1. **Outcome Measures**

The number of participants who adopted improved agricultural practices to reduce carbon footprint

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

The number of participants who adopt improved agricultural practices designed to increase carbon sequestration

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

The number of crop varieties identified that adapt to a changing environment

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

The number of participants who adopt organic grown fruit and vegetable production practices

Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

The number of poultry farmer who increased knowledge of new housing and equipment changes and techniques

Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

The number of farmers with increased knowledge of farm succession methods

Not Reporting on this Outcome Measure

Outcome #7

1. **Outcome Measures**

The number of participants with increased knowledge of forages in animal production systems

Not Reporting on this Outcome Measure

Outcome #8

1. **Outcome Measures**

The number of participants who adopt rainwater collection best practices

Not Reporting on this Outcome Measure

Outcome #9

1. **Outcome Measures**

The number of participants who increase skills related to water conservation

Not Reporting on this Outcome Measure

Outcome #10

1. **Outcome Measures**

Increase number of acres of rainwater irrigated fruits and vegetables

Not Reporting on this Outcome Measure

Outcome #11

1. **Outcome Measures**

The number of urban participants who adopt electronic waste management best practices

Not Reporting on this Outcome Measure

Outcome #12

1. **Outcome Measures**

   The number of urban participants who increased knowledge of urban environmental management best practices

   Not Reporting on this Outcome Measure

Outcome #13

1. **Outcome Measures**

   The number of participants who adopt IPM recommendations

   Not Reporting on this Outcome Measure

Outcome #14

1. **Outcome Measures**

   The number of urban residents with increased knowledge on the impact of household hazards on the environment

   Not Reporting on this Outcome Measure

Outcome #15

1. **Outcome Measures**

   The number of row crops and vegetables producers who adopt agronomic management best practices

   Not Reporting on this Outcome Measure

Outcome #16

1. **Outcome Measures**

   The number of youth who increased knowledge of well head protection

   Not Reporting on this Outcome Measure

Outcome #17

1. **Outcome Measures**

The number of animal stocks identified that can adapt to a changing environment

Not Reporting on this Outcome Measure

Outcome #18

1. **Outcome Measures**

The number of youth with increased knowledge of environmental stewardship best practices

Not Reporting on this Outcome Measure

Outcome #19

1. **Outcome Measures**

The number of adults who adopt environmental stewardship best practices

Not Reporting on this Outcome Measure

Outcome #20

1. **Outcome Measures**

Quantity of e-waste (pounds) recycled by citizens practicing improved environmental stewardship leading to a cleaner, safer environment

2. **Associated Institution Types**

- 1890 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	41999

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The number of electronic products in households and businesses that are considered to be obsolete, broken, or irreparable is growing at an enormous rate. In 2014, the U.S. generated 11.7 million tons of e-waste. According to EPA, only about 1 million tonsof over 3.4 million tons of e-waste generated in the U.S. in 2012 was recycled. Continued production of e-waste in such a rapid manner creates a need for improved education and increased adoption of e-waste best management practices (BMPs) that reduce costs and environmental impacts associated with the production of new electronics.

What has been done

In 2018, seven city-wide e-waste recycling drives were held. A total of 386 cars dropped off 29,603 lbs. of e-waste at drives heldin Dothan, Troy, Enterprise, Decatur, and Hartselle, Alabama. An additional 12,396 lbs. of e-waste were collected via a permanent, curbside drop-off receptacle developed in partnership with the ARK Center of Dothan, Alabama. All seven e-cycling drives along with the curbside collection yielded a total of 41,999 lbs.; more than doubling the reported total for 2017. Total numbersfor select electronics were used as input parameters in the EPA Waste Reduction Model (WARM) to determine the eco-impact resulting from the recycling efforts.

Results

According to the EPA Waste Reduction Model (WARM), which calculates and totals greenhouse gas (GHG) emissions of baseline and alternative waste management practices, the 2018 statewide e-waste activities deferred 93,253 lbs. of carbon emissions from entering the atmosphere. This equates to 15,820 gallons of gasoline conserved [@ $1.98 per gal. = $31,323.60], 3,595 trees saved, 135,149 plastic bottles recycled or 621,687 aluminum cans (19,427 lbs.) recycled [@0.40 per lb. = $7,770.80]. These activities also resulted in the reclamation of plastic, nylon, steel, copper, aluminum and other resources. The economic gains observed from the 41,999 lbs. of e-waste recycled via the 7 city-wide drives and curbside recycling totaled over $3,950.00 (i.e., 4,626 lbs. of wiring @ $0.833 oz./ft.?...).

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation
403	Waste Disposal, Recycling, and Reuse

Outcome #21

1. Outcome Measures

The number of Urban Green participants with increased knowledge

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	4499

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The Urban landscape and phenomenon known as Urban ?Sprawl? has been a potential source of environmental hazards, water contamination and waste, and space management issues that contribute to the overall problem of environmental protection and sustainability of our natural resources. The Urban Green Program is designed to engage, increase awareness, and educate clientele about sustainable urban best management practices; 1) Introduce Sustainable Landscaping Management Practices in Urban/Metro areas, 2) Introduce and develop "Urban Green"-Spaces by revitalizing downtown urban areas, 3) Promote community development in Urban food deserts and vacant spaces, 4) Enhance management of urban landscapes through improved utilization of space for community aesthetics and health.

What has been done
During the course of 2018 seven REAs conducted workshops, seminars and attended various conferences to educate Alabama urban clientele on the benefits of gardening in limited urban spaces, composting, vermiculture, shrub and tree pruning and maintenance, planting bed irrigation basics, and the options and opportunities available for gardening with limited resources. Total number reached by the Urban Home Grounds, Gardens and Home Pests Programming FY2018 was 22,043; Urban Green FY2018 reached 10,116 individuals through 161 scheduled activities. Urban Green accounted for 46% (n=10,116) of total Urban Home Grounds programming. Urban Green participants were 44% (n=4499) adults, 56% (n=5617) youth, 63% (n=6386) black, 36% (n=3617) white, 48% (n=4823) male, and 52% (n=5293) female.

Results
The percentage of adult participants who improved their knowledge of program concepts were as follows: Irrigation practices (78%), Water Conservation Practices (80%), Composting (86%), Rainwater Harvesting and Uses (88%) (n=4499). Sample comments: ?I trees could influence temperature so much!?, ?I want to start a compost pile for my garden.?

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
131	Alternative Uses of Land
133	Pollution Prevention and Mitigation

403 Waste Disposal, Recycling, and Reuse

Outcome #22

1. Outcome Measures

Increased knowledge of Small RNA?s as Novel Regulatory Switches in the Envelope Stress Response in Eschericia coli

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The primary goal of this project is to investigate the possible post-transcriptional regulation of RseA by small regulatory RNAs (sRNAs)

What has been done
Research to investigate the possible post-transcriptional regulation of RseA by small regulatory RNAs (sRNAs)

Results
AAMU Initial experiments suggest that there is a direct regulatory relationship between the small RNA RyhB on the anti-sigma factor RseA. Point mutations in RhyB have been identified that affect the activity of the rseA promoter.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships

Outcome #23

1. Outcome Measures

Increase knowledge of reniform nematode infestation in cotton fields.

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
In the southern United States, Reniform nematode (RN) has become a major pest feeding on cotton roots with an estimated yield loss ranging from 10% to 100%, thus impacting US position in global cotton trade, in reducing profitability to cotton growers and to domestic textile industry. Such a biotic stress leads to wounding response, membrane disorganization, ion influx, generation of reactive oxygen species (ROS), xenobiotic stress, cell death or hypersensitivity response altered gene networks and epigenetic mechanisms in the host. These responses vary significantly between susceptible and tolerant cultivars. The genes and genome of reniform nematode was not fully known. Our previous research efforts at Alabama A&M University resulted in sequencing the partial genome of the reniform nematode and that helped us in better understanding the biological processes including physiological, developmental and parasitism genes of reniform nematode. This current effort will identify underlying epigenetic regulatory mechanisms linked to biotic tolerance inherent in tolerant cotton genotypes by comparing with susceptible genotypes in Gossypium.

What has been done

To meet the goals proposed for the third year, presently, we are generating and analyzing cotton transcriptome and methylome data.
Challenges:

Results
AAMU In the first year (Fall and Spring, 2017), we completed sample collection and pre-processing from the objectives, 1 and 2. In the second year (Fall and Spring, 2018), we generated sequencing data from both the unstressed and stressed samples and completed the partial analysis, which resulted in a publication.
1) Sequencing and Analyzing RNA-Seq and BS-Seq samples (from both un-stressed and RN-

stressed cotton plants) were as expected, but ChIP-Seq and MeDIP-Seq samples were not yielding good results; currently we modified our existing protocols to adjust to the cotton crop. 2) As a result, bioinformatic analysis and functional validations of ChIP-Seq and MeDIP-Seq samples might take little longer than expected.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships

Outcome #24

1. Outcome Measures

The number of black belt landowners with increased knowledge of estate planning and managing forest resources

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	220

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Limited resource landowners tend to sell timber without the aid of a consulting forester. Therefore, they need to know how to sell timber and be aware of contracts. They also need to know the alternatives to livestock management or forest management. Land-based conservation missions of agencies and organizations, Educational institutions, and land owners need to be addressed from a science-based perspective due to concerns for economic viability, real property security/ sustainability and improvement of quality of life.

What has been done
Nine workshops, a conference, field days, and site visitations were conducted in throughout the Black Belt counties (Macon, Barbour, Bullock, Wilcox, and Lowndes) on how market timber, forestry contracts, and silvopasture management. Participants were educated in estate planning, managing your forest resources for profit, Tree identification, and advice on consultant selection were given to 85 contacts.

Results

61% of attendees said that their knowledge before the workshops was adequate to limited, while 98% of the attendees said that their knowledge after the workshops was good to excellent. 100% of the attendees said that they planned to use the information gained at the workshops.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources

Outcome #25

1. Outcome Measures

The number of black belt landowners who adopted estate planning recommendations

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Limited resource landowners tend to sell timber without the aid of a consulting forester. Therefore, they need to know how to sell timber and be aware of contracts. They also need to know the alternatives to livestock management or forest management. Land-based conservation missions of agencies and organizations, Educational institutions, and land owners need to be addressed from a science-based perspective due to concerns for economic viability, real property security/ sustainability and improvement of quality of life.

What has been done
Nine workshops, a conference, field days, and site visitations were conducted in throughout the Black Belt counties (Macon, Barbour, Bullock, Wilcox, and Lowndes) on how market timber, forestry contracts, and silvopasture management. Participants were educated in estate planning, managing your forest resources for profit, Tree identification, and advice on consultant selection were given to 85 contacts.

Results
5 of the participants reported the development a management and/or estate plan.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources

Outcome #26

1. Outcome Measures

Percent of interns who feel confident distinguishing between abiotic and biotic garden/landscape problems

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	97

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Residential gardeners have questions about numerous topics in their landscapes from pest management to plant selection, and
other points in between. Home Grounds agents train MG volunteers on best management practices in the landscape, including IPM, and use historic client questions to prepare them to help Extension office clients. Training provides the volunteer confidence to handle the questions and accurate research-based information.

What has been done
MGs are trained to share what they've learned and implement it as models for others to copy. Working the Helpline and similar
outreach activities, they felt more confident with the basic detective work needed to find solutions to client questions. The first step in pest management is accurately identifying the problem.

Results
97% of trainees (366 x 0.97 = 355) felt confident distinguishing between abiotic and biotic plant and landscape problems if shown a photo. This is important as many garden and landscape problems are related to weather or human factors, not disease and insect pests. The volunteers multiply our training by sharing their new knowledge with Extension office clients.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships

Outcome #27

1. Outcome Measures

Percent of interns who are using their new knowledge of plant life cycles for more efficient use of fertilizers

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	97

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Fertilizer benefits plant growth when lacking in the soil, but off-site fertilizer movement can damage nearby environments. Soil testing to know what is and is not present in a specific soil is the first step in determining what to add, and how much. Knowing the time of year when plants can use this nutritional supplement is just as important. As an example, applying nitrogen fertilizers to dormant turf is a waste of time and money, and leads to off-site fertilizer movement because the turf plants cannot use this nutrient.

What has been done
Teaching Master Gardener volunteers about soil testing and plant growth cycles leads to better stewards in the community. The volunteers effectively improve their own landscapes, and teach others to do the same. They also use this knowledge when they volunteer at the Helpline and other one-on-one client interface activities.

Results
97% of trainees (366 x 0.97 = 355) are using their new knowledge of plant life cycles for more efficient use of fertilizer amendments. This assists the volunteers working the Helpline, Ask and MG, and related one-on-one client interface activities.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships

Outcome #28

1. Outcome Measures

Number of participants that implement a practice or use a skill that they learned towards forest management and earning income from their forestland

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Due to a combination of land degradation and a generation shift, timberland is being separated into smaller tracts and management is deficient. Lack of knowledge, ability, fear of wrongdoing, costs, and weakness of timber markets are some of the reasons contributing to this result. Effectively engaging, educating, and motivating landowners about the importance of forest health and managing their forest as well as educating them on business planning, operating, and financial decision making will not only contribute to their overall economic well-being but also provide opportunities to generate revenue to support their goals as forest landowners and improve the health and sustainability of-of their forest resources.

What has been done
This program has provided educational and assistance programs in the form demonstrations, workshops, training, and field tours across the state of Alabama. Further, this program has produced publications, videos, and guides for forest landowners.

Results
Establishment of this project using assessments, research, and stakeholder needs was the first priority of 2018. Current change assessments are ongoing for these programs. Our long-term objective will be that 10% or greater of participants of our output events that own forestland will implement a forest management practice, plan, or skill learned and that greater than one participant of those interested in generating income from their forestland initiate and establish a plan to do so within the first 12 months following the event.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources

Outcome #29

1. Outcome Measures

Increase in participants who implement a practice or use a skill that they learned in one of our workshops to improve the health and productivity of their forestland and their quality of life.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Family forest landowners make approximately 58% on all forest owners in the Southeast and approximately 60% in Alabama. Therefore, this cohort of landowners is vitally important to the future of natural resources in the state and across the Southeast. Due to a combination of land degradation and a generation shift, management of these lands is deficient. Lack of education and the number of costs are major factors impacting this cohort of forest owners to manage their forests, which is important for improving the health and resiliency of forests, wildlife species, their habitat, and meeting current and future demands for timber products.

What has been done
Workshops, consultations, publications, webinars, videos, and presentations to educate landowners on the benefits of healthy forests and how practicing forest management can not only enhance the health and resiliency of forests but also enhance opportunities to generate income from forests that can potentially be used to support management costs.

Results
Establishment of this project using assessments, research, and stakeholder needs was the first priority of 2018. Our secondary long-term objective is to have a greater than 10% increase of participants implement a practice or use a skill that they learned in one of our workshops to improve the health and productivity of their forestland and their quality of life.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources

Outcome #30

1. Outcome Measures

Number of forage (hay/pastureland) acres impacted by Alabama Grazing Academy

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	2571

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
One of Alabama's greatest resources is its agricultural land. Over 2.5 million acres of land in Alabama is designated as pasture
land or in forage production. It is important that producers adopt practices that improve the overall quality of forage produced
on these acres as well as properly care for the land.

What has been done
The inaugural Alabama Grazing Academy was conducted November 2018. Topics focused on year-round grazing and rotational
grazing. There were 16 producers (this number was limited to less than 20). 100% producers considered themselves livestock
producers and only 50% were hay producers.

Results
The 16 producers managed 2.571 acres of pasture and forage lands. Producers stated they would use temporary fencing and new
grazing and forage species technologies to increase grazing days per year.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships

Outcome #31

1. Outcome Measures

Percent increase in knowledge of Alabama Grazing Acadmey participants

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	28

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
One of Alabama's greatest resources is its agricultural land. Over 2.5 million acres of land in Alabama is designated as pasture
land or in forage production. It is important that producers adopt practices that improve the overall quality of forage produced
on these acres as well as properly care for the land.

What has been done
The inaugural Alabama Grazing Academy was conducted November 2018. Topics focused on year-round grazing and rotational
grazing. There were 16 producers (this number was limited to less than 20). 100% producers considered themselves livestock
producers and only 50% were hay producers.

Results
Participants reported a 26% increase in knowledge regarding forage species and diversity, a 28% increase in knowledge regarding
grazing management, and a 30% increase in knowledge regarding soil structure and fertility. This was an average 28% increase in
knowledge for the entire workshop. The a requirement of participants was that they must have had participated in Alabama Grazing School,
Beef Systems 360 program, or similar programs and have documented their use of rotational grazing systems prior to
participation in the program. So while the change in knowledge is seemingly low, these producers were all very familiar with
the basic concepts of rotational grazing.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships

Outcome #32

1. Outcome Measures

Acres of oyster reef restored

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	7

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Oyster reefs in coastal Alabama and Mississippi have been degraded.

What has been done
Alabama Volunteers produced 85,771 advanced stocker oysters which will be ready to spawn in Spring 2019 through Alabama restoration efforts.

Mississippi Volunteers produced 37,500 advanced stocker oysters which will be ready to spawn in Spring 2019 through Mississippi restoration efforts led by ACES.

Oysters were placed on degraded reef sites in Mobile Bay and the Mississippi Sound.

Results
The combined 123,271 advanced stocker oysters produced and planted by the 118 volunteer sites in two states are sufficient to plant 6.14 acres.

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife

Outcome #33

1. Outcome Measures

the increase in oyster larvae generated from planting oysters grown by the program

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	1000000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Loss of oyster reef is furthered via the resulting limitations on oyster larvae available to the estuarine system

What has been done
123,271 oysters planted will be capable of spawning in the Spring of 2019 generating millions of additional larvae.

Results
The 1,000,000 additional oyster larvae represents the conservative spawning capacity of the 123,271 oysters planted by the program. The additional larvae for the estuarine systems are capable of further expanding the reef environment into which they were planted.

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

The types of e-waste accepted by e-waste recyclers constantly changes and significantly impacts the quantity of what can be recycled. Weather affects participation in e-waste drives.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

TU Assessment of Global Climate Change Impacts Results projects decreases in corn yields of 17% and 32% in 2045, and 29% and 61% in 2075, and decreases in soybean yields of 29% and 23% in 2045, and 19% and 43% in 2075, respectively under RCP 4.5 and RCP 8.5 scenarios. Annual streamflow within the Alabama River basin is projected to decrease by an average of 31.0% in 2045 and 6.0% in 2075 under medium emission scenario. There is also increasing trends in the annual occurrence of hottest day, warmest night, warm days, warm nights and growing season length, in contrast with decreases in cool nights, cool days, frost days and ice days.
TU Sustainable Management of Forest and Range Land within Black Belt Counties- 61% of attendees said that their knowledge before the workshops was adequate to limited, while 98% of the attendees said that their knowledge after the workshops was good to excellent. 100% of the attendees said that they planned to use the information gained at the workshops. 5 of the participants reported the development a management and/or estate plan.
Forest Business Resources By providing landowners with these opportunities, experiences, and resources they will gain the knowledge to make forest management and business management decisions to improve their quality of life and health and resiliency of their forest. The direct impact of the Forest Business Resources Program included approximately 41, 000 forestland acres owned and/or managed by participants of output events with an estimated $1.9 million in improved forestland value, recovered loss, and financial decision making based on information learned.
Impact of Climate Change on Tennessee River Basin water availability -The study reviewed the main feature of the present climate of the MTEW and its environment focusing on the vast area of the southeast and its variability, annual seasonal (JJA) and annual cycle timescales. Precis RCM is sensitive to the choice of driving GCM Suggesting a careful selection of driving data based on the current performance for the use of future climate impact assessment.

AAMU Urban Green- The percentage of adult participants who improved their knowledge of program concepts were as follows: Irrigation practices (78%), Water Conservation Practices (80%), Composting (86%), Rainwater Harvesting and Uses (88%) (n=4499). The average knowledge of green space use was relatively low (1-3) compared to after the Urban Green programs and demonstrations, very high (4-5). Adult participants indicated that 83% agreed that the program encouraged them to adopt green space practices (n=4499).
AAMU E-Waste - Printer cartridges recycled via Funding Factory their eco-impact report revealed that the cartridges recycled were equivalent to offsetting CO2 emissions from the consumption of more than 36 gallons of gasoline. It was also equivalent to staving off global warming via the intake and storage of carbon of 8 tree seedling(s) grown for 10 years.
AU Climate Variability and Change: Results indicate decreased drought severity during years 1970-2005 in the Southeast. However, future droughts are predicted to increase in severity by as much as 23.7%. **AU Environmental and Ecological Sustainability:** Subsurface application of broiler litter reduced phosphorus losses at the watershed outlet by as much as 40% and reduce toxic algal blooms.

Key Items of Evaluation

TU **Assessment of Global Climate Change Impacts** Results projects decreases in corn yields of 17% and 32% in 2045, and 29% and 61% in 2075, and decreases in soybean yields of 29% and 23% in 2045, and 19% and 43% in 2075, respectively under RCP 4.5 and RCP 8.5 scenarios. Annual streamflow within the Alabama River basin is projected to decrease by an average of 31.0% in 2045 and 6.0% in 2075 under medium emission scenario. There is also increasing trends in the annual occurrence of hottest day, warmest night, warm days, warm nights and growing season length, in contrast with decreases in cool nights, cool days, frost days and ice days.
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V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Food Systems and Food Safety

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	13%	0%	0%	0%
205	Plant Management Systems	20%	0%	0%	0%
216	Integrated Pest Management Systems	12%	0%	0%	0%
304	Animal Genome	0%	0%	2%	7%
305	Animal Physiological Processes	0%	0%	20%	5%
307	Animal Management Systems	0%	0%	20%	13%
308	Improved Animal Products (Before Harvest)	0%	0%	1%	7%
311	Animal Diseases	0%	0%	34%	5%
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals	0%	0%	2%	10%
501	New and Improved Food Processing Technologies	5%	10%	2%	10%
503	Quality Maintenance in Storing and Marketing Food Products	5%	10%	3%	3%
504	Home and Commercial Food Service	10%	10%	0%	0%
607	Consumer Economics	0%	0%	0%	5%
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	20%	35%	0%	15%
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	0%	0%	9%	10%
721	Insects and Other Pests Affecting Humans	15%	35%	5%	0%
723	Hazards to Human Health and Safety	0%	0%	2%	10%
	Total	100%	100%	100%	100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2018	Extension		Research	
	1862	1890	1862	1890
Plan	17.8	2.0	28.0	7.9
Actual Paid	20.1	0.7	43.0	4.4
Actual Volunteer	0.0	0.0	0.0	0.0

2. Institution Name: Auburn University

Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
788862	0	1373782	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
426735	0	1384807	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
3317381	0	8572181	0

2. Institution Name: Alabama A&M University

Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

2. Institution Name: Tuskegee University

Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	57359	0	333550
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	47333	0	304314
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The Cluster Initiative was to bridge the gap between the ability of historically disadvantaged farmers to grow produce and their ability to pack and market their produce in a manner that resulted in enhanced profits. A variety of approaches were utilized to educate farmers on GAP as well as other food safety regulations in order to drive their production in a manner that makes their produce more marketable. The cluster assisted grew in numbers, added another market, and developed food safety plans for participating growers.
Investigating Salmonella in organic apple cider and apple Juice: the goal of the work is to improve the microbiological safety of apple juice and apple cider labeled as natural and organic. All phytochemical analysis was completed. In addition, natural antimicrobials were evaluated.
Organic Food Products the projects focused on consumers' valuation of and willingness to pay for organic food products, and developing a local, community-based sustainable food system that would further stimulate the growth and competitiveness of the economy.
AU Food Systems Institute: Integrating research, education and outreach activities in food systems and food safety through 12 working groups. **AU Heifer Reproduction Program**: Linking genomic, metabolomic and production markers for development of heifer pregnancy, which will result in increased efficiency of cattle production. **AU Food Safety and Quality**: Researchers are studying natural antimicrobials as food additives to ensure food safety and extend product shelf life with plant based sources.
The Tunnel house technology project assisted four landowners to construct NRCS-approved Wiregrass Tunnel Houses. Another landowner in Gadsden, Etowah County in Alabama was provided assistance in order to retrofit two metal greenhouses into tunnel houses for the training and teaching of individuals with disabilities. In addition to providing space to train these new tunnel house owners, and area youth on the essentials of gardening and plant biology, the tunnel houses were used as test plots in a research project aimed at discerning best management practices in trellising and harvesting cultural crops.
Opportunities for Value-Added Livestock Marketing The overall objective of this planned program is to increase farmer and rancher knowledge and expertise in various value-added marketing options. Educational programs, written materials and assistance for value-added marketing programs such as co-mingled feeder calf programs, retained ownership, seedstock bull sales, replacement heifer sales and other livestock as opportunities arise.

2. Brief description of the target audience

The Cluster Initiative targets small and limited resource producers
Apple Juice Research: Juice industry and regulators, produce industry
Organic Food Products: The target audience consisted of landowners and farmers in North Alabama,

business owners and managers particularly of groceries and supermarkets that sold fresh foods and the general public.
AU Food System Institute: Food entrepreneurs, food processors, regulatory officials, food safety professionals and general public. **AU Heifer Reproduction Program**: Cattle producers, livestock extension agents, and stakeholders. **AU Food Safety and Quality** : Livestock and poultry producers, other food commodities, processing plant workers, veterinarians, extension agents and stakeholders. The Tunnel House Technology program targets agricultural professionals, farmers, faith-based groups, and schools including those for youth with disabilities.
Opportunities for Value-Added Livestock Marketing The target audience for this planned program is commercial and seedstock beef cattle producers and also beef cattle industry organizations and professionals.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	71361	71422	14931	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year:	2018
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	7	36	43

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of publications

Year	Actual
2018	18

Output #2

Output Measure

- Number of abstracts

Year	Actual
2018	22

Output #3

Output Measure

- Number of presentations given at scientific meetings

Year	Actual
2018	22

Output #4

Output Measure

- Number of Extension publications
  Not reporting on this Output for this Annual Report

Output #5

Output Measure

- Number of training programs
  Not reporting on this Output for this Annual Report

Output #6

Output Measure

- Number of farm demonstrations
  Not reporting on this Output for this Annual Report

Output #7

Output Measure

- Number of graduate students

Year	Actual
2018	6

Output #8

Output Measure

- Number of thesis

Year	Actual
2018	2

Output #9

Output Measure

- Number of dissertations
  Not reporting on this Output for this Annual Report

Output #10

Output Measure

- Number of TU Food Safety publications

Year	Actual
2018	4

Output #11

Output Measure

- Number of TU Food Safety workshops and trainings

Year	Actual
2018	21

Output #12

Output Measure

- Number of TU individual farm visits

Year	Actual
2018	27

Output #13

Output Measure

- Number of TU presentations/abstracts

Year	Actual
2018	2

Output #14

Output Measure

- Number of TU Tunnel house Technology abstracts/presentations

Year	Actual
2018	5

Output #15

Output Measure

- Number of TU tunnel houses provide technical assistance for production

Year	Actual
2018	11

Output #16

Output Measure

- Number of TU tunnel houses assisted in construction

Year	Actual
2018	4

Output #17

Output Measure

- Number of Black Belt landowners reached in TU tunnel house technology programs

Year	Actual
2018	41

Output #18

Output Measure

- Number of Assisting Food Entrepreneurs navigate through the Food System training programs

Year	Actual
2018	208

Output #19

Output Measure

- Number of individuals assisted with testing of food products as a result of the Assisting Food Entrepreneurs navigate through the Food System

Year	Actual
2018	113

Output #20

Output Measure

- Number of Opportunities for Value-Added Livestock Marketing educational trainings, advisory board meetings and marketing events

Year	Actual
2018	37

Output #21

Output Measure

- Number of participants engaged in Opportunities for Value-Added Livestock Marketing activities

Year	Actual
2018	2423

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of food service workers receiving certification in food safety training
2	Number of participants with increased knowledge of alternate pest management strategies in home food gardens
3	Number of participants who adopt IPM principles
4	Number of people who start or enhance their own food gardens at home
5	Number of participants who adopt Good Agricultural Practices (GAP) for commercial food producers
6	Number of participants who adopt Good Handling Practices (GHP) for commercial food producers
7	Number of participants who increase knowledge of safe food systems practices
8	Number of participants who adopt safe food systems practices
9	Number of alternative methods (non antimicrobial) for pathogen reduction in livestock species that have an impact on reducing foodborne pathogens.
10	Number of food entrepreneurs who begin business in the southeast.
11	Number of commercial and seedstock beef cattle producers committed to the goal to produce better beef and genetics
12	The number of Black Belt farmers with increased knowledge of FSMA and GAP regulations
13	The number of Black Belt farmers who adpopted GAP and FSMA recommendations to develop food safety plans
14	The number of new growers in the TU Cluster Initiative
15	The number of new markets expanded for TU green growers
16	The number of Black Belt landowners with increased knowledge of tunnel house technology
17	The number of days that harvest can be reduced by using TU Tunnel house technology

18	The economic impact of the Assisting Food Entrepreneurs navigate through the Food System program
19	Number of Nutrition Facts Labels competed for Food Entrepreneurs
20	The number of participants who stayed employed as a result of passing the Serv Safe exam
21	Number of cattle producers who benefit from value-added marketing opportunities
22	Economic impact of value-added marketing as compared to conventional marketing channels
23	Increased revenue per feeder steer in value-added calf marketing opportunities

Outcome #1

1. **Outcome Measures**

Number of food service workers receiving certification in food safety training

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

Number of participants with increased knowledge of alternate pest management strategies in home food gardens

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

Number of participants who adopt IPM principles

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

Number of people who start or enhance their own food gardens at home

Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

Number of participants who adopt Good Agricultural Practices (GAP) for commercial food producers

Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

Number of participants who adopt Good Handling Practices (GHP) for commercial food producers

Not Reporting on this Outcome Measure

Outcome #7

1. **Outcome Measures**

Number of participants who increase knowledge of safe food systems practices

Not Reporting on this Outcome Measure

Outcome #8

1. **Outcome Measures**

Number of participants who adopt safe food systems practices

Not Reporting on this Outcome Measure

Outcome #9

1. Outcome Measures

Number of alternative methods (non antimicrobial) for pathogen reduction in livestock species that have an impact on reducing foodborne pathogens.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	17

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Salmonella bacteria continue to be a threat to our food supply and to human health. Most human infections are acquired from food animals and their products. Salmonella infections are transmitted to humans through food products originating from poultry and livestock. In 2012, a human outbreak of a Salmonella strain, normally transmitted to people through contaminated poultry products, was traced to tainted ground beef, suggesting movement of this strain between chickens and cattle. In Alabama, food animal producers often raise two or more species of food animals on the same premise, the most common combination being chickens and cattle. Thus, movement of Salmonella among food animal species on Alabama farms poses a potential food safety threat to human health, and will require novel interventions.

What has been done
A pilot study was initiated to examine Salmonella movement between animal facilities at the Auburn University College of Vet. Medicine (AUCVM). Environmental sampling across the AUCVM campus detected two distinct Salmonella strains - S. Muenster was present in 10 of 19 sample sites, while S. Cerro was found at one sample site. Follow-up sampling in Summer, 2014, showed 11 of 16 sites contaminated with Salmonella, including both cattle and horse facilities. These findings suggest movement of Salmonella across the AU-CVM campus, and led to our hypothesis that a veterinary teaching hospital would be an ideal setting to model movement of Salmonella among food animal facilities, so that specific approaches can be developed to prevent dissemination of Salmonella from infected animals into the environment.

Results
Proximal movement of Salmonella species among the Auburn University College of Veterinary Medicine's equine, beef, and dairy barns, along with associated pastures and natural water sources was traced. Of the positive samples, seventeen displayed lytic activity against a set of Salmonella serotypes, indicating that the natural bacteriophage can be used to control Salmonella

in the contaminated environment without the used on antimicrobials.

4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #10

1. Outcome Measures

Number of food entrepreneurs who begin business in the southeast.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	4

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
There are a number of citizens in the southeast who have a desire to contribute to the local supply of food and have an entrepreneurial spirit. There are limited sources of information that come in a ?one stop shop? type of approach. Regulations and requirements are confusing and difficult to understand, and business basics present another challenge to entrepreneurs.

What has been done
The Auburn University Food Systems Institute hosts a workshop every year for Food Entrepreneurs and provides a multitude of one on one activities throughout the year to assist local entrepreneurs with making their dreams come to fruition.

Results
There were 75 attendees at the 2018 Food Entrepreneur Conference who learned from a variety of topics such as business building blocks, regulations for meat and poultry, cottage food law, fisheries and aquaculture products. They also learned about food brokers and how to get their products onto retail shelf space. Of the 75 attendees, 5 have since began their own business.

4. Associated Knowledge Areas

KA Code	Knowledge Area
504	Home and Commercial Food Service

Outcome #11

1. Outcome Measures

Number of commercial and seedstock beef cattle producers committed to the goal to produce better beef and genetics

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	200

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
In Alabama, the USDA cattle inventory estimated the presence of ~120,000 replacement beef heifers in 2017. If we consider that 20% of the replacement heifers do not become pregnant, over 3.8 million dollars will not enter the cattle industry in our state. Considering all cows in Alabama (693,000) the economic loss due to infertility is estimated to be over 20 million dollars. Infertility in beef cattle has been a long-standing problem with negative consequences for the economy in Alabama. Nationwide, the estimated economical loss due to infertility is greater than 4.7 billion dollars annually. In heifers, reproductive performance can be assessed by first service at conception and pregnancy rate.

What has been done
We accumulated records of reproductive outcome on 252 beef heifers. The data collected comprised of date of birth, weaning weight, body condition score, reproductive tract score and reproductive outcome. We generated RNA-sequencing data from 23 heifers from two locations either artificially inseminated, natural service pregnant and non-pregnant and quantified transcript abundance for 12,538 genes.

Results
Heifers categorized with body conduction score = 6 and reproductive tract score = 4 or 5 had the highest proportion of pregnancy to artificial insemination (49 and 44%, respectively). It was notable that heifers presenting body conduction score = 6 and reproductive tract score = 5 presented the highest pregnancy rate at end of the breeding season (89%). Heifers younger than

368 days at the start of the breeding season did not become pregnant to artificial insemination. Those young heifers had 12.5% chance to become pregnant in their first breeding season, compared to 87.5% if the heifers were older than 368 days. The comparison of gene expression levels between AI-pregnant and NB-pregnant heifers yielded 18 differentially expressed. The comparison of gene expression levels between AI-pregnant and non-pregnant heifers yielded six. The research is making progress toward identifying the genes that will have economic impact to the society by reducing costs from producers who will not have to feed heifers that do not have the potential to become pregnant.

4. Associated Knowledge Areas

KA Code	Knowledge Area
308	Improved Animal Products (Before Harvest)

Outcome #12

1. Outcome Measures

The number of Black Belt farmers with increased knowledge of FSMA and GAP regulations

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	8

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Small and historically disadvantaged farmers, including women, military veterans, and new and beginning farmers in Alabama Black and other surrounding Counties have been excluded from agricultural programs, denied access to farm programs, underfunded in accessible programs, and have had little to no access to viable marketing opportunities for sale of their vegetables and produce necessary for sustainability and profitability. In addition, lack of GAP knowledge results in major economic losses either from crop losses, or application cost associated with excessive pesticide application, and produce quality rejection at the market.

What has been done
Hands-on training, state-level training and workshops, and one-on-one follow up sessions were used to assist historically disadvantaged farmers to be able to supply produce commercially. Topics included: developing cold chain management systems for crop storage, transit, and processing; methods for properly packaging and storing produce; how to cultivate and build

mutually beneficial relationships with commercial buyers; scale-appropriate integrated pest management (IPM) and grading; and, farmers? cooperative management. Direct pest management assistance and mock GAP certification audits were also given to farmers on-farm.

Results
Twenty eight farmers attended along with four State Auditors and TU Research/Extension Staff a meeting for FSMA and GAP updates. 100% of the farmers reported that they had increased their knowledge regarding GAP and FSMA regulations for the upcoming growing year.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
504	Home and Commercial Food Service
607	Consumer Economics
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
723	Hazards to Human Health and Safety

Outcome #13

1. Outcome Measures

The number of Black Belt farmers who adpopted GAP and FSMA recommendations to develop food safety plans

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Small and historically disadvantaged farmers, including women, military veterans, and new and beginning farmers in Alabama Black and other surrounding Counties have been excluded from agricultural programs, denied access to farm programs, underfunded in accessible programs, and have had little to no access to viable marketing opportunities for sale of their vegetables and produce necessary for sustainability and profitability. In addition, lack of GAP knowledge results in

major economic losses either from crop losses, or application cost associated with excessive pesticide application, and produce quality rejection at the market.

What has been done

Hands-on training, state-level training and workshops, and one-on-one follow up sessions were used to assist historically disadvantaged farmers to be able to supply produce commercially. Topics included: developing cold chain management systems for crop storage, transit, and processing; methods for properly packaging and storing produce; how to cultivate and build mutually beneficial relationships with commercial buyers; scale-appropriate integrated pest management (IPM) and grading; and, farmers? cooperative management. Direct pest management assistance and mock GAP certification audits were also given to farmers on-farm.

Results

Twenty eight farmers attended along with four State Auditors and TU Research/Extension Staff a meeting for FSMA and GAP updates. As a result of this increase in knowledge, ten farmers developed Food Safety Plans for 2018 growing season.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
503	Quality Maintenance in Storing and Marketing Food Products
607	Consumer Economics
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #14

1. Outcome Measures

The number of new growers in the TU Cluster Initiative

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Small and historically disadvantaged farmers, including women, military veterans, and new and beginning farmers in Alabama Black and other surrounding Counties have been excluded from agricultural programs, denied access to farm programs, underfunded in accessible programs, and have had little to no access to viable marketing opportunities for sale of their vegetables and produce necessary for sustainability and profitability. In addition, lack of GAP knowledge results in major economic losses either from crop losses, or application cost associated with excessive pesticide application, and produce quality rejection at the market.

What has been done

Hands-on training, state-level training and workshops, and one-on-one follow up sessions were used to assist historically disadvantaged farmers to be able to supply produce commercially. Topics included: developing cold chain management systems for crop storage, transit, and processing; methods for properly packaging and storing produce; how to cultivate and build mutually beneficial relationships with commercial buyers; scale-appropriate integrated pest management (IPM) and grading; and, farmers? cooperative management. Direct pest management assistance and mock GAP certification audits were also given to farmers on-farm.

Results

Twenty eight farmers attended along with four State Auditors and TU Research/Extension Staff a meeting for FSMA and GAP updates. 100% of the farmers reported that they had increased their knowledge regarding GAP and FSMA regulations for the upcoming growing year. As a result 2 new growers were recruited into the cluster for the upcoming year.

4. Associated Knowledge Areas

KA Code	Knowledge Area
503	Quality Maintenance in Storing and Marketing Food Products
504	Home and Commercial Food Service
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #15

1. Outcome Measures

The number of new markets expanded for TU green growers

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Small and historically disadvantaged farmers, including women, military veterans, and new and beginning farmers in Alabama Black and other surrounding Counties have been excluded from agricultural programs, denied access to farm programs, underfunded in accessible programs, and have had little to no access to viable marketing opportunities for sale of their vegetables and produce necessary for sustainability and profitability. In addition, lack of GAP knowledge results in major economic losses either from crop losses, or application cost associated with excessive pesticide application, and produce quality rejection at the market.

What has been done
Hands-on training, state-level training and workshops, and one-on-one follow up sessions were used to assist historically disadvantaged farmers to be able to supply produce commercially. Topics included: developing cold chain management systems for crop storage, transit, and processing; methods for properly packaging and storing produce; how to cultivate and build mutually beneficial relationships with commercial buyers; scale-appropriate integrated pest management (IPM) and grading; and, farmers? cooperative management. Direct pest management assistance and mock GAP certification audits were also given to farmers on-farm.

Results
Twenty eight farmers attended along with four State Auditors and TU Research/Extension Staff a meeting for FSMA and GAP updates. 100% of the farmers reported that they had increased their knowledge regarding GAP and FSMA regulations for the upcoming growing year. As a result one new market was acquired for green growers

4. Associated Knowledge Areas

KA Code	Knowledge Area
308	Improved Animal Products (Before Harvest)
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
501	New and Improved Food Processing Technologies
504	Home and Commercial Food Service
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #16

1. Outcome Measures

The number of Black Belt landowners with increased knowledge of tunnel house technology

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	41

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Environmental conditions such as cold weather (in Winter), limit the production and thus the availability of certain vegetables to consumers during certain periods. This sometimes result in better/premium prices for some of these vegetables. Though this ability to extend the season is gained, space is sacrificed. The ability to maximize yield of the entire crop across both limited time and space is of primacy. Two cultural crops that have already proven to yield well in tunnel house conditions in both winter and summer seasons have been collard greens and sweet potato respectively.

What has been done
Program participants assisted four landowners (Autauga, Chambers, Shelby, and Barbour counties) to construct their NRCS-approved Wiregrass Tunnel Houses, as well as assisted in the retrofitting of two metal greenhouses into tunnel houses in Etowah County, AL for the training and teaching of growers and youth with disabilities. Additionally, two studies were carried out that tested cropping intensity (100% vs. 50%) on recovery rate (total harvestable yield) of Top Bunch Collard Greens and another that tested the impact of trellising on Total Marketable yield of two sweet potato varieties (TU-1892 and Carver).

Results
The knowledge, attitude, skills and abilities (KASA) of 100% of the participating landowners pertaining to vegetable production in tunnel houses.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships

205	Plant Management Systems
503	Quality Maintenance in Storing and Marketing Food Products
504	Home and Commercial Food Service

Outcome #17

1. Outcome Measures

The number of days that harvest can be reduced by using TU Tunnel house technology

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	15

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Environmental conditions such as cold weather (in Winter), limit the production and thus the availability of certain vegetables to consumers during certain periods. This sometimes result in better/premium prices for some of these vegetables. Though this ability to extend the season is gained, space is sacrificed. The ability to maximize yield of the entire crop across both limited time and space is of primacy. Two cultural crops that have already proven to yield well in tunnel house conditions in both winter and summer seasons have been collard greens and sweet potato respectively.

What has been done
Program participants assisted four landowners (Autauga, Chambers, Shelby, and Barbour counties) to construct their NRCS-approved Wiregrass Tunnel Houses, as well as assisted in the retrofitting of two metal greenhouses into tunnel houses in Etowah County, AL for the training and teaching of growers and youth with disabilities. Additionally, two studies were carried out that tested cropping intensity (100% vs. 50%) on recovery rate (total harvestable yield) of Top Bunch Collard Greens and another that tested the impact of trellising on Total Marketable yield of two sweet potato varieties (TU-1892 and Carver).

Results
The leaf recovery rates were greater for plants that had 50% of their leaves harvested compared to those which had 100% of their leaves harvested. This higher recovery rate for the former suggests that the harvest interval could be reduced in the future from 21 to 15 or 18 days.

Results indicated that there were significant interactions between sweet potato varieties and planting methods for total marketable yield. There were also significant differences between varieties and planting methods for Canners and between varieties and total marketable yield. The results indicated that the response of sweet potatoes under tunnel house conditions maybe varietal related and influenced by high ambient temperature prevalent in tunnel houses during the summer months.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #18

1. Outcome Measures

The economic impact of the Assisting Food Entrepreneurs navigate through the Food System program

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	13000000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Individuals are looking for ways to sell non-hazardous foods from their home. Foods prepared in home kitchens are not inspected by the health department. Therefore the cottage food law in Alabama was put in place to only allow non-hazardous foods to be sold. Center for Disease Control (CDC) reports nearly 10,000 outbreaks yearly in the United Sates. Foods that have not been associated with a foodborne outbreak are deemed non-hazardous and therefore safe to be sold from an uninspected home kitchen.

What has been done
A total of 198 food safety certification classes for food entrepreneurs was offered in all 67 counties of Alabama.

Results
A total of 654 individuals completed the Food Safety training class to receive a certificate of completion for the Cottage Food Law Class. With this certificate, these individuals can sell up to

$20,000 in product. This relates to a potential income of just over 13 million dollars.

4. Associated Knowledge Areas

KA Code	Knowledge Area
504	Home and Commercial Food Service

Outcome #19

1. Outcome Measures

Number of Nutrition Facts Labels competed for Food Entrepreneurs

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	73

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Food entrepreneurs want to add nutrition facts to their labels to better market their products. However, they do not understand nor have the technology to produce an accurate food label.

What has been done
A computer program was purchased by the ACES/Auburn University Food Testing Lab to assist food entrepreneurs in the development of nutrition facts labels for their food products. Food Entrepreneurs sent formulations of their food products to the Food Testing Lab to create a Nutrition Facts Label for their products. Even though the entrepreneur does not need to place the label on their products because they meet the small food manufacturing exemption, the entrepreneur may still choose to do so to increase their marketability.

Results
Seventy-three food products were sent to the ACES /Auburn University Food Testing and Labeling lab. The products were analyzed and the companies received a print ready nutrition facts label. This allowed the food entrepreneur to market a more professional looking product to the public.

4. Associated Knowledge Areas

KA Code	Knowledge Area
504	Home and Commercial Food Service

Outcome #20

1. Outcome Measures

The number of participants who stayed employed as a result of passing the Serv Safe exam

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	1368

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
CDC estimates that 1 in 6 Americans get sick yearly with foodborne illnesses. Not only is there a human loss with the foodborne illnesses but there is also an economic loss. Scharff in 2012 "estimated that cost to be as high as $152 billion. This cost of illness includes treatment cost, the value of the time at work that is lost, and the cost of willingness to pay to prevent death." CDC estimates that 60% of these illnesses are associated with food service establishments. Therefore, food safety training for food service workers is critical to reducing foodborne illnesses in the United States. As Americans eat more and more meals away from home this number stands to increase.

What has been done
A total of 173 food safety certification classes for food service workers was offered in all 67 counties in Alabama with a total of 1368 participants.

Results
As a result of these classes, a total of 1368 food service workers completed the certified food safety training. After the completion of the rigorous exam, 1106 passed. Since this certification lasts for 5 years, the number of individuals that the Food Safety Team has trained over these years is nearly 7,000. The change in condition for these individuals was their ability to keep a job in the food service industry and to even increase their job opportunities to move to a higher paying/supervising position. Even if the individual did not pass the exam they were given a certificate of training which allows them to keep their job and to retake the exam in the next year.

4. Associated Knowledge Areas

KA Code	Knowledge Area
504	Home and Commercial Food Service

Outcome #21

1. Outcome Measures

Number of cattle producers who benefit from value-added marketing opportunities

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	230

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Education and guidance for beef cattle producers in adding value and marketing options to market feeder calves in economic units and breeding animals, such as bulls and replacement heifers. For feeder calf events and the retained ownership program, documentation supplying the description of the feeder calves, which includes breed composition, calf sex, average weight, number of head, immunization history, treatments such as castration method, growth stimulant implants and pre-conditioning history, is supplied. Documentation of performance information for BCIA bull evaluations and sales is generated for each marketing opportunity for beef cattle producers to understand the definitions and values of the performance information.

What has been done
Three value-added feeder calf marketing events were held with educational assistance by ACES personnel. Three marketing events within BCIA were also held to market bulls, bred and open replacement heifers. Twenty-three individual beef operations participated in the opportunity of retained ownership through educational programming. Thirty-seven activities of educational trainings, advisory board meetings, value-added marketing events, farm visits, and demonstrations totaled to 2,423 participants.

Results
Two hundred thirty individuals were impacted by opportunities for value-added livestock marketing. Fifty-eight Alabama beef operations are represented in utilizing the opportunities for value-added feeder calf marketing in these 3 highlighted feeder calf marketing events. Overall for 2018 breeding animal marketing events, a total of 149 beef cattle operations were impacted by value-added marketing opportunities and superior genetic selection. Twenty-three individual beef

operations participated in the opportunity of retained ownership through educational programming.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

Outcome #22

1. Outcome Measures

Economic impact of value-added marketing as compared to conventional marketing channels

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	9104836

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Education and guidance for beef cattle producers in adding value and marketing options to market feeder calves in economic units and breeding animals, such as bulls and replacement heifers. for feeder calf events and the retained ownership program, documentation supplying the description of the feeder calves, which includes breed composition, calf sex, average weight, number of head, immunization history, treatments such as castration method, growth stimulant implants and pre-conditioning history, is supplied. Documentation of performance information for BCIA bull evaluations and sales is generated for each marketing opportunity for beef cattle producers to understand the definitions and values of the performance information.

What has been done
Three value-added feeder calf marketing events were held with educational assistance by ACES personnel. Three marketing events within BCIA were also held to market bulls, bred and open replacement heifers. Twenty-three individual beef operations participated in the opportunity of retained ownership through educational programming. Thirty-seven activities of educational trainings, advisory board meetings, value-added marketing events, farm visits, and demonstrations totaled to 2,423 participants.

Results

Total economic impact of valued-added livestock marketing opportunities equaled to $9,104,836.78 Economic impact of 3 highlighted value-added feeder calf marketing event represented 8,133 of Alabama bred and raised feeder calves worth $7,545,741.42. For breeding animal marketing events, an economic impact of $740,500.00 from 372 head marketed. Retained ownership marketing opportunities represented 507 Alabama bred and raised feeder calves worth $818,595.36 at the time of harvest.

4. Associated Knowledge Areas

KA Code	Knowledge Area
504	Home and Commercial Food Service

Outcome #23

1. Outcome Measures

Increased revenue per feeder steer in value-added calf marketing opportunities

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	192

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Education and guidance for beef cattle producers in adding value and marketing options to market feeder calves in economic units and breeding animals, such as bulls and replacement heifers. for feeder calf events and the retained ownership program, documentation supplying the description of the feeder calves, which includes breed composition, calf sex, average weight, number of head, immunization history, treatments such as castration method, growth stimulant implants and pre-conditioning history, is supplied. Documentation of performance information for BCIA bull evaluations and sales is generated for each marketing opportunity for beef cattle producers to understand the definitions and values of the performance information.

What has been done

Three value-added feeder calf marketing events were held with educational assistance by ACES personnel. Three marketing events within BCIA were also held to market bulls, bred and open replacement heifers. Twenty-three individual beef operations participated in the opportunity of retained ownership through educational programming. Thirty-seven activities of educational trainings, advisory board meetings, value-added marketing events, farm visits, and

demonstrations totaled to 2,423 participants.

Results

By producers utilizing proper management and health protocols, participating beef operations realized an increased revenue of $192.71 per steer on average, with an increased price per hundred pounds of $19.76 for steers by marketing in these marketing events over weekly livestock auction sales, as reported in the USDA Alabama Weekly Summary Report for the same respective time period. Fifty-eight Alabama beef cattle operations are represented in value-added feeder calf marketing in these 3 highlighted feeder calf marketing events.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The Cluster Initiative:Twenty eight farmers attended along with four State Auditors and TU Research/Extension Staff a meeting for FSMA and GAP updates. 100% of the farmers reported that they had increased their knowledge regarding GAP and FSMA regulations for the upcoming growing year. As a result of this increase in knowledge, ten Food Safety Plans were developed for 2018 growing season, and 2 new growers were recruited into the cluster for the upcoming year. One new market was acquired for green growers.

In-Vitro Digestion : Total phenolic content , total flavonoid content and antioxidant activities using ferric reducing antioxidant potential and 1,1-diphenyl-2-picrylhydrazyl were determined. For the simulated digestion, the TPC and TFC were significantly higher at the OP for the 200 FTU (treatment). After the GP, the TPC and TFC was significantly higher for the control. However, at the IP, TPC and TFC were decreased for both the control and treatment. The results obtained from this study showed that the hydrolyzed RKB are excellent sources of flavonoids, phenolic, and nutritional compounds.

AU Food System Institute: Research resulted in increased awareness and knowledge about

foodborne illnesses and food safety among stakeholders. **AU Heifer Reproduction Program**: Research resulted in increased awareness and knowledge about pregnancy and conception in beef cattle among stakeholders. **AU Food Safety and Quality**: Program resulted in increased knowledge about animal disease and potential alternatives to traditional antimicrobials in the food system.
TU Tunnel House Technology-The knowledge, attitude, skills and abilities (KASA) of 100% of the participating landowners pertaining to vegetable production in tunnel houses. Results indicate that for 100% leaf removal rate of recovery for 66, 87, and 108 days is 37%, 50%, and 88% respectively. While for 50% leaf removal at the same intervals was 117%, 151%, and 184% respectively. This higher recovery rate for the latter suggests that the harvest interval could be reduced in the future from 21 to 15 or 18 days.
Opportunities for Value-Added Livestock Marketing The 3 highlighted feeder calf sales represent 8,133 head of Alabama bred and raised feeder calves worth over $7.5 million. Overall for the 2017-18 Alabama Pasture to Rail retained ownership program, an economic impact of $818,595.36 was realized from 507 finished calves from 23 individual Alabama beef operations. Alabama born and raised feeder calves were shipped from Alabama, ownership retained by participating Alabama beef operations and finished at Hy-Plains Feedyard in Montezuma, Kansas.

Key Items of Evaluation

The TU Cluster Initiative:Twenty eight farmers attended along with four State Auditors and TU Research/Extension Staff a meeting for FSMA and GAP updates. 100% of the farmers reported that they had increased their knowledge regarding GAP and FSMA regulations for the upcoming growing year. As a result of this increase in knowledge, ten Food Safety Plans were developed for 2018 growing season, and 2 new growers were recruited into the cluster for the upcoming year. One new market was acquired for green growers.
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AU Food System Institute: Research resulted in increased awareness and knowledge about foodborne illnesses and food safety among stakeholders. **AU Heifer Reproduction Program**: Research resulted in increased awareness and knowledge about pregnancy and conception in beef cattle among stakeholders. **AU Food Safety and Quality**: Program resulted in increased knowledge about animal disease and potential alternatives to traditional antimicrobials in the food system.
TU Tunnel House Technology-Additional results indicated that there were significant interactions between sweet potato varieties and planting methods for total marketable yield as TU-1892 produced 627 bu/acre (Conventional) vs. 410 bu/acre (Trellised). Carver produced 27 bu/acre (Conventional) vs. 71 bu/acre (Trellised). The results indicated that the response of sweet potatoes under tunnel house conditions maybe varietal related and influenced by high ambient temperature prevalent in tunnel houses during the summer months.
Opportunities for Value-Added Livestock Marketing For 2018 breeding animal sale events, an economic impact of $740,500 from 372 head marketed to impact 149 beef cattle operations. One hundred fourteen bulls were marketed for an overall gross of $275,650 with an average price of $2,418. Bulls were sold by 20 different participants to 69 different buyers. Two hundred thirty-two bred heifers were marketed for an overall

gross of $432,600 with an average price per bred heifer of $1,865.

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Human nutrition, well-being, health and obesity

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
701	Nutrient Composition of Food	40%	20%	0%	15%
702	Requirements and Function of Nutrients and Other Food Components	0%	0%	3%	15%
703	Nutrition Education and Behavior	50%	40%	0%	13%
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	0%	0%	6%	5%
724	Healthy Lifestyle	5%	30%	14%	15%
802	Human Development and Family Well-Being	0%	0%	61%	7%
805	Community Institutions, Health, and Social Services	0%	0%	0%	5%
806	Youth Development	0%	0%	1%	20%
903	Communication, Education, and Information Delivery	5%	10%	15%	5%
	Total	100%	100%	100%	100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2018	Extension		Research	
	1862	1890	1862	1890
Plan	70.3	11.9	25.0	7.0
Actual Paid	74.0	16.0	8.0	5.3
Actual Volunteer	0.0	0.0	0.0	0.0

2. Institution Name: Auburn University

Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
1509428	0	77711	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1161083	0	78335	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
14646932	0	598919	0

2. Institution Name: Alabama A&M University

Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	353913	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	353913	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

2. Institution Name: Tuskegee University

Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	614558	0	401776
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	507139	0	366560
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

TU Research Green leafy vegetables fatty acid ratio: The influence of green leafy vegetables (i.e., collard greens, purslane, sweet potato leaves) in diets with a 25:1 omega-6/omega-3 fatty acid ratio on the erythrocyte fatty acid profile of spontaneously hypertensive rats was examined.
AU Health Disparities Research examines health disparities in minority, low-resourced, rural populations resulting from discrimination, poor-quality sleep, and lack of access to healthcare. **AU Obesity-linked Diabetes, Cancer, and Alzheimer's Research**: Addresses i) impact of a Western diet on the circadian clock and hippocampal functioning in mice, ii) role of omega-3 derived lipid mediators on neuronal inflammation in a diabetic mouse model, and iii) relationships between gut microbiota and dendritic cells in obesity.
Alabama Extension at Auburn University Supplemental Nutrition Assistance Program - Education (SNAP-Ed) used an evidence-based, comprehensive, multi-level approach to create a healthy population.
EFNEP teaches limited-resource audiences, through a series of lessons primarily in group settings, how to improve dietary practices and become more effective managers of available resources.
Health Concerns of Small-Scale Limited Resource Farmers : Tuskegee University Cooperative Extension Program in conjunction with the University of West Alabama, embarked on a 15-week hands-on and group demonstration series of workshops, and also four (4) group meetings related to issues of health and health disparity for rural farmers and workers. The program involved university health care professionals; farmers, and part-time farm workers. The participants learned basic preventive health care such as animal-borne illness, self-administering veterinarian supplies, and the effects of exposure to too much sun.
CHAMPION is designed to improve eating habits and increase physical activity to reduce risk factors of chronic diseases. The behavioral change curriculum is a series of four (4) lessons on fruits and vegetables and four (4) physical activity classes. The intervention method focused on the "Small Steps" strategy using only two concepts to transform or modify existing behaviors to live a healthy lifestyle.
AAMU Research Super Market Tour-based Intervention -The purpose of this study was to evaluate whether a hands-on supermarket tour intervention could increase consumption of fruits and vegetables.

2. Brief description of the target audience

TU Green leafy vegetables fatty acid ratio research targets researchers and clinicians
AU Health Disparities Research/ AU Obesity-linked Diabetes, Cancer, and Alzheimer's Research: Scientists, students, policymakers, health professionals, and general public.
The target audience for EFNEP includes: -Limited-resource parents and other adult caregivers who have responsibility for feeding young children. -Limited-resource pregnant teens and women. The target audience eligible to receive nutrition education and obesity prevention services continues to focus on SNAP participants and low income individuals.
Health Concerns of Small-Scale Limited Resource Farmers targets rural small-scale limited resource farmers, farm workers, and farm families.
Champion targets urban youth and adults
AAMU Research Super Market Tour-based Intervention targets -youth and adults

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	45828	67000	37520	4500

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year:	2018
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	23	42	65

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of basic nutrition classes/workshops conducted

Year	Actual
2018	5498

Output #2

Output Measure

- Number of people participating in nutrition classes
  Not reporting on this Output for this Annual Report

Output #3

Output Measure

- Number of food resource management classes conducted
  Not reporting on this Output for this Annual Report

Output #4

Output Measure

- Number of people participating in the food resource management classes
  Not reporting on this Output for this Annual Report

Output #5

Output Measure

- Number of food safety classes conducted
  Not reporting on this Output for this Annual Report

Output #6

Output Measure

- Number of people participating in food safety classes
  Not reporting on this Output for this Annual Report

Output #7

Output Measure

- Number of meal planning classes conducted
  Not reporting on this Output for this Annual Report

Output #8

Output Measure

- Number of people participating in meal planning classes
  Not reporting on this Output for this Annual Report

Output #9

Output Measure

- Number of food preparation classes conducted
  Not reporting on this Output for this Annual Report

Output #10

Output Measure

- Number of people participating in food preparation classes
  Not reporting on this Output for this Annual Report

Output #11

Output Measure

- Number of food demonstrations conducted
  Not reporting on this Output for this Annual Report

Output #12

Output Measure

- Number of people participating in food demonstrations
  Not reporting on this Output for this Annual Report

Output #13

Output Measure

- Number of students participating in Body Quest: Food of the Warrior.
  Not reporting on this Output for this Annual Report

Output #14

Output Measure

- Number of in-service trainings
  Not reporting on this Output for this Annual Report

Output #15

Output Measure

- Number of adult participants
  Not reporting on this Output for this Annual Report

Output #16

Output Measure

- Number of youth participants
  Not reporting on this Output for this Annual Report

Output #17

Output Measure

- Number of chronic disease lessons.
  Not reporting on this Output for this Annual Report

Output #18

Output Measure

- Number of physical activity lessons
  Not reporting on this Output for this Annual Report

Output #19

Output Measure

- Number of participants weighed-in
  Not reporting on this Output for this Annual Report

Output #20

Output Measure

- Number of people participating in physical activity
  Not reporting on this Output for this Annual Report

Output #21

Output Measure

- Number of places that provide healthy food options.
  Not reporting on this Output for this Annual Report

Output #22

Output Measure

- Number of places that provide opportunities for physical activity.
  Not reporting on this Output for this Annual Report

Output #23

Output Measure

- Number of people who receive diabetes self-management training.
  Not reporting on this Output for this Annual Report

Output #24

Output Measure

- Number of facts sheets, newsletters, etc.
  Not reporting on this Output for this Annual Report

Output #25

Output Measure

- Number of adaptive teaching and training curriculum modules
  Not reporting on this Output for this Annual Report

Output #26

Output Measure

- Number of new food products
  Not reporting on this Output for this Annual Report

Output #27

Output Measure

- Number of food coupons distributed
  Not reporting on this Output for this Annual Report

Output #28

Output Measure

- Number of community coalitions participating in the ALProHealth project

Year	Actual
2018	16

Output #29

Output Measure

- Number of coalition members trained to assess the use of community walking trails using infrared counters

Year	Actual
2018	4

Output #30

Output Measure

- Number of state partnerships supporting statewide efforts of ALProHealth

Year	Actual
2018	27

Output #31

Output Measure

- Number of counties conducting Body Quest, a childhood obesity prevention initiative for 3rd graders

Year	Actual
2018	12

Output #32

Output Measure

- Number of counties establishing or expanding a school garden

Year	Actual
2018	9

Output #33

Output Measure

- Number of schools implementing "Just Move! Alabama," a statewide initiative to increase physical activity in children grades K-8

Year	Actual
2018	3

Output #34

Output Measure

- Number of community gardens established by community coalitions

Year	Actual
2018	8

Output #35

Output Measure

- Number of existing community gardens enhanced or supported by community coalitions

Year	Actual
2018	19

Output #36

Output Measure

- Number of counties promoting healthy lifestyle choices through signage messaging

Year	Actual
2018	5

Output #37

Output Measure

- Number of counties working with local convenience stores or grocery stores to market healthy foods and beverages through Good Choice

Year	Actual
2018	6

Output #38

Output Measure

- Number of food banks with increased capactiy for distribution of fruits and vegetables

Year	Actual
2018	5

Output #39

Output Measure

- Number of counties installing outdoor fitness or exercise equipment

Year	Actual
2018	5

Output #40

Output Measure

- Number of counties establishing or supporting an indoor community fitness facility

Year	Actual
2018	5

Output #41

Output Measure

- Number of counties installing or repairing playground equipment at community parks

Year	Actual
2018	7

Output #42

Output Measure

- Number of counties Number of counties establishing a new walking or biking trail

Year	Actual
2018	1

Output #43

Output Measure

- Number of counties participating in Scale Back Alabama

Year	Actual
2018	5

Output #44

Output Measure

- Number of counties establishing and supporting a walking or exercise group

Year	Actual
2018	5

Output #45

Output Measure

- Number of counties participating in a Safe Routes to School program

Year	Actual
2018	2

Output #46

Output Measure

- Number of adults who participated in AU SNAP-Ed nutrition education (unduplicated count)

Year	Actual
2018	22845

Output #47

Output Measure

- Number of youth who participated in AU SNAP-Ed nutrition education (unduplicated count)

Year	Actual
2018	20033

Output #48

Output Measure

- Number of basic SNAP Ed nutrition classes/workshops conducted

Year	Actual
2018	5498

Output #49

Output Measure

- Number of students participating in Body Quest: Food of the Warrior.

Year	Actual
2018	6580

Output #50

Output Measure

- Number of parents participating in Body Quest: Food of the Warrior

Year	Actual
2018	4980

Output #51

Output Measure

- Number of Alabama counties with elementary schools participating in Body Quest: Food of the Warrior

Year	Actual
2018	54

Output #52

Output Measure

- Number of 3rd grade classrooms participating in Body Quest: Food of the Warrior

Year	Actual
2018	346

Output #53

Output Measure

- Number of impressions for a social marketing billboard campaign

Year	Actual
2018	674500

Output #54

Output Measure

- Number of Alabama counties with policy, systems, environmental and promotional changes at parks/trails

Year	Actual
2018	8

Output #55

Output Measure

- Number of Alabama counties with policy, systems, environmental and promotional changes at schools

Year	Actual
2018	24

Output #56

Output Measure

- Number of schools with healthy policy, systems, environmental and promotional changes

Year	Actual
2018	59

Output #57

Output Measure

- Number of professional presentations

Year	Actual
2018	15

Output #58

Output Measure

- Number of EFNEP basic nutrition classes/workshops conducted

Year	Actual
2018	10854

Output #59

Output Measure

- Number of EFNEP adult participants

Year	Actual
2018	1671

Output #60

Output Measure

- Number of EFNEP youth participants

Year	Actual
2018	4401

Output #61

Output Measure

- Number of limited-resource pregnant teens and women

Year	Actual
2018	617

Output #62

Output Measure

- Number of sessions of basic nutrition education taught directly to youth completing EFNEP

Year	Actual
2018	1309

Output #63

Output Measure

- Number of Community Partnerships for adult and youth EFNEP nutrition education

Year	Actual
2018	273

Output #64

Output Measure

- Number of EFNEP Adult Graduates, Completing Series of 6 lessons

Year	Actual
2018	1324

Output #65

Output Measure

- Number of EFNEP Youth Graduates, Completing Series of 6 lessons

Year	Actual
2018	4113

Output #66

Output Measure

- The number of TU Health Concerns of Small-Scale Limited Resource Farmers Program presentations conducted

Year	Actual
2018	2

Output #67

Output Measure

- The number of participants in TU Health Concerns of Small-Scale Limited Resource Farmers Program.

Year	Actual
2018	19

Output #68

Output Measure

- Number of adult participants in Champion programs

Year	Actual
2018	733

Output #69

Output Measure

- Number of Champion basic nutrition classes/workshops conducted

Year	Actual
2018	204

Output #70

Output Measure

- Number of Champion in-service trainings

Year	Actual
2018	2

Output #71

Output Measure

- Number of Champion physical activity lessons

Year	Actual
2018	98

Output #72

Output Measure

- Number of Champion adaptive teaching and training curriculum modules

Year	Actual
2018	1

Output #73

Output Measure

- The number of Champion health events

Year	Actual
2018	23

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	The number of participants who increased knowledge of basic nutrition concepts
2	The number of participants that follow MyPlate/Dietary Guidelines recommendations
3	The number of participants who increased physical activity
4	The number of participants who adopted food safety tips
5	The number of participants who read food labels when purchasing food
6	The number of participants who utilize a personal budget
7	The number of participants who plan meals based on what is on hand, on sale, and in season
8	The number of participants who prepare shopping list before shopping
9	The number of participants who modify recipes to make them healthier
10	The number of participants who use comparison shopping techniques
11	Number/% of treatment group participants who increase fruit and vegetable consumption from pre- to post-assessment and as compared to control group
12	Number/% of treatment group participants who increase physical activity from pre- to post-assessment and as compared to control group
13	Number/% of treatment group families of participants who increase physical activity from pre- to post-assessment and as compared to control group
14	Number/% of treatment group participants who increase eating breakfast from pre- to post-assessment and as compared to control group
15	Number of adults increased physical activity to 30 minutes or more
16	Number of youth increased physical activity to 60 minutes or more
17	The percent change of adult participants weight loss

18	Means comparison of youth and adults nutritional, physical activity, and chronic disease knowledge retained three (3) months post education
19	Percentage of youth and adults improved eating habits and physical activity time three (3) months post education
20	The number of participants with increase knowledge on healthy behaviors associated with eating.
21	The number of participants with increased knowledge of diabetes.
22	The number of participant who did not run out of food before the month end
23	The number of participants who consumer healthier foods (fruit and vegetable)
24	Number of individuals with increased food security enhancement of local food banks
25	Increase in total funding obtained through partner contributions, volunteer hours and grants using ALProHealth as leverage
26	Difference in vegetable consumption between Body Quest treatment group students and control group students at post-analysis as measured through self-report
27	Difference in vegetable consumption of Body Quest treatment group students from pre- to post-assessment as measured through self-report
28	Increased Health disparities in Alabama research
29	The number of EFNEP adults who adopted food insecurity avoidance recommnendations
30	The number of children in EFNEP programs who adopted healthy food choice recommendations
31	The number of ENFEP youth who increased physical activity
32	The number of Black Belt farmers with increased knowledge of basic preventative health.
33	The number of vegetables identified by TU food scientists that mitigate the potential effects of elevated ω-6/ω-3 FAR
34	Increase #/% in Champion adults' fruits, vegetables and physical activity knowledge
35	Increased in #/% of participants fruits and vegetables consumption.
36	Increased #/% of Champion participants engaged in physical activity.
37	The number of AAMU researchers with increased knowledge of socio economic barriers to healthy food consumption

Outcome #1

1. **Outcome Measures**

The number of participants who increased knowledge of basic nutrition concepts

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

The number of participants that follow MyPlate/Dietary Guidelines recommendations

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

The number of participants who increased physical activity

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

The number of participants who adopted food safety tips

Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

The number of participants who read food labels when purchasing food

Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

The number of participants who utilize a personal budget

Not Reporting on this Outcome Measure

Outcome #7

1. **Outcome Measures**

The number of participants who plan meals based on what is on hand, on sale, and in season

Not Reporting on this Outcome Measure

Outcome #8

1. **Outcome Measures**

The number of participants who prepare shopping list before shopping

Not Reporting on this Outcome Measure

Outcome #9

1. **Outcome Measures**

The number of participants who modify recipes to make them healthier

Not Reporting on this Outcome Measure

Outcome #10

1. **Outcome Measures**

The number of participants who use comparison shopping techniques

Not Reporting on this Outcome Measure

Outcome #11

1. **Outcome Measures**

Number/% of treatment group participants who increase fruit and vegetable consumption from pre- to post-assessment and as compared to control group

Not Reporting on this Outcome Measure

Outcome #12

1. **Outcome Measures**

Number/% of treatment group participants who increase physical activity from pre- to post-assessment and as compared to control group

Not Reporting on this Outcome Measure

Outcome #13

1. **Outcome Measures**

Number/% of treatment group families of participants who increase physical activity from pre- to post-assessment and as compared to control group

Not Reporting on this Outcome Measure

Outcome #14

1. **Outcome Measures**

Number/% of treatment group participants who increase eating breakfast from pre- to post-assessment and as compared to control group

Not Reporting on this Outcome Measure

Outcome #15

1. **Outcome Measures**

Number of adults increased physical activity to 30 minutes or more

Not Reporting on this Outcome Measure

Outcome #16

1. **Outcome Measures**

Number of youth increased physical activity to 60 minutes or more

Not Reporting on this Outcome Measure

Outcome #17

1. **Outcome Measures**

The percent change of adult participants weight loss

Not Reporting on this Outcome Measure

Outcome #18

1. **Outcome Measures**

Means comparison of youth and adults nutritional, physical activity, and chronic disease knowledge retained three (3) months post education

Not Reporting on this Outcome Measure

Outcome #19

1. **Outcome Measures**

Percentage of youth and adults improved eating habits and physical activity time three (3) months post education

Not Reporting on this Outcome Measure

Outcome #20

1. **Outcome Measures**

The number of participants with increase knowledge on healthy behaviors associated with eating.

Not Reporting on this Outcome Measure

Outcome #21

1. **Outcome Measures**

The number of participants with increased knowledge of diabetes.

Not Reporting on this Outcome Measure

Outcome #22

1. **Outcome Measures**

The number of participant who did not run out of food before the month end

Not Reporting on this Outcome Measure

Outcome #23

1. **Outcome Measures**

The number of participants who consumer healthier foods (fruit and vegetable)

Not Reporting on this Outcome Measure

Outcome #24

1. **Outcome Measures**

Number of individuals with increased food security enhancement of local food banks

2. **Associated Institution Types**

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	116177

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

While more than one-third of adults in Alabama are obese, rates of obesity and related illnesses are disproportionately higher among rural and limited resource individuals. Characteristics of the community, such as the access to healthy food sources and physical activity sites, can play a key role in influencing obesity-related behaviors. Rural southern populations experience disadvantageous environments that contribute to increased obesity rates. Understanding which characteristics of the community have the heaviest impact on obesity in rural Alabama is critical to developing an appropriate intervention strategy.

What has been done
ALProHealth is an obesity-prevention program for residents of Alabama?s fourteen counties with adult obesity rates of greater than forty percent. Coalitions consisting of community champions were formed in all fourteen counties. Through policy, systems, and environmental changes, Community Coalitions provided guidance on the implementation of nutrition education opportunities, increased access to healthy food options and created safe, affordable places for physical activity.

Results
116117 individuals are less food insecure as a result of local food bank enhancements.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle
802	Human Development and Family Well-Being

Outcome #25

1. Outcome Measures

Increase in total funding obtained through partner contributions, volunteer hours and grants using ALProHealth as leverage

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	1298744

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

While more than one-third of adults in Alabama are obese, rates of obesity and related illnesses are disproportionately higher among rural and limited resource individuals. Characteristics of the community, such as the access to healthy food sources and physical activity sites, can play a key role in influencing obesity-related behaviors. Rural southern populations experience disadvantageous environments that contribute to increased obesity rates. Understanding which characteristics of the community have the heaviest impact on obesity in rural Alabama is critical to developing an appropriate intervention strategy.

What has been done

ALProHealth is an obesity-prevention program for residents of Alabama?s fourteen counties with adult obesity rates of greater than forty percent. Coalitions consisting of community champions were formed in all fourteen counties. Through policy, systems, and environmental changes, Community Coalitions provided guidance on the implementation of nutrition education opportunities, increased access to healthy food options and created safe, affordable places for physical activity.

Results

The following counties contributed to the leveraged funds:
Barbour $86,019
Bibb $12,254
Bullock $200,875
Chambers $115,880
Coosa $47,372
Crenshaw $3,838
Cullman $47,973
Escambia $20,168
Greene $666,143
Pickens $13,601
Sumter $59,156
Wilcox $3,008

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
802	Human Development and Family Well-Being
805	Community Institutions, Health, and Social Services

Outcome #26

1. Outcome Measures

Difference in vegetable consumption between Body Quest treatment group students and control group students at post-analysis as measured through self-report

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	1667

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Nineteen percent of Alabama's children ages 10-17 are obese. Dietary patterns begin in childhood making child nutrition education and early intervention critical. Alabama has among the highest obesity rates and obesity-related disease rates in the nation. An associated risk factor for obesity and chronic disease is low fruit and vegetable consumption. Currently, Alabama children do not reach federal recommendations for fruit and vegetable consumption. Reaching children in low-income communities through SNAP-Ed is a key strategy for tackling Alabama obesity and health issues.

What has been done
Body Quest is a childhood obesity prevention program for elementary youth, particularly third graders in schools with 50% or more of students receiving free or reduced meals. Third graders across the state are empowered to make healthier choices during a 15-week impact evaluation intervention. In FY18, each SNAP-Ed Extension, full-time nutrition educator (n=33) worked with a minimum of 10 classes designated as either treatment or control. Treatment students were in different schools from control students. Schools were randomly assigned with one to five classes per school. Students were recruited using standardized scripts; parents of participating third graders signed an informed consent. An Institutional Review Board approved this study.

Results
Based on pre- and post-assessment data analyzed by t-test:
Body Quest treatment group students (n=2,239) reported significantly higher ($t=8.64$, $p<0.001$) vegetable consumption compared to control group students (n=1,667) at post-analysis.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle
802	Human Development and Family Well-Being

Outcome #27

1. Outcome Measures

Difference in vegetable consumption of Body Quest treatment group students from pre- to post-assessment as measured through self-report

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	2239

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Nineteen percent of Alabama's children ages 10-17 are obese. Dietary patterns begin in childhood making child nutrition education and early intervention critical. Alabama has among the highest obesity rates and obesity-related disease rates in the nation. An associated risk factor for obesity and chronic disease is low fruit and vegetable consumption. Currently, Alabama children do not reach federal recommendations for fruit and vegetable consumption. Reaching children in low-income communities through SNAP-Ed is a key strategy for tackling Alabama obesity and health issues.

What has been done
Body Quest is a childhood obesity prevention program for elementary youth, particularly third graders in schools with 50% or more of students receiving free or reduced meals. Third graders across the state are empowered to make healthier choices during a 15-week impact evaluation intervention. In FY18, each SNAP-Ed Extension, full-time nutrition educator (n=33) worked with a minimum of 10 classes designated as either treatment or control. Treatment students were in different schools from control students. Schools were randomly assigned with one to five classes per school. Students were recruited using standardized scripts; parents of participating third graders signed an informed consent. An Institutional Review Board approved this study.

Results
Based on pre- and post-assessment data analyzed by t-test:
Body Quest treatment group students (n=2,239) reported a significant increase ($t=10.61$, $p<0.001$) in vegetable consumption from pre- to post-assessment.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle
802	Human Development and Family Well-Being

Outcome #28

1. Outcome Measures

Increased Health disparities in Alabama research

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The goals of AU Health Disparities Research to examine: (a) Early life adversity, health behaviors, financial resources, and discrimination as predictors of group differences in health and in the link between education and health; (b) Racial and socioeconomic disparities in sleep as related to social, emotional, and cognitive functioning in childhood and adolescence; (c) Intelligent agent technology as a strategy to overcome barriers to e-health use in the rural elderly community.

What has been done
Data collection has included (a) Self-reported health behaviors and academic stress, physiological reactivity to academic stress, and biomarkers of stress; (b) Self-reported and objective (i.e., actigraph) measures of sleep as well as standardized cognitive assessments and questionnaire-based and observational measures of social and emotional functioning; (c) Interviews with state government officials to identify needs with respect to older adults? Medicare plan decision making, as well as experimental data on the effects of intelligent-agent communication styles (i.e., task- or social-oriented).

Results
Results suggest that (a) Discrimination experiences in the workplace and community settings predict greater health declines among adults who are socioeconomically disadvantaged; (b) African American children and children from families with lower socioeconomic status reported greater sleepiness; greater sleepiness, in turn, predicted lower cognitive and academic

functioning; (c) Older adults? will benefit from on-screen, real-time decision assistance with Medicare plan decisions, and the most effective style of intelligent-agent communication varies based on users? task-related competence.

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

Outcome #29

1. Outcome Measures

The number of EFNEP adults who adopted food insecurity avoidance recommnendations

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	672

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Limited-resource families are more likely to not have enough nutritious food to eat. To reduce the likelihood of
running out of food before the end of the month, there is a need to increase ability of EFNEP clients to purchase
food directly, get food from assistance programs, and identify ways to better manage food resources.

What has been done
In 2018, 24 EFNEP Educators in 23 Alabama counties taught 1324 heads of households how to to choose foods with the most
nutrition at the lowest cost and how to better utilize food resources (i.e., WIC, SNAP benefits, dollars, gardens, food
bank) to not run out of money for food before the end of the month. Peer educators stay abreast of community
resources so as to offer hunger reducing solutions and make referrals to the target audience.

Results

Fifty -one percent (n =672) of participants showed improvement in one or more food security indicators (i.e., not eating less than you wanted so there was more food for your family or having enough money to get food for your family).

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle
802	Human Development and Family Well-Being

Outcome #30

1. Outcome Measures

The number of children in EFNEP programs who adopted healthy food choice recommendations

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	3545

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Childhood obesity is one of the greatest and most pressing child health issues in the state of Alabama. Children of limited-resource families are at particular risk.

What has been done
Through school enrichment, short term programs, and after-school programming, 4401 Alabama children and youth in grades Kindergarten and grades 4-8, participated in CATCH (Coordinated Approach to Child Health) to increase nutrition education and physical activity levels.

Results
After 1347 lessons and 4113 graduates, 86% of children and youth improved their abilities to choose foods according to Federal dietary guidelines.

4. Associated Knowledge Areas

KA Code	Knowledge Area

703	Nutrition Education and Behavior
724	Healthy Lifestyle
802	Human Development and Family Well-Being

Outcome #31

1. Outcome Measures

The number of ENFEP youth who increased physical activity

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	2015

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Childhood obesity is one of the greatest and most pressing child health issues in the state of Alabama. Children of limited-resource families are at particular risk.

What has been done
Through school enrichment, short term programs, and after-school programming, 4401 Alabama children and youth in grades Kindergarten and grades 4-8, participated in CATCH (Coordinated Approach to Child Health) to increase nutrition education and physical activity levels.

Results
49% of youth improved their physical activity practices. Making wise nutrition choices and increasing physical activity helps to prevent childhood obesity.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle
802	Human Development and Family Well-Being

Outcome #32

1. Outcome Measures

The number of Black Belt farmers with increased knowledge of basic preventative health.

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	19

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The Green and Hale County Advisory Council, in conjunction with TUCEP and the University of West Alabama health care professionals, was concerned with the lack of adequate physicians to serve in the Green and Hale Counties, both underserved counties. They formed a partnership in order to deal with this problem, especially for small-scale farmers, farm workers, and farm families.

What has been done
TUCEP, in conjunction with the University of West Alabama, embarked on a 15-week hands-on and group demonstration series of workshops, and also four (4) group meetings related to issues of health and health disparity for rural farmers and workers. The program involved seventeen (17; 5 females and 12 males) university health care professionals; four (4) male farmers, and fifteen (15; 11 males and 4 females) part-time farm workers. The participants were taught basics of preventive health care and other farm and health related issues. The farmers and farm workers gained knowledge on basic health and other health exposures, such as animal-borne illness, self-administering veterinarian supplies, early hearing test, and the effects of exposure to too much sun. Two (2) research proposals are also being developed.

Results
100% of Nineteen (19) farmers and farm workers participated in the Health Concerns of Small-Scale Limited Resource Farmers Program. The participants were taught basics of preventive health care and other farm and health related issues. The farmers and farm workers gained knowledge on basic health and other health exposures, such as animal-borne illness, self-administering veterinarian supplies, early hearing test, and the effects of exposure to too much sun.

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
802	Human Development and Family Well-Being

Outcome #33

1. Outcome Measures

The number of vegetables identified by TU food scientists that mitigate the potential effects of elevated ω-6/ω-3 FAR

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Cardiovascular diseases (CVDs) and their associated co-morbidities are the leading causes of morbidity and mortality in the United States and globally. One of the most modifiable risk factors for CVDs is dietary intake, with plant-based diets rich in green leafy vegetables, fruits, and whole grains and with a lower omega-6/omega-3 fatty acid ratio, reducing the risk for disease. Conversely, the Western dietary pattern, characterized by refined grain, fats, an elevated omega-6/omega-3 fatty acid ratio (~25:1) and few fruits, vegetables and whole grains, significantly increases the risk for disease. Further, indicators of dietary intake and disease risk may be reflected in cellular and tissue status and reserves. Examining the erythrocyte fatty acid profile is one way to examine the relationship between dietary intake and CVD risk.

What has been done
An animal study was conducted to determine the influence of collard greens (CG; Brassica Oleracea L.), purslane (PL; Portulaca oleracea) and sweet potato greens (SPG; Ipomoea batatas L.), incorporated into diets with a 25:1 omega-6/omega-3 fatty acid ratio (FAR) , on the erythrocyte fatty acid profile of spontaneously hypertensive rats (SHRs) following six weeks consumption of diets. SHRs were randomly assigned to one of five dietary groups ? standardized control (AIN-76A), Control (25:1 ω-6/ω-3 FAR), CG (25:1 ω-6/ω-3 FAR + 4% CG), PL (25:1 ω-6/ω-3 FAR + 4% PL) or SPG (25:1 ω-6/ω-3 FAR + 4% SPG). Gas-liquid chromatography was utilized to determine SHRs erythrocyte fatty acid profiles.

Results
Consumption of diets containing GLVs resulted in significantly lower percentages of total saturated fatty acids ($p < 0.05$) and greater percentages of polyunsaturated fatty acids in SHR erythrocytes. Total polyunsaturated fatty acids were greatest among SHRs consuming diets containing PL. The present study demonstrates the ability of collard greens, purslane and sweet potato greens to mitigate the potential effects of an elevated ω-6/ω-3 FAR, which may contribute to an atherogenic fatty acid profile, inflammation and disease pathogenesis. Optimal nutritional recommendations for disease prevention should consider the inclusion of these GLVs into the diet, particularly among those consuming diets with an elevated ω-6/ω-3 FAR.

4. Associated Knowledge Areas

KA Code	Knowledge Area
701	Nutrient Composition of Food
702	Requirements and Function of Nutrients and Other Food Components

Outcome #34

1. Outcome Measures

Increase #/% in Champion adults' fruits, vegetables and physical activity knowledge

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	733

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Alabama is ranked fifth for adult obesity (36.3%). Majority of individuals ages 26-64 years (40%); Blacks (43%) and Women (34%) and Men (32%) are at the highest risk. This rate has an effect on the increased incidents of obesity-related diseases (Diabetes- 14%, Hypertension- 42%, High Cholesterol- 34%, Coronary Heart Disease- 7%). Contributing key factors are unhealthy eating habits- consumed under the recommended servings of fruits and vegetables combined (adults-52%) and physical inactivity (adults-32%).

What has been done
The behavioral change curriculum was implemented by six UREAs. The program was a series of four lessons on fruits and vegetables and four physical activity classes. The intervention method

focused on the ?Small Steps? strategy using only two concepts to transform or modify existing behaviors to live a healthy lifestyle.

Results

Adults? before (n=733) and after (n=687) nutrition and physical activity knowledge increased from pretest (38%) to posttest (76%).

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle

Outcome #35

1. Outcome Measures

Increased in #/% of participants fruits and vegetables consumption.

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	733

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Alabama is ranked fifth for adult obesity (36.3%). Majority of individuals ages 26-64 years (40%); Blacks (43%) and Women (34%) and Men (32%) are at the highest risk. This rate has an effect on the increased incidents of obesity-related diseases (Diabetes- 14%, Hypertension- 42%, High Cholesterol- 34%, Coronary Heart Disease- 7%). Contributing key factors are unhealthy eating habits- consumed under the recommended servings of fruits and vegetables combined (adults-52%) and physical inactivity (adults-32%).

What has been done

The behavioral change curriculum was implemented by six UREAs. The program was a series of four lessons on fruits and vegetables and four physical activity classes. The intervention method focused on the ?Small Steps? strategy using only two concepts to transform or modify existing behaviors to live a healthy lifestyle.

Results

Adults? before (n=733) and after (n=687) nutrition and physical activity knowledge increased from pretest (38%) to posttest (76%).

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
802	Human Development and Family Well-Being

Outcome #36

1. Outcome Measures

Increased #/% of Champion participants engaged in physical activity.

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	733

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Thirty-two percent of adults in Alabama are physically inactive. However, 45% achieved the equivalent of at least 150 minutes of moderate intensity physical activity per week. Adults will not keep up a continuous physical activity regime to reduce risk of obesity and related chronic diseases.

What has been done
Physical activity classes were conducted with each nutrition lesson for 30 minutes or more (4 classes). Adults completed a self-evaluated physical activity questionnaire.

Results
Adults engaged in some form of physical activity (75%) after classes. Physical activity goals increased from 10-20 minutes per day to 30 minutes per day. Participants exercised 3-5 days per week, engaging in aerobic activities 2-3 days per week for 10-30 minutes and strength training 1-3 days per week for 10-20 minutes.

4. Associated Knowledge Areas

KA Code	Knowledge Area

724	Healthy Lifestyle
802	Human Development and Family Well-Being

Outcome #37

1. Outcome Measures

The number of AAMU researchers with increased knowledge of socio economic barriers to healthy food consumption

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The purpose of this study was to evaluate whether a hands-on supermarket tour intervention could increase consumption of fruits and vegetables.

What has been done
The Surveys for Fruit and Vegetable Consumption and Physical Activity

Institutional Review Board (IRB)

Nutrition-focused grocery store tours
The height of each participant was measured using a pre-calibrated Inbody BSM370 Stadiometer. The weight and body fat percentage of the students were measured using an Inbody 570.

Data were collected and statistically analyzed

Results
Results showed no significant increase ($p > 0.05$) in the intervention group?s fruit and vegetable consumption when compared to the control group. The perceived barrier found within this sample population of college students, which is cost, could possibly rationalize the lack of increase vegetable consumption among the intervention group. The overall fruit consumption was found to be below the recommended values, but vegetable consumption exceeded the recommended values. It was found that males consumed more fruits and vegetables than did females. Interventions that will be more effective is probably necessary to persuade shoppers to purchase and consume more fruits and vegetables.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
805	Community Institutions, Health, and Social Services

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)
- Other (catastrophic food poisoning)

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

TU Health Concerns of Small-Scale Limited Resource Farmers: 100% of nineteen farmers and farm workers who participated in the Health Concerns of Small-Scale Limited Resource Farmers Program were taught basics of preventive health care and other farm and health related issues. The results showed that all the 19 participants gained knowledge in basic health and other health exposure issues, such as animal-borne illness, self-administering veterinarian supplies, early hearing test, and the effects of exposure to too much sun.
TU Green leaf fatty acid research: Consumption of diets containing GLVs resulted in significantly lower percentages of total saturated fatty acids ($p < 0.05$) and greater percentages of polyunsaturated fatty acids in SHR erythrocytes. Total polyunsaturated fatty acids were greatest among SHRs consuming diets containing PL. The present study demonstrates the ability of collard greens, purslane and sweet potato greens to mitigate the potential effects of an elevated -6/-3 FAR, which may contribute to an atherogenic fatty acid profile, inflammation and disease pathogenesis.
AU Health Disparities Research: Results identify explanations for socioeconomic disparities in health, linking race and socioeconomic status with cognitive outcomes, and strategies for improving access to health information. **AU Obesity-linked Diabetes, Cancer, and Alzheimer's Research**: Research identified: i) that circadian clock in the hippocampus, is altered in the animal model of obesity; and (ii) alteration in neuronal resolution of inflammation in an advanced stage diabetic mouse model.
ALProHealth 116117 individuals are less food insecure as a result of local food bank enhancements. **Body Quest** treatment group students (n=2,239) reported significantly

higher (t=8.64, p<0.001) vegetable consumption compared to control group students (n=1,667) at post-analysis. Data show that 95.5% of adul**t EFNEP** graduates showed positive change in any food group at exit (fruits, vegetables, grains, protein foods, dairy).
Champion Adults' before (n=733) and after (n=687) nutrition, chronic diseases and physical activity knowledge increased from pretest (38%) to posttest (76%). Majority of adult participants consumed 1 1/2- 2 cups of fruit pre (n=481) (61%); post (n=447) (70%). Majority of adult participants consumed 1 1/2- 2 cups of vegetables pre (n=532) (46%); post (n=500) (54%).
Adults engaged in some form of physical activity (75%) after classes. Physical activity goals increased from 10-20 minutes per day to 30 minutes per day. Participants exercised 3-5 days per week, engaging in aerobic activities 2-3 days per week for 10-30 minutes and strength training 1-3 days per week for 10-20 minutes.
AAMU Research Super Market Tour-based Intervention Results showed no significant increase ($p > 0.05$) in the intervention group's fruit and vegetable consumption when compared to the control group. The perceived barrier found within this sample population of college students, which is cost, could possibly rationalize the lack of increase vegetable consumption among the intervention group. The overall fruit consumption was found to be below the recommended values, but vegetable consumption exceeded the recommended values. It was found that males consumed more fruits and vegetables than did females.

Key Items of Evaluation

TU Green leaf fatty acid research: Consumption of diets containing GLVs resulted in significantly lower percentages of total saturated fatty acids ($p < 0.05$) and greater percentages of polyunsaturated fatty acids in SHR erythrocytes. Total polyunsaturated fatty acids were greatest among SHRs consuming diets containing PL. The present study demonstrates the ability of collard greens, purslane and sweet potato greens to mitigate the potential effects of an elevated -6/-3 FAR, which may contribute to an atherogenic fatty acid profile, inflammation and disease pathogenesis.
TU Health Concerns of Small-Scale Limited Resource Farmers: 100% of nineteen farmers and farm workers who participated in the Health Concerns of Small-Scale Limited Resource Farmers Program were taught basics of preventive health care and other farm and health related issues. The results showed that all the 19 participants gained knowledge in basic health and other health exposure issues, such as animal-borne illness, self-administering veterinarian supplies, early hearing test, and the effects of exposure to too much sun.
AU Health Disparities Research: Results identify explanations for socioeconomic disparities in health, linking race and socioeconomic status with cognitive outcomes, and strategies for improving access to health information. **AU Obesity-linked Diabetes, Cancer, and Alzheimer's Research**: Research identified: i) that circadian clock in the hippocampus, is altered in the animal model of obesity; and (ii) alteration in neuronal resolution of inflammation in an advanced stage diabetic mouse model.
ALProHealth 116117 individuals are less food insecure as a result of local food bank enhancements. **Body Quest t**reatment group students (n=2,239) reported significantly higher (t=8.64, p<0.001) vegetable consumption compared to control group students (n=1,667) at post-analysis. Data show that 95.5% of adult. **EFNEP** graduates showed positive change in any food group at exit (fruits, vegetables, grains, protein foods, dairy).
Champion Behavioral habits of adults three-six months post-delayed (n=362) were assessed for consumption of fruits and vegetables. Majority of participants (n=357) consumed 1 1/2- 2 cups/per day of Fruits (49%) and Vegetables (63%). Participants

engaged in physical activity for 3-5 days per week for 30 minutes (36%).

AAMU Research Super Market Tour-based Intervention Results showed no significant increase ($p > 0.05$) in the intervention group's fruit and vegetable consumption when compared to the control group. The perceived barrier found within this sample population of college students, which is cost, could possibly rationalize the lack of increase vegetable consumption among the intervention group. The overall fruit consumption was found to be below the recommended values, but vegetable consumption exceeded the recommended values. It was found that males consumed more fruits and vegetables than did females.

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Sustainable Energy

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
101	Appraisal of Soil Resources	10%	0%	0%	0%
102	Soil, Plant, Water, Nutrient Relationships	20%	0%	0%	5%
125	Agroforestry	0%	0%	0%	10%
201	Plant Genome, Genetics, and Genetic Mechanisms	0%	0%	0%	10%
202	Plant Genetic Resources	0%	0%	0%	10%
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%	0%	0%	5%
205	Plant Management Systems	0%	0%	40%	10%
211	Insects, Mites, and Other Arthropods Affecting Plants	0%	0%	0%	5%
212	Pathogens and Nematodes Affecting Plants	0%	0%	3%	5%
216	Integrated Pest Management Systems	20%	0%	0%	10%
303	Genetic Improvement of Animals	0%	0%	1%	0%
402	Engineering Systems and Equipment	20%	0%	29%	0%
403	Waste Disposal, Recycling, and Reuse	20%	0%	8%	0%
404	Instrumentation and Control Systems	0%	0%	2%	0%
405	Drainage and Irrigation Systems and Facilities	0%	0%	7%	0%
511	New and Improved Non-Food Products and Processes	0%	0%	8%	0%
601	Economics of Agricultural Production and Farm Management	0%	50%	0%	10%
603	Market Economics	10%	0%	2%	5%
605	Natural Resource and Environmental Economics	0%	0%	0%	10%
607	Consumer Economics	0%	50%	0%	5%
	Total	100%	100%	100%	100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2018	Extension		Research	
	1862	1890	1862	1890
Plan	1.9	1.3	18.0	6.0
Actual Paid	1.7	1.6	17.0	4.7
Actual Volunteer	0.0	0.0	0.0	0.0

2. Institution Name: Auburn University

Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
29649	0	901042	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
49602	0	908273	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
278383	0	2283913	0

2. Institution Name: Alabama A&M University

Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

2. Institution Name: Tuskegee University

Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	127009	0	356292
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	104809	0	325062
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

AAMU Renewable biofuels that utilize biomass (crop residues) have been touted as way to secure America's energy future. Many soil scientists fear continued removal of crop residues can lead to a decline in soil productivity. Biochar has been identified as a key component in adapting agronomic-biomas-bioenergy production systems and as a potential soil amendment capable of mitigating climate. Biochar returned to the soil has the ability to return most of nutrients that are taken with the residues, increase carbon storage, and increase plant available water. However, there is a lack of information regarding the impact of biochar on the soil moisture and thermal regimes. Therefore, the objective of the proposed research to determine the effect biochar has on heat and water movement in soil. A four component project is used to determine the effect of biochar application on soil water retention, soil thermal properties, coupled heat and water transfer, and soil water evaporation. The results of the proposed project will help to establish a fundamental basis for mitigating and adapting agronomic-biomass-bioenergy production systems to global climate changes and evaluating the potential of biochar as a soil amendment for highly weathered soils.
AU Biomass Production and Conversion Research: Researchers are developing new materials such as nanocellulose and biofuels from biomass. **AU Phosphorus Recovery from Poultry Litter**: Researchers are investigating an alternative approach to poultry litter management that will lead to reduced environmental impacts and greater income for farmers. **AU Modification of Bio-char for Absorption and Energy Production:** Researchers are investigating surface modification of biochar to other useful materials.

2. Brief description of the target audience

AAMU Target audiences for this project include the following: researchers in soils, biofuels, hydrology, and agronomy; employees of State and Federal agencies dealing with soil, water, and carbon sequestration; and private citizens who are interested in the use of biochar as a soil amendment.
AU Biomass Production and Conversion Research/ AU Modification of Bio-char for Absorption, Energy Production: Engineers, students biofuel start-up companies, producers, crop consultants, county and regional extension agents, policy makers and general public. **AU Phosphorus Recovery from Poultry Litter**: Poultry producers, student, and general public.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2018

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	0	18	18

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of publications

Year	Actual
2018	15

Output #2

Output Measure

- Number of rural well owners trained to improve the quality of their private wells
  Not reporting on this Output for this Annual Report

Output #3

Output Measure

- Number of homeowners trained to improve the use of energy in their homes
  Not reporting on this Output for this Annual Report

Output #4

Output Measure

- Number of homeowners trained to improve the use of energy in their farms
  Not reporting on this Output for this Annual Report

Output #5

Output Measure

- Number of homeowners trained to improve the use of energy in their businesses
  Not reporting on this Output for this Annual Report

Output #6

Output Measure

- Number of children in the Black Belt educated on natural resource management
  Not reporting on this Output for this Annual Report

Output #7

Output Measure

- Number of parents trained in responsible environmental stewardship
  Not reporting on this Output for this Annual Report

Output #8

Output Measure

- Number of volunteers trained in responsible environmental stewardship
  Not reporting on this Output for this Annual Report

Output #9

Output Measure

- Number of community leaders trained in responsible environmental stewardship
  Not reporting on this Output for this Annual Report

Output #10

Output Measure

- Number of development of alternate bioenergy, biofuels, bioproducts and waste management
  Thesis completed

Year	Actual
2018	2

Output #11

Output Measure

- Number of development of alternate bioenergy, biofuels, bioproducts and waste management
  Students.

Year	Actual
2018	7

Output #12

Output Measure

- Number of research projects conducted on preprocessing, preparation and conversion of biomass into fuels, chemicals and products using hydrothermal liquefaction process.

Year	Actual
2018	1

Output #13

Output Measure

- Number of AU metabolic engineering studies carried to increase the efficiency of biobutanol and other chemicals fermentation from biomass.

Year	Actual
2018	1

Output #14

Output Measure

- Number of research project conducted on recovering phosphorous from poultry litter.

Year	Actual
2018	1

Output #15

Output Measure

- Number of studies conducted on producing nanocellulose and adhesives from waste biomass.

Year	Actual
2018	2

Output #16

Output Measure

- The number of Black Belt Photovoltaic Program on farm visits

Year	Actual
2018	22

Output #17

Output Measure

- The number of Black Belt Photovoltaic Program demonstrations

Year	Actual
2018	8

Output #18

Output Measure

- The number of Black Belt Photovoltaic Program students trained

Year	Actual
2018	7

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	The amount of bioenergy increased
2	Development and demonstration of logistics for bioenergy production
3	The number of participants who adopt sustainable energy recommendations
4	The amount of energy saved
5	The number of participants with increased knowledge of sustainable energy
6	The amount of energy produced
7	Increase in knowledge of the effect of biochar on soil physical properties
8	Knowledge gain for the recovery of phosphorus from poultry litter.
9	Knowledge gain for the activation of bio-char produced from pyrolysis.
10	The cost reduction in kWh using solar power in the TU Black Belt Photovoltaic Program research project

Outcome #1

1. **Outcome Measures**

   The amount of bioenergy increased

   Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

   Development and demonstration of logistics for bioenergy production

   Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

   The number of participants who adopt sustainable energy recommendations

   Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

   The amount of energy saved

   Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

   The number of participants with increased knowledge of sustainable energy

   Not Reporting on this Outcome Measure

Outcome #6

1. Outcome Measures

The amount of energy produced

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Increase in knowledge of the effect of biochar on soil physical properties

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The results have enhanced our understanding of the effect of biochar on soil physical properties and processes near the soil surface. As a result, further insights regarding the use biochar as a climate change mitigation tool and soil amendment have been gained.

What has been done
he project has evaluated the effect of biochar on soil thermal and hydraulic properties. Specifically, these measurements have evaluated soil thermal properties (soil thermal conductivity, diffusivity, and volumetric heat capacity). In addition, measurements of saturated hydraulic conductivity in biochar amended soils utilizing different rates and placement methods have been performed. Closed soil column experiments have been performed to evaluated coupled heat and water movement in biochar amended soils. Currently, instrumented soil columns (water content sensors, matric potential sensors, and load cells) are being constructed (in house) to allow performance of open soil column evaporation experiments for biochar amended soils.

Results
AMMU the objectives will help to provide a basis for the use of biochar as a soil amendment that is helpful in establishing agronomic-biomass-bioenergy systems. Furthermore, the objectives of

the project will help to provide a basis for the use biochar as a soil amendment in highly weathered soils and as a potential climate change mitigation tool. Lastly, the project will fill a critical knowledge gap related to the effect of biochar on near-surface soil hydraulic and thermal properties and heat and water transfer which influences a number of biological and chemical processes in soil.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships

Outcome #8

1. Outcome Measures

Knowledge gain for the recovery of phosphorus from poultry litter.

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Poultry litter is typically stored in piles on site until it can be transported to agriculture fields where it is used as a fertilizer substitute. This practice often leads to overloading fields with phosphorus, limiting the time and locations where litter can be applied. Uncontrolled breakdown of organic material during litter storage also can lead to methane emissions, a potent greenhouse gas. This puts a lot of pressure to the poultry growers on how to dispose litter.

What has been done
Researchers developed biological pretreatment to overcome recalcitrance of poultry litter to anaerobic digestion, and develop physical, chemical, and biological approaches to overcome potential digestate inhibition of algal growth. Also, analyzed algal biomass composition to determine suitability for biofuel and animal feed applications including investigation of potential pathogens in the recovered biomass.

Results
Researchers reported that leaching poultry litter prior to anaerobic digestion is beneficial. Leached litter with water was very well-suited to anaerobic digestion whereas the remaining

bedding material was less-amenable to digestion. Interestingly, the leached material was very high in nitrogen and phosphorus. Based on these results, our leaching and digestion approach holds potential to 1) increase digestibility of poultry manure, 2) produce biogas which can be used to heat poultry houses and dry the leached litter, and 3) strip the litter of phosphorus so that soils are not overloaded during land application of litter.

4. Associated Knowledge Areas

KA Code	Knowledge Area
403	Waste Disposal, Recycling, and Reuse

Outcome #9

1. Outcome Measures

Knowledge gain for the activation of bio-char produced from pyrolysis.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
About 15-20% of initial biomass is converted into bio-char during pyrolysis. Therefore, it is a great interest for bio-based industries to add value to this bio-char to have another source of revenue. Bio-char is primarily being used as a source of heat or as a soil amendment but the value ($/ton) is very low. Therefore, there is an interest to find new applications.

What has been done
Study was conducted to evaluate the effectiveness of different types of activated carbons and biochars on anaerobic digestion. Biochars obtained from canola meal, switchgrass and Ashe juniper were tested for methane production from both glucose and aqueous phase of bio-oil generated via hydrothermal liquefaction of algae.

Results
The results suggested that absorbents enhanced methane production. Furthermore, biochars synthesized at intermediate temperatures significantly increased methane yield and reduced the lag time required for methane formation. In addition, the results suggested that the redox active moieties such as quinones and phenazines in biochars are responsible for electron transport,

which ultimately enhanced methane production. Activated carbon is known to enhance methane formation in anaerobic reactors via interspecies electron transfer between fermentative bacteria and methanogenic archaea. Biochar, a by-product of biomass pyrolysis process, could also perform similar functions due to its conductive properties and the presence of redox active moieties.

4. Associated Knowledge Areas

KA Code	Knowledge Area
402	Engineering Systems and Equipment

Outcome #10

1. Outcome Measures

The cost reduction in kWh using solar power in the TU Black Belt Photovoltaic Program research project

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	29

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Water-use is an essential component of agriculture that impacts yield and profitability. Access to reliable sources of water using irrigated technologies is an expensive acquisition for farmers, disproportionately so for Limited Resource Farmers (LRF). Farmers located in more rural areas tend to lack reliable access to energy resources often leading to additional costs in acquiring energy supplies for mechanical needs. Grid-tied electricity and Diesel are considered traditional sources of energy in modern irrigation technologies; however, the cost and possible environmental impacts have deterred LRFs from using them.

What has been done
8 Photovoltaic powered irrigation systems, 2 diesel powered surface water pumps, and 10 traditional grid-tied electric systems were installed with TU technical assistance. The project team conducted on site case studies and provided one-on-one technical assistance to the producers. Team members went through the specifics of operating the systems for each producer. Follow-up visits were conducted for all producers to assess their level of understanding and operation of the

new technology. Additionally, cost-benefit analysis was conducted on all of the systems to provide data to strengthen any future suggestions by TUCEP professionals to producers considering their options

Results

A cost/benefit analysis showed that when considering the utility costs and the costs per kWh, it was shown that of course the solar powered system was superior at $0/29.8kWh while traditional grid-tied systems performed at $3.46/29.8kWh. Total payback time for the solar powered system vs. the grid-tied system was 11 vs. 9.5 years. 100% of the producers visited were able to adapt to and adopt the new irrigation technologies. These results suggest that there may need to be more literature and educational operations focused around irrigation technologies and the sustainable energy options that could accompany them.

4. Associated Knowledge Areas

KA Code	Knowledge Area
403	Waste Disposal, Recycling, and Reuse
607	Consumer Economics

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

AAMU evaluated the effect of biochar on soil thermal and hydraulic properties. Specifically, these measurements have evaluated soil thermal properties (soil thermal conductivity, diffusivity, and volumetric heat capacity). In addition, measurements of saturated hydraulic conductivity in biochar amended soils utilizing different rates and placement methods have been performed. Closed soil column experiments have been performed to evaluated coupled heat and water movement in biochar amended soils. Currently, instrumented soil columns (water content sensors, matric potential sensors, and load cells) are being constructed (in house) to allow performance of open soil column evaporation experiments for biochar amended soils.
AU Sustainable Energy results were evaluated based on the gram of phosphorus recovered per gram of poultry litter or amount of methane gas (mL) produced per gram of chemical oxygen demand (COD).

Black Belt Photovoltaic Program (2BP) A cost/benefit analysis showed that when considering the utility costs and the costs per kWh, it was shown that of course the solar powered system was superior at $0/29.8kWh while traditional grid-tied systems performed at $3.46/29.8kWh. Total payback time for the solar powered system vs. the grid-tied system was 11 vs. 9.5 years. 100% of the producers visited were able to adapt to and adopt the new irrigation technologies. These results suggest that there may need to be more literature and educational operations focused around irrigation technologies and the sustainable energy options that could accompany them.

Key Items of Evaluation

AAMU evaluated the effect of biochar on soil thermal and hydraulic properties. Specifically, these measurements have evaluated soil thermal properties (soil thermal conductivity, diffusivity, and volumetric heat capacity). In addition, measurements of saturated hydraulic conductivity in biochar amended soils utilizing different rates and placement methods have been performed. Closed soil column experiments have been performed to evaluated coupled heat and water movement in biochar amended soils. Currently, instrumented soil columns (water content sensors, matric potential sensors, and load cells) are being constructed (in house) to allow performance of open soil column evaporation experiments for biochar amended soils.

AU Sustainable Energy results were evaluated based on the gram of phosphorus recovered per gram of poultry litter or amount of methane gas (mL) produced per gram of chemical oxygen demand (COD).

Black Belt Photovoltaic Program (2BP) A cost/benefit analysis showed that when considering the utility costs and the costs per kWh, it was shown that of course the solar powered system was superior at $0/29.8kWh while traditional grid-tied systems performed at $3.46/29.8kWh. Total payback time for the solar powered system vs. the grid-tied system was 11 vs. 9.5 years. 100% of the producers visited were able to adapt to and adopt the new irrigation technologies. These results suggest that there may need to be more literature and educational operations focused around irrigation technologies and the sustainable energy options that could accompany them.

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Community Development

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
601	Economics of Agricultural Production and Farm Management	0%	20%	0%	0%
605	Natural Resource and Environmental Economics	15%	10%	0%	0%
608	Community Resource Planning and Development	70%	50%	0%	0%
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	10%	10%	100%	0%
805	Community Institutions, Health, and Social Services	5%	10%	0%	0%
	Total	100%	100%	100%	0%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2018	Extension		Research	
	1862	1890	1862	1890
Plan	30.2	6.6	0.0	1.0
Actual Paid	29.8	9.2	1.0	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

2. Institution Name: Auburn University

Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
513572	0	30105	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
455846	0	30347	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
2261674	0	203433	0

2. Institution Name: Alabama A&M University

Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	216383	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	216383	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

2. Institution Name: Tuskegee University

Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	327764	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	270474	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Skegee Money $mart (SM$)-- organized the following workshops/training sessions/Train-The-Trainers (T3) workshops to strengthen knowledge, attitude, skills, aspirations, and behavior (KASAB) of the target clienteles that comprised of i) community people (limited resource farmers, low-and-medium income families, veterans, and beginning/small/future farmers and ranchers), ii) collegiate youths (undergraduate and graduate students; focusing on juniors), iii) school students (elementary, middle, and high). Communication approaches of SM$ Brochures, SM$ flyers, PowerPoint presentations, Hands-on exercises, Financial quizzes, Pre-and Post-tests, One-to-One and One-to-many counseling, personal and mass communications (email, Facebook, telephone) were taken throughout the program year.
Community Development Assessment of Proposed Opportunity Zones: In response to the Opportunity Zone legislation forwarded to impact Rural Development in the country, states were given leeway in choosing where those zones of development through tax incentives for investors. Given this, the locations of these areas are to be largely impactful especially to historically underdeveloped areas and marginalized communities. A brief geographical and socio-economic assessment was done on particular zones chosen in or adjacent to Black Belt counties and examined for their potential to institute development.

2. Brief description of the target audience

Skegee Money $mart targets community citizens (limited resource farmers, low-and-medium income families, veterans, and beginning/small/future farmers and ranchers), collegiate youths (undergraduate and graduate students; focusing on juniors),School students (elementary, middle, and high). Community Development Assessment of Proposed Opportunity Zones targets Black Belt communities and local governments

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	64049	0	29730	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year:	2018
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	2	1	3

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of individuals enrolled in economic development certification program
  Not reporting on this Output for this Annual Report

Output #2

Output Measure

- Number of career exploration and education planning workshops conducted
  Not reporting on this Output for this Annual Report

Output #3

Output Measure

- Number of employment simulations conducted
  Not reporting on this Output for this Annual Report

Output #4

Output Measure

- Number of partnerships created
  Not reporting on this Output for this Annual Report

Output #5

Output Measure

- Number of individuals trained in leadership skills development
  Not reporting on this Output for this Annual Report

Output #6

Output Measure

- Number of individuals trained in business management
  Not reporting on this Output for this Annual Report

Output #7

Output Measure

- Number of sessions conducted on managing credit
  Not reporting on this Output for this Annual Report

Output #8

Output Measure

- Number of individuals enrolled in entrepreneurship training programs
  Not reporting on this Output for this Annual Report

Output #9

Output Measure

- Number of Entrepreneurship workshops conducted
  Not reporting on this Output for this Annual Report

Output #10

Output Measure

- Number of Entrepreneurship training modules developed
  Not reporting on this Output for this Annual Report

Output #11

Output Measure

- Number of Extension e-bulletins and fact sheets
  Not reporting on this Output for this Annual Report

Output #12

Output Measure

- Number of refereed publications
  Not reporting on this Output for this Annual Report

Output #13

Output Measure

- Number of Requests for Technical Assistance
  Not reporting on this Output for this Annual Report

Output #14

Output Measure

- Number of workshops on estate planning
  Not reporting on this Output for this Annual Report

Output #15

Output Measure

- Number of workshops on leadership
  Not reporting on this Output for this Annual Report

Output #16

Output Measure

- Number of workshops on volunteerism
  Not reporting on this Output for this Annual Report

Output #17

Output Measure

- Number of TU Public Presentations Made

Year	Actual
2018	2

Output #18

Output Measure

- The number of TU Development Plans proposed

Year	Actual
2018	2

Output #19

Output Measure

- The number of participants in TU community development programs

Year	Actual
2018	38

Output #20

Output Measure

- Number of individuals reached through TU Community Development Extension workshops

Year	Actual
2018	338

Output #21

Output Measure

- The number of TU Abstract and Poster Presentations

Year	Actual
2018	1

Output #22

Output Measure

- The number of TU Abstract/Proceedings, and Oral Presentations

Year	Actual
2018	3

Output #23

Output Measure

- The number of TU Extension, Outreach, and Oral Presentations

Year	Actual
2018	7

Output #24

Output Measure

- The number of TU community development extension publications

Year	Actual
2018	2

Output #25

Output Measure

- Number of enhanced TU curricula development for graduate and undergraduate studies

Year	Actual
2018	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Percentage / number of program participants who demonstrate an increased knowledge in the strategies of community economic development
2	Percentage / number of program participants who demonstrate an increased knowledge on resources for small business creation and development
3	Percentage/ number of program participants who demonstrate and increased knowledge financial management practices
4	The number of individuals with improved study habits
5	Percentage / number of program participants who seek post-secondary education
6	Number of people completing financial management education programs who decrease consumer credit debt
7	Number of program participants that demonstrated and increase knowledge on debit reduction
8	Number of people adopt retirement plan recommendations
9	Number of program participants who start and or expand a business
10	Number of program participants who develop a business plan
11	Number of program participants who develop new jobs skills
12	Number of program participants who obtain personal and or business loans to start or expand their business
13	Number of program participants that demonstrate an increased knowledge of estate planning
14	Number of program participants that demonstrate and increased knowledge on volunteerism
15	Number of program participants that demonstrate an increase in community and organization volunteering
16	The number of participants who secure employment
17	Number of people completing financial management education programs who increase assets

18	The number of TU community development participants with increased knowledge and awareness of opportunities in community and economic development
19	The number of Black Belt participants with increased knowledge of financial management best practices
20	The number of Black Belt participants who adopted financial management best practices.

Outcome #1

1. **Outcome Measures**

Percentage / number of program participants who demonstrate an increased knowledge in the strategies of community economic development

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

Percentage / number of program participants who demonstrate an increased knowledge on resources for small business creation and development

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

Percentage/ number of program participants who demonstrate and increased knowledge financial management practices

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

The number of individuals with improved study habits

Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

Percentage / number of program participants who seek post-secondary education

Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

Number of people completing financial management education programs who decrease consumer credit debt

Not Reporting on this Outcome Measure

Outcome #7

1. **Outcome Measures**

Number of program participants that demonstrated and increase knowledge on debit reduction

Not Reporting on this Outcome Measure

Outcome #8

1. **Outcome Measures**

Number of people adopt retirement plan recommendations

Not Reporting on this Outcome Measure

Outcome #9

1. **Outcome Measures**

Number of program participants who start and or expand a business

Not Reporting on this Outcome Measure

Outcome #10

1. **Outcome Measures**

Number of program participants who develop a business plan

Not Reporting on this Outcome Measure

Outcome #11

1. **Outcome Measures**

Number of program participants who develop new jobs skills

Not Reporting on this Outcome Measure

Outcome #12

1. **Outcome Measures**

Number of program participants who obtain personal and or business loans to start or expand their business

Not Reporting on this Outcome Measure

Outcome #13

1. **Outcome Measures**

Number of program participants that demonstrate an increased knowledge of estate planning

Not Reporting on this Outcome Measure

Outcome #14

1. **Outcome Measures**

Number of program participants that demonstrate and increased knowledge on volunteerism

Not Reporting on this Outcome Measure

Outcome #15

1. **Outcome Measures**

Number of program participants that demonstrate an increase in community and organization volunteering

Not Reporting on this Outcome Measure

Outcome #16

1. **Outcome Measures**

The number of participants who secure employment

Not Reporting on this Outcome Measure

Outcome #17

1. **Outcome Measures**

Number of people completing financial management education programs who increase assets

Not Reporting on this Outcome Measure

Outcome #18

1. **Outcome Measures**

The number of TU community development participants with increased knowledge and awareness of opportunities in community and economic development

2. **Associated Institution Types**

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	38

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

On March 21, 2018, Governor Ivey announced 158 Alabama?s Opportunity Zones by submitting eligible census tracts to the U.S. Treasury Department for certification. The criteria were as follows: the census tracts have to be low-income communities (LICs). LICs had to have an individual poverty rate of at least 20% and median family income up to 80% percent of the area median. Census tracts that did not meet the definition of a low-income community could be designated under an exemption.

What has been done

done of the same counties to show the socio-economic composition of the opportunity zones as well as those census tracts (for the City of Tuskegee and TU) that were not chosen. Similar zones for areas of Selma (Dallas), Livingston (Sumter), and Demopolis (Marengo), as well as other opportunities for development were provided. Two meetings were held to discuss the findings and strategies with TU faculty, staff, students, Tuskegee/Macon County officials and residents.

Results

Results of the quick analysis provided some of the tracts left out of the original LICs though there seemed to fit the metrics. A revised list was released by the state. A historical assessment of opportunity-type zones revealed that prior work on type projects provides local advantages for securing the new opportunities. It was thus the recommendation to be prepared to compete for such resources. At the conclusion of town hall meetings, it was suggested for (1) optimal involvement and utilization of all human assets and social capital, (2) innovation (particularly through University partnership) and (3) self-investment/?skin in the game?. The result was a plan developed between the mayor and university personnel (Integrative Public Policy and Development & Cooperative Extension) for enhanced involvement in Macon County Development.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

Outcome #19

1. Outcome Measures

The number of Black Belt participants with increased knowledge of financial management best practices

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	335

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Poor spending, saving and money management practices lead to financial insecurity. The followings are some of the major qualitative impact created by the program:

What has been done
The project team conducted nine Skegee Money $mart (SMS) financial literacy and education workshops throughout the Black Belt Counties, including Tuskegee University, providing information on personal finance management. To address specific needs curricula of the Skegee Money $mart (SM$) program were customized: 16 modules were developed to meet the training needs of various target groups, of which 335 binders full of educational materials were constructed and distributed, introduced personal banks to stimulate savings for emergencies and improve financial security, and gave personal financial counseling to those who followed up. The participates were made up of school students (45%), collegiate youth (26%), and adult participants in the target communities (29%).

Results
Workshops assisted 335 people to strengthen their knowledge, attitude, skills, and aspirations (KASA) regarding personal finance management, financial capability, and making informed financial decisions to achieve financial security. All 335 (100%) participants of the 9 workshops increased their level of personal finance management knowledge, money management skills, financial planning, financial decision-making.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

Outcome #20

1. Outcome Measures

The number of Black Belt participants who adopted financial management best practices.

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	166

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Poor spending, saving and money management practices lead to financial insecurity.

What has been done
The project team conducted nine Skegee Money $mart (SMS) financial literacy and education workshops throughout the Black Belt Counties, including Tuskegee University, providing information on personal finance management. To address specific needs curricula of the Skegee Money $mart (SM$) program were customized: 16 modules were developed to meet the training needs of various target groups, of which 335 binders full of educational materials were constructed and distributed, introduced personal banks to stimulate savings for emergencies and improve financial security, and gave personal financial counseling to those who followed up.

Results
Fifty percent, or 167 participants initiated a savings system to prepare for emergencies and to achieve better financial security.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Community Development Assessment of Proposed Opportunity Zones: At the conclusion of town hall meetings, it was suggested for (1) optimal involvement and utilization of all human assets and social capital, (2) innovation (particularly through University partnership) and (3) self-investment/"skin in the game". The result was a plan developed between the mayor and university personnel (Integrative Public Policy and Development & Cooperative Extension) for enhanced involvement in Macon County Development.
Skegee Money $mart: Due to increased personal finance knowledge, the saving attitude and habits of all participants (100%) have changed greatly. Half (50%) of the participants (i.e. 168 people) have initiated saving for emergencies and to improve their financial security; the other half have shown keen interest and determination to initiate saving, scaling down their expenses, applying the 'need' versus 'want' money management approach, and are committed to extend/share the acquired knowledge with others in and outside their communities. Feedback from the students: **Student one**: I wish I had this level of financial knowledge and information a few years ago. **Student two**: I think the whole SM$ program is very useful. Cooperative extension should continue expanding and extending the program and its course contents.

Key Items of Evaluation

Community Development Assessment of Proposed Opportunity Zones: At the conclusion of town hall meetings, it was suggested for (1) optimal involvement and utilization of all human assets and social capital, (2) innovation (particularly through University partnership) and (3) self-investment/"skin in the game". The result was a plan developed between the mayor and university personnel (Integrative Public Policy and Development & Cooperative Extension) for enhanced involvement in Macon County Development.
Skegee Money $mart: Due to increased personal finance knowledge, the saving attitude and habits of all participants (100%) have changed greatly. Half (50%) of the participants (i.e. 168 people) have initiated saving for emergencies and to improve their financial security; the other half have shown keen interest and determination to initiate saving, scaling down their expenses, applying the 'need' versus 'want' money management approach, and are

committed to extend/share the acquired knowledge with others in and outside their communities. Feedback from the students: **Student one**: I wish I had this level of financial knowledge and information a few years ago. **Student two**: I think the whole SM$ program is very useful. Cooperative extension should continue expanding and extending the program and its course contents.

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Family, Home, 4-H and Youth Development

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
602	Business Management, Finance, and Taxation	10%	10%	0%	0%
607	Consumer Economics	10%	10%	0%	0%
801	Individual and Family Resource Management	20%	20%	0%	0%
802	Human Development and Family Well-Being	20%	20%	0%	0%
806	Youth Development	40%	40%	0%	0%
	Total	100%	100%	0%	0%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2018	Extension		Research	
	1862	1890	1862	1890
Plan	146.3	12.9	0.0	0.0
Actual Paid	145.6	14.6	0.0	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

2. Institution Name: Auburn University

Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
2994548	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
2342979	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
15440306	0	0	0

2. Institution Name: Alabama A&M University

Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	493189	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	493189	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

2. Institution Name: Tuskegee University

Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	278600	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	229903	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Yoga and Meditation Series: First to eighth grade students living in Black Belt Counties participated in the Yoga and Meditation Series. They learned various forms of exercises and stress management during the Macon County Career Day and the Exert Summer Youth Camp. The students were taught how to do gentle forms of swift exercise movements that would serve as an outlet for excess energy, improve posture, and build strength. During the mediation, students were taught breathing and visualization techniques in order to improve their moods and manage their physical and emotional stressors.
TU EXert is a youth program within TUCEP that contains multiple activities and events throughout the programmatic year that addresses multiple NIFA approved outcomes related to STEM. EXERT Camp Scholars experienced a week-long, hands-on activity summer camp to enhance their overall well-being. The EXERT Youth Competition is a competition where high school students throughout the black belt counties compete in one of the five available competitions. Educators are engaged in mentor/leadership programs at local schools, a summer camp, and a yearly competition to apply learned skills in STEM.
AU Adolescent Risk Research examines biological and social risk and protective factors for behavioral and psychological health problems in adolescence.
The Successful Aging Initiative focused on the specific needs of older adults. Resources such as the Senior Can Curriculum, An Overview of Elder Law, Estate Planning Basics, and Legal Ease were utilized in conducting this program.
Making Money Count focuses on improving the financial knowledge and skills of individuals. It uses the financial management curriculum, Making Money Count. The focus of the lessons was on decision making, spending plans, credit, predatory lending, and banking.
4-H leadership and citizenship program Learning about leadership can be fun! Basic leadership knowledge and skills are essential for success in any field. Even though the person me not be the president or vice-president of a club, skills associated with leadership is helpful if not necessary when working with a group. In the 2018 4-H club year 838 youth had the opportunity to participate in a variety of leadership programs to increase their knowledge, skills, and conditions in leadership and citizenship.
Escape Vapes aims to prevent and reduce adolescent use of electronic cigarettes (e-cigarettes). E-cigarettes have become popular among youth as a "safer" alternative to traditional tobacco cigarettes. However, e-cigarettes can be more dangerous than traditional cigarettes. Escape Vapes uses education to inform and stop adolescents' use of these substances.

2. Brief description of the target audience

Yoga and Meditation Series targets first-eighth (1^{st}-8^{th}) grade students living in Black Belt Counties.
EXert targets Alabama black belt youth
AU Adolescent Risk Research: Scientists, students, policymakers, health professionals, general public.
The Successful Aging Initiative targets new and nontraditional urban seniors
Making Money Count targets new and nontraditional urban adults
4-H leadership and citizenship program targets youth ages 9-18
Escape Vapes targets youth and families

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	108102	127334	66397	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year:	2018
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	19	11	30

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of partnerships
  Not reporting on this Output for this Annual Report

Output #2

Output Measure

- Number of publications
  Not reporting on this Output for this Annual Report

Output #3

Output Measure

- Number of newsletters
  Not reporting on this Output for this Annual Report

Output #4

Output Measure

- Number of articles
  Not reporting on this Output for this Annual Report

Output #5

Output Measure

- Number of business plans
  Not reporting on this Output for this Annual Report

Output #6

Output Measure

- Number of volunteers
  Not reporting on this Output for this Annual Report

Output #7

Output Measure

- Number of success stories
  Not reporting on this Output for this Annual Report

Output #8

Output Measure

- Number of testimonies
  Not reporting on this Output for this Annual Report

Output #9

Output Measure

- Number of grants and contracts submitted and/or awarded.
  Not reporting on this Output for this Annual Report

Output #10

Output Measure

- Number of support groups.
  Not reporting on this Output for this Annual Report

Output #11

Output Measure

- Number of technology- based resources.
  Not reporting on this Output for this Annual Report

Output #12

Output Measure

- Number of times research-based professional expertise engaged.
  Not reporting on this Output for this Annual Report

Output #13

Output Measure

- Number of curriculum utilized.
  Not reporting on this Output for this Annual Report

Output #14

Output Measure

- Number of participants in Citizenship Education Tours
  Not reporting on this Output for this Annual Report

Output #15

Output Measure

- Number of participants in 4-H Clubs
  Not reporting on this Output for this Annual Report

Output #16

Output Measure

- Number of participants in 4-H After-school
  Not reporting on this Output for this Annual Report

Output #17

Output Measure

- Number of participants in Tech Academies Social Media Education
  Not reporting on this Output for this Annual Report

Output #18

Output Measure

- Number of participants in Entrepreneurship
  Not reporting on this Output for this Annual Report

Output #19

Output Measure

- Number of participants in Youth Gardens
  Not reporting on this Output for this Annual Report

Output #20

Output Measure

- Number of participants in Youth Animal
  Not reporting on this Output for this Annual Report

Output #21

Output Measure

- Number of participants in Group discussions
  Not reporting on this Output for this Annual Report

Output #22

Output Measure

- Number of participants in Summer Camps
  Not reporting on this Output for this Annual Report

Output #23

Output Measure

- Number of participants in Enrichment Programs
  Not reporting on this Output for this Annual Report

Output #24

Output Measure

- Number of military clubs
  Not reporting on this Output for this Annual Report

Output #25

Output Measure

- Number of participants in Activities
  Not reporting on this Output for this Annual Report

Output #26

Output Measure

- Number of participants in Special Events
  Not reporting on this Output for this Annual Report

Output #27

Output Measure

- Number of participants in 4-H Special Interest Clubs
  Not reporting on this Output for this Annual Report

Output #28

Output Measure

- Number of participants in 4-H In-school clubs
  Not reporting on this Output for this Annual Report

Output #29

Output Measure

- Number of Making Money Count activities

Year	Actual
2018	156

Output #30

Output Measure

- Number of MMC surveys completed

Year	Actual
2018	2744

Output #31

Output Measure

- Number of participant who were trained on how to use a debt elimination software (PowerPay).

Year	Actual
2018	176

Output #32

Output Measure

- Number of participants who applied for their Credit Report for the first time.

Year	Actual
2018	397

Output #33

Output Measure

- Number of participants in Successful Aging Activities

Year	Actual
2018	4898

Output #34

Output Measure

- Number of Successful Aging surveys completed

Year	Actual
2018	2512

Output #35

Output Measure

- Number of Successful Aging surveys developed

Year	Actual
2018	2

Output #36

Output Measure

- Number of Legal Will Clinic / Pro Bono Clinics held

Year	Actual
2018	7

Output #37

Output Measure

- Number of Older Adults attending Successful Aging Conferences

Year	Actual
2018	1872

Output #38

Output Measure

- Number of Successful Aging Activities

Year	Actual
2018	178

Output #39

Output Measure

- Number of older adults trained in computer basics.

Year	Actual
2018	54

Output #40

Output Measure

- Number of older adults trained in Smartphones Basics.

Year	Actual
2018	22

Output #41

Output Measure

- Number of youth leadership surveys completed

Year	Actual
2018	838

Output #42

Output Measure

- Number of Chic Chain surveys completed

Year	Actual
2018	251

Output #43

Output Measure

- Number of participants in Youth Animal

Year	Actual
2018	780

Output #44

Output Measure

- The number of Golden Egg Contest entries

Year	Actual
2018	16

Output #45

Output Measure

- Number of Riverkids youth

Year	Actual
2018	790

Output #46

Output Measure

- The number of shooting sports participants

Year	Actual
2018	2734

Output #47

Output Measure

- Number of Riverkids counties

Year	Actual
2018	28

Output #48

Output Measure

- Number of certified Riverkids instructors

Year	Actual
2018	37

Output #49

Output Measure

- Number of Riverkids activities

Year	Actual
2018	58

Output #50

Output Measure

- Number of mile paddled by Riverkids

Year	Actual
2018	182

Output #51

Output Measure

- The number of AWW youth certified

Year	Actual
2018	77

Output #52

Output Measure

- The number of Escape Vape participants

Year	Actual
2018	9102

Output #53

Output Measure

- The number of Escape Vape surveys collected

Year	Actual
2018	2185

Output #54

Output Measure

- Number of Escape Vapes Community Events

Year	Actual
2018	12

Output #55

Output Measure

- The number of Escape Vapes PSAs developed by youth

Year	Actual
2018	21

Output #56

Output Measure

- The number of Escape Vape presentations delivered

Year	Actual
2018	189

Output #57

Output Measure

- Number of schools partnering with Escape Vape

Year	Actual
2018	26

Output #58

Output Measure

- The number of Escape Vapes community partners

Year	Actual
2018	27

Output #59

Output Measure

- Number of people reached through social marketing reach

Year	Actual
2018	802956

Output #60

Output Measure

- Number of family and child development parenting programs conducted

Year	Actual
2018	618

Output #61

Output Measure

- Number of counties participating in parenting education programs

Year	Actual
2018	51

Output #62

Output Measure

- The number of participants reached through family and child development parenting programs

Year	Actual
2018	7841

Output #63

Output Measure

- Number of job search preparation partnerships

Year	Actual
2018	30

Output #64

Output Measure

- Number of job search preparation curriculum utilized.

Year	Actual
2018	1

Output #65

Output Measure

- Number of job search preparation participants in Activities

Year	Actual
2018	1648

Output #66

Output Measure

- Number of job search preparation surveys completed

Year	Actual
2018	582

Output #67

Output Measure

- The number of 4H volunteers

Year	Actual
2018	8907

Output #68

Output Measure

- Value of 4H volunteers

Year	Actual
2018	43000000

Output #69

Output Measure

- the number of financial decision making participants

Year	Actual
2018	481

Output #70

Output Measure

- The number of financial spending plan participants

Year	Actual
2018	925

Output #71

Output Measure

- The number of credit management participants

Year	Actual
2018	798

Output #72

Output Measure

- The number of banking education particpants

Year	Actual
2018	400

Output #73

Output Measure

- The number of Adolescent Risk research presentations conducted

Year	Actual
2018	7

Output #74

Output Measure

- Number of TU Yoga demonstrations and workshops

Year	Actual
2018	12

Output #75

Output Measure

- The number of Black Belt youth in yoga classes

Year	Actual
2018	90

Output #76

Output Measure

- The number of Black Belt youth in TU EXert program

Year	Actual
2018	379

Output #77

Output Measure

- The number of adult TU EXert volunteers

Year	Actual
2018	13

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of participants who increased knowledge of life-skills
2	Number of participants who gain knowledge about leadership
3	Number of participants who increased knowledge about starting a business.
4	Number of participants who adopt personal financial management best practices
5	Number of dollars saved as a result of estate planning.
6	Number of participants who improved application of life skills
7	the number of people with increased financial knowledge
8	Increased use of financial strategies for improving their financial well-being.
9	The number of participants with increased knowledge of finances and safety.
10	The number of older individuals who adopted estate planning recommendations
11	The number of participants with increased use of strategies that improve their overall quality of life.
12	The number of youth with increased understanding of how nicotine affects their brain
13	The number of adolescents with increased knowledge that E-Cigarettes can contain nicotine
14	The number of youth with increased knowledge regarding the amount of nicotine in a JUULpod
15	The number of youth with increased understanding that Hookah is as harmful as smoking cigarettes
16	The number of youth who increased their ability to learn different styles of leadership for different situations.
17	The number of job search preparation participants who adopted career development recommendations

18	The number of job search preparation participants who gained employment after the training
19	The number of financial literacy participants who increased knowledge of sound financial management principles
20	knowledge increased as a result of Adolescent risk research
21	The number of Black Belt youth who implemented stress reduction strategies using Yoga
22	The number of Black Belt youth who increased knowledge of Sciences
23	The number of Black Belt youth who increased the application of science (includes agriculture, engineering, design, culinary arts, etc.).
24	The number of youth who increased leadership skills through leadership and citizenship opportunities
25	The percent of Riverkids who increased the ability to collect scientific data about water
26	The number of kids who increased physical activity through RIVERKIDS
27	Adolescent risk research

Outcome #1

1. **Outcome Measures**

   Number of participants who increased knowledge of life-skills

   Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

   Number of participants who gain knowledge about leadership

   Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

   Number of participants who increased knowledge about starting a business.

   Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

   Number of participants who adopt personal financial management best practices

   Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

   Number of dollars saved as a result of estate planning.

   Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

   Number of participants who improved application of life skills

   Not Reporting on this Outcome Measure

Outcome #7

1. **Outcome Measures**

   the number of people with increased financial knowledge

2. **Associated Institution Types**

   - 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	343

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

American consumers owe approximately $11.85 trillion in debt of which $918.5 billion is credit card debt (Chen, 2015). In 2015, 911,086 bankruptcy filings were processed (United States Courts, 2015). In addition to sinking in debt, nearly 9.6 million households in 2013 were unbanked and 24.8 million were underbanked - those with a bank account but use alternative financial services such as payday loans, title loans, etc. The State of Alabama ranks second among the fifty states in most bankruptcy filings per capita (Seale, 2015) and it has 26.4% of its citizens underbanked and 9.2% unbanked (Cole, 2014).

What has been done

Five Urban Regional Agents utilized workshops, classes and software training sessions to increase individuals', especially limited-resource individuals, awareness and knowledge of the impact of decision making on personal and family finance, utilization of spending plans, techniques and strategies used by alternative credit sources, credit reports, and banking. The Making Money Count Curriculum was implemented as a series of four lessons or as single stand-alone lessons in the urban areas of 15 counties throughout the state. A pretest and post-test for each of the four lessons were utilized in assessing participants? knowledge (2 evaluations * 4 lessons = 8 evaluations per participant). A delayed post-test was utilized in assessing participants? behaviors/actions months after completing the series.

Results

Of the 3,114 program participants, 343 participants completed the entire series of 4 lessons. Based on the results of both a pretest and posttest, participants?knowledge increased significantly after attending the classes. Program participants had a significantly better understanding of the decision making process (t = 18.90), the importance of gathering and using quality information in making decisions (t = 16.03), the importance of including children in family conversations about money (t = 17.78), and making financial decisions more deliberately and less impulsively (t = 17.52). Participants? knowledge of the importance of creating financial goals (t = 21.59), tracking spending (t = 16.56), maintaining a written spending plan (t = 18.43), and including savings within a spending plan (t = 18.44) increased. After attending the series of classes, program participants had greater knowledge of how to request their credit report (t = 29.82), the importance of credit (t = 14.86), debt-trapping tactics predatory lenders use (t = 15.65), and examples of predatory lenders (t = 14.41).

4. Associated Knowledge Areas

KA Code	Knowledge Area
607	Consumer Economics

Outcome #8

1. Outcome Measures

Increased use of financial strategies for improving their financial well-being.

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	123

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
American consumers owe approximately $11.85 trillion in debt of which $918.5 billion is credit card debt (Chen, 2015). In 2015, 911,086 bankruptcy filings were processed (United States Courts, 2015). In addition to sinking in debt, nearly 9.6 million households in 2013 were unbanked and 24.8 million were underbanked - those with a bank account but use alternative financial services such as payday loans, title loans, etc. The State of Alabama ranks second among the fifty states in most bankruptcy filings per capita (Seale, 2015) and it has 26.4% of its citizens underbanked and 9.2% unbanked (Cole, 2014).

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Results
A delayed post assessment was used to assess participants who completed the program 1 to 6 months ago. Approximately 36% of the participants who completed the entire series were assessed, on average, four months after completing the series. Of the 123 respondents,
a)91% were making financial decision less impulsively and more deliberately
b)nearly 88% were tracking their spending,

c)81% were using a spending plan,
d)80% reduced their use of predatory lenders, and
e)74% ordered their credit reports (74%).

4. Associated Knowledge Areas

KA Code	Knowledge Area
607	Consumer Economics

Outcome #9

1. Outcome Measures

The number of participants with increased knowledge of finances and safety.

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	314

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The elderly population in the United States is rapidly expanding. One out of every seven Americans (35 million) is over the age of 65. With the aging of the baby boomers, America's older population will double by 2030 (71.5 million), and will account for 19.6 percent (about 1 in 5) of the population. It is not uncommon for people, as they age, to be concerned about what the future will bring and whether they will be equipped to meet the challenges that lie ahead.

What has been done
The Seniors Can Curriculum, a wellness program for older adults developed by the University of Nevada Cooperative Extension System, was modified and used as an educational resource and guide. Additionally, an overview of Elder Law, A Gift for your Family, and LegalEASE publications, and Estate Planning Basics, A Guide to Life Organization were used. The program was implemented by six Urban Regional Agents throughout urban areas in 18 counties. Classes, workshops, seminars, family day programs, conferences, and support groups were used in the implementation of the program. A pretest and post-test for each of the four lessons were utilized in assessing participants? knowledge (2 evaluations * 4 lessons = 8 evaluations per participant).

Results
Of the 4,898 program participants, 314 participants completed the entire series of 4 lessons. Based on the results of both a pretest and posttest, participants? knowledge increased significantly after attending the classes. Program participants have a significantly better knowledge of how to cut cost on prescription medication (t = 25.26), food (t = 19.37), clothing (t = 23.12), and entertainment (t = 23.89). Likewise, participants? knowledge of age-related changes (t = 11.09), choices/behaviors (t = 11.22) and environmental factors (t = 19.51) that increase an older person?s risk of falling increased. The participants had a greater knowledge of techniques that are used to steal a person?s identity (t = 19.42), how to protect their identity (t = 21.76), and practices to use to avoid scams (t = 18.34). Program participants also had a significantly higher knowledge of the importance of writing out financial goals (t = 22.16), tracking their spending (t = 17.94), and maintaining a written spending plan (t = 21.46) after attending the series of classes.

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

Outcome #10

1. Outcome Measures

The number of older individuals who adopted estate planning recommendations

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	2491

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The elderly population in the United States is rapidly expanding. One out of every seven Americans (35 million) is over the age of 65. With the aging of the baby boomers, America's older population will double by 2030 (71.5 million), and will account for 19.6 percent (about 1 in 5) of the population. It is not uncommon for people, as they age, to be concerned about what the future will bring and whether they will be equipped to meet the challenges that lie ahead.

What has been done

The Virginia Caples Lifelong Learning Institute, offered 23 continuous education classes that focused on topics such as gardening, genealogy, smartphones, retirement planning, computer basics, fitness, fraud and scams, healthy cooking, etc. A total of 107 older adults attended the continuous education classes. Four Successful Aging Conferences were held in various locations throughout the state. A total of 1872 individuals attended these conferences. A delayed post-test was utilized in assessing participants? behaviors/actions months after completing the series.

Results
a) 1,040 individuals completed an Advance Directive.
b) 163 individuals completed a simple will.
c) 1,288 started to work on organizing their important papers for planning their estate.

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

Outcome #11

1. Outcome Measures

The number of participants with increased use of strategies that improve their overall quality of life.

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	144

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The elderly population in the United States is rapidly expanding. One out of every seven Americans (35 million) is over the age of 65. With the aging of the baby boomers, America's older population will double by 2030 (71.5 million), and will account for 19.6 percent (about 1 in 5) of the population. It is not uncommon for people, as they age, to be concerned about what the future will bring and whether they will be equipped to meet the challenges that lie ahead.

What has been done

The Seniors Can Curriculum, a wellness program for older adults developed by the University of Nevada Cooperative Extension System, was modified and used as an educational resource and guide. Additionally, an overview of Elder Law, A Gift for your Family, and LegalEASE publications, and Estate Planning Basics, A Guide to Life Organization were used. The program was implemented by six Urban Regional Agents throughout urban areas in 18 counties. Classes, workshops, seminars, family day programs, conferences, and support groups were used in the implementation of the program.

Results

A delayed post-test assessment was given to individuals approximately 2 to 3 months after participating in the program. Nearly 46% of the participants who completed the entire series were assessed. Months after attending the program, respondents continued to:
a)look for (97%) and use cost cutting strategies to save money (88%),
b)check their environment periodically for things that increase their risk of falling (96%),
c)look for signs of identity theft/fraud/scams (92%),
d)use different strategies in protecting their identity (91%),
e)track their spending (79%)
f)use a written spending plan (62%)

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

Outcome #12

1. Outcome Measures

The number of youth with increased understanding of how nicotine affects their brain

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	1425

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

There has been a staggering increase among high school students using e-cigarettes. These high-dose nicotine products are a direct gateway to traditional cigarette and cause a number of health issues in addition to nicotine addiction.

What has been done
Escape Vapes aims to prevent and reduce adolescent use of electronic cigarettes (e-cigarettes). E-cigarettes have become popular among youth as a ?safer? alternative to traditional tobacco cigarettes. However, e-cigarettes can be more dangerous than traditional cigarettes. Escape Vapes uses education to inform and stop adolescents? use of these substances.

Results
69.5% (1,425) of adolescents reported that they increased in their understanding of how nicotine affects their brain.

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

Outcome #13

1. Outcome Measures

The number of adolescents with increased knowledge that E-Cigarettes can contain nicotine

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	1345

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
There has been a staggering increase among high school students using e-cigarettes. These high-dose nicotine products are a direct gateway to traditional cigarette and cause a number of health issues in addition to nicotine addiction.

What has been done
Escape Vapes aims to prevent and reduce adolescent use of electronic cigarettes (e-cigarettes). E-cigarettes have become popular among youth as a ?safer? alternative to traditional tobacco cigarettes. However, e-cigarettes can be more dangerous than traditional cigarettes. Escape

Vapes uses education to inform and stop adolescents? use of these substances.

Results
5.6% (1,345) of adolescents reported that they increased in their knowledge that E-Cigarettes can contain nicotine

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

Outcome #14

1. Outcome Measures

The number of youth with increased knowledge regarding the amount of nicotine in a JUULpod

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	1568

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
There has been a staggering increase among high school students using e-cigarettes. These high-dose nicotine products are a direct gateway to traditional cigarette and cause a number of health issues in addition to nicotine addiction.

What has been done
Escape Vapes aims to prevent and reduce adolescent use of electronic cigarettes (e-cigarettes). E-cigarettes have become popular among youth as a ?safer? alternative to traditional tobacco cigarettes. However, e-cigarettes can be more dangerous than traditional cigarettes. Escape Vapes uses education to inform and stop adolescents? use of these substances.

Results
77.1% (1,568) of adolescents reported that they increased in their knowledge that one JUULpod has as much nicotine as 20 cigarettes

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

Outcome #15

1. Outcome Measures

The number of youth with increased understanding that Hookah is as harmful as smoking cigarettes

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	1480

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
There has been a staggering increase among high school students using e-cigarettes. These high-dose nicotine products are a direct gateway to traditional cigarette and cause a number of health issues in addition to nicotine addiction.

What has been done
Escape Vapes aims to prevent and reduce adolescent use of electronic cigarettes (e-cigarettes). E-cigarettes have become popular among youth as a ?safer? alternative to traditional tobacco cigarettes. However, e-cigarettes can be more dangerous than traditional cigarettes. Escape Vapes uses education to inform and stop adolescents? use of these substances.

Results
73.1% (1,480) of adolescents reported that they increased in their understanding that Hookah is as harmful as smoking cigarettes

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

Outcome #16

1. Outcome Measures

The number of youth who increased their ability to learn different styles of leadership for different situations.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	838

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
4-H members that participate in a leadership and citizenship program had an opportunity to gain knowledge in leadership and citizenship skills. The youth were surveyed on their ability to cooperate with other youth and adults, problem-solving, and decision making. These leadership and citizenship skills allow the youth to gain knowledge in workforce development, people skills, and teamwork.

What has been done
The youth were asked a variety of qualitative questions that allowed them to see if their actions had increased or stayed the same in different leadership and citizenship areas.

Results
91% of youth used their leadership and citizenship information that the learned to help increase their ability to learn different styles of leadership for different situations.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #17

1. Outcome Measures

The number of job search preparation participants who adopted career development recommendations

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	146

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Employment is the keystone to family financial stability and a strong workforce is essential for community and state economic vitality. Families struggle economically due to unemployment or low-wage employment. Relevant Alabama indices in 2017: poverty rate 18.5%, unemployment 6.0%, underemployment 22.4%. Many Alabamians had a need to look for new or better jobs. Employers had difficulty filling job openings with suitable candidates. Lack of relevant work experience, technical and soft skills, poor attitude and attendance history, and failed drug screenings were reasons for candidate rejection. This project provides career preparation training to equip jobseekers to pursue and obtain available jobs.

What has been done
The project was implemented by eight Regional Extension Agents and one Specialist. A four-lesson career preparation series was taught that focused on filling out job applications, preparing a resume, job interview skills and professional dress. Agents conducted 156 activities and reached 1,648 participants. Partnerships were established with more than thirty (30) public agencies and non-profit organizations statewide.

Results
Participants completed surveys N=415 pre-, N=377 post-. 73% were unemployed. Statistical analysis showed that the training program was effective in promoting readiness for employment possibilities. Wilcoxon two-sample test indicated a positive difference in interview skills, appropriate dress, and overall job search skills. Post-test group score was significantly higher than pre-test group score for each variable at significance level $p < 0.0001$. Interview skills $Z=14.85$, Appropriate dress $Z=11.72$, Overall job search skills $Z=14.34$.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #18

1. Outcome Measures

The number of job search preparation participants who gained employment after the training

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	65

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Employment is the keystone to family financial stability and a strong workforce is essential for community and state economic vitality. Families struggle economically due to unemployment or low-wage employment. Relevant Alabama indices in 2017: poverty rate 18.5%, unemployment 6.0%, underemployment 22.4%. Many Alabamians had a need to look for new or better jobs. Employers had difficulty filling job openings with suitable candidates. Lack of relevant work experience, technical and soft skills, poor attitude and attendance history, and failed drug screenings were reasons for candidate rejection. This project provides career preparation training to equip jobseekers to pursue and obtain available jobs.

What has been done
The project was implemented by eight Regional Extension Agents and one Specialist. A four-lesson career preparation series was taught that focused on filling out job applications, preparing a resume, job interview skills and professional dress. Agents conducted 156 activities and reached 1,648 participants. Partnerships were established with more than thirty (30) public agencies and non-profit organizations statewide.

Results
A 30-day follow-up survey was completed by 35% of participants (N= 146). 44.5% (N=65) were employed.

4. Associated Knowledge Areas

KA Code	Knowledge Area

801 Individual and Family Resource Management

Outcome #19

1. Outcome Measures

The number of financial literacy participants who increased knowledge of sound financial management principles

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	989

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The number of Alabama bankruptcy filings in 2016 was 25,249 which rose 2 percent from 2015. This has been the biggest increase of any state indicating 5.36 filings per 1,000 residents (Flessner, 2016). Whether you are saving, spending, or borrowing money, this is information we can?t afford to overlook. Unfortunately, Alabama still ranks second for bankruptcy fillings which is an indication of why financial education is warranted.

What has been done
Making Money Count Curriculum was implemented as a series of four workshops or as single stand-alone lesson in all 67 counties. Nine REA?s targeted limited-resource individuals and families to conducted workshops, classes, and software training sessions. Awareness and knowledge were increased by implementing decision-making for personal or family finances, utilization of spending plans, sharing techniques and strategies used by alternative credit sources, banking, PowerPay, and ordering credit reports.

Results
complete

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #20

1. Outcome Measures

knowledge increased as a result of Adolescent risk research

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The goals of AU Adolescent Risk Research are to examine: (a) Parent and adolescent responses to peer stress in early adolescence; (b) The effects of peer and reward contexts on brain activity and risky decision making in adolescence; and (c) How personality and social experiences are related to the onset and trajectory of substance use problems in adolescence and across the transition to early adulthood.

What has been done
Data collection has included: (a) Self-reported and observational measures of parent and adolescent responses to peer stress, as well as autonomic physiological measures of adolescents? responses to peer stress; (b) Behavioral and functional magnetic resonance imaging measures of adolescents? safe or risky responses to experimental manipulations of monetary reward and peer observation; (c) Self-reported measures of personality, college-related stress, and substance use among incoming freshman followed across the first two years of college.

Results
Results suggest that: (a) Parents? prosocial behavioral advice and benign interpretations of peer stress, as well as adolescents? stronger physiological responses and engaged coping responses to peer stress, predict more positive social, academic, and psychological adjustment; (b) Rewards for safe choices decrease risky decision making in peer contexts, and conditions that involve rewards for safe choices and peer observation activate areas of the brain that indicate motivational conflict between approaching and avoiding risk; and (c) Greater alcohol use disorder symptoms in the first year of college predict declines in constraint (e.g., more risk taking) in the second year of college among males.

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

Outcome #21

1. Outcome Measures

The number of Black Belt youth who implemented stress reduction strategies using Yoga

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	81

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Children deal with many distractions, temptations, overstimulation, and peer pressure. Schools are challenged to do more with less and be creative in how they reach even the most isolated child. Yoga is a low-cost, helpful tool that can have a positive impact on children by teaching them how to develop body awareness, build concentration, and increase their confidence and positive self-image. Yoga and meditation can help children feel part of a wholesome, non-competitive group while learning how to use their bodies in a healthy way.

What has been done
During the Macon County Career Day, and also, during the Exert Summer Youth Camp a Yoga and Meditation Series, for one hour daily for two weeks, Yoga in the form of exercises and meditation was held for first to eighth grade students living in Black Belt Counties. This was done in order to instruct them in gentle forms of swift exercise movements that would serve as an outlet for excess energy, improve posture, and build strength. During the mediation, students were taught breathing and visualization techniques as well as Yoga postures to help manage stress and their moods.

Results
Ninety (90) students gained knowledge in Yoga as a form of exercise and meditation. Also, over 90% reported reduced stress, tension, and restless energy immediately following the Yoga and Meditation Series. In addition to a reduction in stress, students reported that they enjoyed having a break from the constant attachment to electronic devices.

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

Outcome #22

1. Outcome Measures

The number of Black Belt youth who increased knowledge of Sciences

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	341

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
An alarming number of young children and teens are disconnected from the mainstream of our society. They have been labeled "at risk" because of the harsh realities of their lives. If these young people remain disconnected, we will lack the skilled, motivated workers to sustain our economy. We will have denied these young people the chance to lead healthy, fulfilling, productive lives.

What has been done
Weekly meetings with students in to educate them on Character Education and presenting topics in STEM, Nutrition and Obesity, as well as community development and personal finances. The Exert Competition was a one day event culminating in the application of these same type of skills that some have gained through TUCEP educators throughout the year. The EXERT Camp held in the summer further establishes these hallmarks of character, citizenship, and STEAM through team-building activities, agricultural/planting activities, hiking & tree identification, art, reading, writing and reflection, swimming fishing and other recreation.

Results
Results indicated that of the 379 students participating in the EXERT program throughout the year that 90% of all of the students reported that they had increased their knowledge of Sciences (including basic science, tools of science, and scientific method).

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

Outcome #23

1. Outcome Measures

The number of Black Belt youth who increased the application of science (includes agriculture, engineering, design, culinary arts, etc.).

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	307

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
An alarming number of young children and teens are disconnected from the mainstream of our society. They have been labeled "at risk" because of the harsh realities of their lives. If these young people remain disconnected, we will lack the skilled, motivated workers to sustain our economy. We will have denied these young people the chance to lead healthy, fulfilling, productive lives.

What has been done
Weekly meetings with students in to educate them on Character Education and presenting topics in STEM, Nutrition and Obesity, as well as community development and personal finances. The Exert Competition was a one day event culminating in the application of these same type of skills that some have gained through TUCEP educators throughout the year. The EXERT Camp held in the summer further establishes these hallmarks of character, citizenship, and STEAM through team-building activities, agricultural/planting activities, hiking & tree identification, art, reading, writing and reflection, swimming fishing and other recreation.

Results
Results indicated that of the 379 students participating in the EXERT program throughout the year that 81% reported increased the application of science (includes agriculture, engineering, design, culinary arts, etc.).

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

Outcome #24

1. Outcome Measures

The number of youth who increased leadership skills through leadership and citizenship opportunities

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	838

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
4-H members that participate in a leadership and citizenship program had an opportunity to gain knowledge in leadership and citizenship skills. The youth were surveyed on their ability to cooperate with other youth and adults, problem-solving, and decision making. These leadership and citizenship skills allow the youth to gain knowledge in workforce development, people skills, and teamwork.

What has been done
The youth were asked a variety of qualitative questions that allowed them to see if their actions had increased or stayed the same in different leadership and citizenship areas.

Results
838 youth were surveyed on their ability to learn different styles of leadership for different situations. Out of the 838 youth 761 youth used leadership and citizenship information that the learned to help them increase their ability to learn different styles of leadership for different situations.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #25

1. Outcome Measures

The percent of Riverkids who increased the ability to collect scientific data about water

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	36

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Alabamians should recognize water as one of our most valuable resources, and be protected accordingly. Unfortunately, Alabamians regularly place a very low priority on environmental protection. Low environmental literacy and decreased time spent outdoors contribute to a lack of knowledge of our water resources and the role that citizens may play.

What has been done
Implemented student training to inform and prepare them to make informed and responsible decisions about their environment, and will explore related career paths.77 students were certified as 4-H AWW monitors. 4-H AWW Staff conducted four Water Chemistry Monitoring workshops to train new students as water monitors from the following County 4-H Programs: Clarke, Limestone, Madison, and Marion. During each workshop, 4-H AWW Staff used lecture and hands-on activities to teach students about watersheds, water pollution, water quality standards, and water chemistry principals. In addition, the students learned to accurately conduct water chemistry monitoring using the AWW method.

Results
There was an increase in students? confidence in the ability of citizens including students to collect scientific data about water quality. Following participation with 4-H AWW, 94% of the students agreed that citizens and students could collect scientific data about water quality. Only 75% had agreed with the statement in the pre-test.
Students become more comfortable with the concept of a watershed. Only 47% of students indicated that they were familiar with the term ?watershed? and that they knew the name of the watershed in which they live prior to their participation with 4-H AWW, as opposed to 82% following participation.
Students? willingness to help take care of water resources increased by 11%, and about 45% of the students are interested in having a career in water resources following their participation with

4-H AWW.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #26

1. Outcome Measures

The number of kids who increased physical activity through RIVERKIDS

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	790

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
We are currently faced with an increasing disconnect from the natural world, and a decline in informed public support for management and conservation of state resources. We must demonstrate our commitment to growing experienced outdoorsmen and future stewards.

What has been done
Trained ACES staff and certified volunteers delivered 52 kayaking classes in 19 statewide locations with 790 participants to teach paddling skills while cultivating knowledge of the importance of being good stewards of our abundant water resources.

Results
Increased number of youth spending time outdoors and being active through the RiverKids program this year. Participation in the program increased by 24% and youth paddled 182 miles of freshwater (45% increase) in Alabama.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #27

1. Outcome Measures

Adolescent risk research

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The goals of AU Adolescent Risk Research are to examine: (a) Parent and adolescent responses to peer stress in early adolescence; (b) The effects of peer and reward contexts on brain activity and risky decision making in adolescence; and (c) How personality and social experiences are related to the onset and trajectory of substance use problems in adolescence and across the transition to early adulthood.

What has been done
Data collection has included: (a) Self-reported and observational measures of parent and adolescent responses to peer stress, as well as autonomic physiological measures of adolescents? responses to peer stress; (b) Behavioral and functional magnetic resonance imaging measures of adolescents? safe or risky responses to experimental manipulations of monetary reward and peer observation; (c) Self-reported measures of personality, college-related stress, and substance use among incoming freshman followed across the first two years of college.

Results
Results suggest that: (a) Parents? prosocial behavioral advice and benign interpretations of peer stress, as well as adolescents? stronger physiological responses and engaged coping responses to peer stress, predict more positive social, academic, and psychological adjustment; (b) Rewards for safe choices decrease risky decision making in peer contexts, and conditions that involve rewards for safe choices and peer observation activate areas of the brain that indicate motivational conflict between approaching and avoiding risk; and (c) Greater alcohol use disorder symptoms in the first year of college predict declines in constraint (e.g., more risk taking) in the second year of college among males.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

SAI Based on the results of both a pretest and post-test, 314 participants have a significantly better knowledge of how to cut cost on prescription medication (t = 25.26), food (t = 19.37), clothing (t = 23.12), and entertainment (t = 23.89).
Making Money Count- Based on the results, 343 participants' had a significantly better understanding of: a)the decision making process (t = 18.90), b) the importance of gathering and using quality information in making decisions (t = 16.03), creating financial goals (t = 21.59), b) tracking spending (t = 16.56).
Escape Vapes: 32.1% (652) of adolescents reported that they increased in their confidence to avoid nicotine products; 65.6% (1,345) of adolescents reported that they increased in their knowledge that E-Cigarettes can contain nicotine.
4-H leadership and citizenship program results show 91% of youth used their leadership and citizenship information that the learned to help increase their ability to learn different styles of leadership for different situations.
TU EXERT results indicated that of the 379 students participating in the program throughout the year that 90% of all of the students reported that they had increased their knowledge of Sciences (including basic science, tools of science, and scientific method), while 81% reported that they had increased the application of science (includes agriculture, engineering, design, culinary arts, etc.).
TU Yoga and Meditation Series results showed over 90% of youth reported reduced stress, tension, and restless energy. In addition, students reported that they enjoyed having a break from the constant attachment to electronic devices. One student remarked, "I learned you can have fun without technology!" Another stated, "When we were mediating I felt all of my stress melt away, it's like I was in another place. I felt peace." Furthermore, several of the teachers asked for more information on Yoga and how they can incorporate the practice in their daily classroom activities as a way of modifying behavior.
AU Adolescent Risk Research: Results identify effective responses to peer stress in early

adolescence, environmental protections against risky decision making in adolescence, and consequences of risky behaviors in adolescence and early adulthood.

Key Items of Evaluation

MMC A delayed post assessment was used to assess 123 participants .Approximately 36% of the participants who completed the entire series were assessed. Of the 123 respondents, a) 91% were making financial decision less impulsively and more deliberately b) nearly 88% were tracking their spending, c) 81% were using a spending plan, d) 80% reduced their use of predatory lenders, and e) 74% ordered their credit reports (74%).

SAI Based on the results of both a pretest and post-test, 314 participants have a significantly better knowledge of how to cut cost on prescription medication (t = 25.26), food (t = 19.37), clothing (t = 23.12), and entertainment (t = 23.89).

4-H leadership and citizenship program results show 56% of the youth felt their ability to express themselves increase or stayed the same after participating in a 4-H leadership and citizenship role. 838 youth were surveyed on their ability to learn different styles of leadership for different situations. 91% of youth used their leadership and citizenship information that the learned to help increase their ability to learn different styles of leadership for different situations.

Escape Vapes: 32.1% (652) of adolescents reported that they increased in their confidence to avoid nicotine products; 65.6% (1,345) of adolescents reported that they increased in their knowledge that E-Cigarettes can contain nicotine.

TU EXERT results indicated that of the 379 students participating in the program throughout the year that 90% of all of the students reported that they had increased their knowledge of Sciences (including basic science, tools of science, and scientific method), while 81% reported that they had increased the application of science (includes agriculture, engineering, design, culinary arts, etc.).

TU Yoga and Meditation Series results showed over 90% of youth reported reduced stress, tension, and restless energy. In addition, students reported that they enjoyed having a break from the constant attachment to electronic devices. One student remarked, "I learned you can have fun without technology!" Another stated, "When we were mediating I felt all of my stress melt away, it's like I was in another place. I felt peace." Furthermore, several of the teachers asked for more information on Yoga and how they can incorporate the practice in their daily classroom activities as a way of modifying behavior.

AU Adolescent Risk Research: Results identify effective responses to peer stress in early adolescence, environmental protections against risky decision making in adolescence, and consequences of risky behaviors in adolescence and early adulthood.

VI. National Outcomes and Indicators

1. NIFA Selected Outcomes and Indicators

Childhood Obesity (Outcome 1, Indicator 1.c)	
6580	Number of children and youth who reported eating more of healthy foods.
Climate Change (Outcome 1, Indicator 4)	
0	Number of new crop varieties, animal breeds, and genotypes whit climate adaptive traits.
Global Food Security and Hunger (Outcome 1, Indicator 4.a)	
0	Number of participants adopting best practices and technologies resulting in increased yield, reduced inputs, increased efficiency, increased economic return, and/or conservation of resources.
Global Food Security and Hunger (Outcome 2, Indicator 1)	
0	Number of new or improved innovations developed for food enterprises.
Food Safety (Outcome 1, Indicator 1)	
0	Number of viable technologies developed or modified for the detection and
Sustainable Energy (Outcome 3, Indicator 2)	
0	Number of farmers who adopted a dedicated bioenergy crop
Sustainable Energy (Outcome 3, Indicator 4)	
0	Tons of feedstocks delivered.