2018 Fort Valley State University and University of Georgia Combined Research and Extension Annual Report of Accomplishments and Results

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I. Report Overview

1. Executive Summary

This executive summary provides background information about Georgia and the state's Federal Report of Accomplishments. This summary provides data on the state and its universities, program highlights, examples of collaborative efforts between the University of Georgia (UGA) and Fort Valley State University (FVSU), and brief summaries of each of the eight planned programs.

BACKGROUND

FVSU and UGA address major agricultural issues and other problems that affect rural and urban areas, the environment, families and youth. This accomplishment report presents coordinated efforts between the state's 1862 and 1890 land-grant institutions, UGA and FVSU, respectively, and covers the joint planning that occurs between agricultural experiment stations and Cooperative Extension units at both universities.

Georgia started as one of the country's original 13 colonies. The state has a land area of 59,425 square miles; it's the largest state east of the Mississippi River and the 24th-largest state in the country. Five major physiographic regions comprise Georgia: the Blue Ridge Mountains in the northeast; the Ridge and Valley Province and the Cumberland Plateau in the northwest; the Piedmont across central Georgia; and the Coastal Plain in the south. Elevations range from sea level to 4,784 feet at Brasstown Bald, located in the Blue Ridge Mountains.

Georgia's 2018 estimated population was 10,519,475. As of 2018, the U.S. Census Bureau reported 23.8 percent of Georgians are under age 18 and 10.7 percent of the state's population is 65 or older. According to the census, 59.7 percent of Georgians identify themselves as white, 30.5 percent identify as African-American and 8.8 percent identify as Hispanic or Latino.

Georgia's Extension program has 167 offices with programming in all of Georgia's 159 counties. FVSU and UGA personnel are housed jointly in county offices. Extension delivers programming in Agriculture and Natural Resources, Family and Consumer Sciences, and 4-H Youth Development as both individual county efforts and as multicounty programs. State faculty members deliver training to county agents and programming directly to clientele, when appropriate.

FVSU and UGA researchers and scientists conduct research programs through a system of agricultural experiment stations. There are several campuses throughout the state, but the four largest are located in Athens, Fort Valley, Tifton and Griffin, Georgia. In addition, 11 Georgia research and education centers are located throughout the state.

Core programs and targeted issues are determined and guided by a structured program-development system, and they are the focus of this joint report. The program-development system is a multistep process that remains in operation throughout the year. It enables needs assessment, problem identification and program evaluation, which is used to determine impact. The Georgia program-development model works in cooperation with multiple advisory systems at county and state levels.

Georgia's Federal Report of Accomplishments does not capture all of the work of the colleges' faculty members. Instead, it is intended to document the accomplishments of faculty members who receive specific formula funds. Core programs cover traditional animal and plant production, family and consumer skills, the emerging issue of biofuels, and more. The goal of these programs is to demonstrate short- and long-term impacts. The greatest impacts of these core programs are the foundations they create to support and leverage additional resources beyond state matching funds.

PLANNED PROGRAMS

A variety of projects through the **Animal Production** and **Plant Production** programs addressed global food security and hunger. These programs, along with **Urban Agriculture** programs, responded to the growing issues of climate change and natural resource conservation.

In an effort to reverse the trend of childhood obesity, faculty working in the **Health and Nutrition** and the **Youth and Family Development** programs provided much-needed research and education to encourage healthy eating habits and physical activity in children.

Sustainability, Conservation and the Environment programs encompassed a variety of interdisciplinary research projects to develop the new knowledge and technologies needed to address the effects of climate variability and change. Research projects also focused on the development and enhancement of sustainable biofuels in order to provide domestic sources of sustainable energy.

Faculty in **Food Safety** programs increased and improved the number of viable technologies and educational opportunities for the detection, characterization and prevention of foodborne threats.

The **Home and Life Skills** programs worked on improving home health and homeownership. This program also covered financial planning, consumer awareness, indoor air quality and general well-being.

SITUATION AND PRIORITIES

Animal Production

- **Cattle**

Mastitis in dairy cattle is a leading cause in the reduction in milk yield and milk quality worldwide. In the U.S. alone, losses to dairymen approach $2 billion annually. New management practices based on novel antimicrobial products are needed to control mastitis and to prevent further losses.
Genetic values that can be used to fairly compare bulls and cows of different breeds will enhance the profitability of commercial operations.

Currently, producers in Georgia continue to seek ideas to improve reproductive management and milk production. Our ability to evaluate and assist producers in these efforts is essential.
Producers need a reliable scientific basis for selecting genetically superior animals. Producers need programs they can participate in to evaluate their cattle to identify superior genetics. In addition, carcass data is becoming increasingly important in establishing the value of cattle at slaughter. Producers need production protocols that can be used successfully on their beef cattle operations to properly manage their herds to maximize profitability.

Throughout the Southeastern U.S. and in many subtropical and tropical regions, dairy cattle are subject to elevated temperatures and/or high relative humidity for four to six months of each year. Heat stress reduces feed intake and elevates body temperatures, which reduce milk yield and reproductive performance. Moreover, genetic selection for milk yield has reduced the dairy cows' ability to regulate body temperature, which exacerbates the effects of heat stress. Environmental modifications to reduce the impact of heat stress have been developed, but production records suggest that further research is needed to minimize the impact of heat stress.

The UGA Beef Team is currently offering the Master Cattlemen's Program. This program involves detailed, in-depth educational seminars related to beef cattle. Topics include record-keeping, economics, nutrition, forages, fly control, reproduction, genetics, breeding, facilities and herd health.

- **Aquaculture**

Existing aquaculture businesses are expanding, and many Georgians are looking for alternative income activities and are interested in aquaculture enterprises. Species-specific production or processing information is needed. Training in all aspects of the aquaculture industry are needed as potential producers evaluate the industry and as established producers apply new technology.

- **Small Ruminants**

Goat meat (chevon) is one of the most widely consumed meats in the world, especially in Asia and Africa. Although the palatability of chevon is considered to be low among American consumers, imports of goat meat into the U.S. has constantly increased mainly due to increased demand by ethnic consumers. Goat meat is low in fat content compared to other red meats, and it has an excellent ratio of polyunsaturated to saturated fats, making it a very healthy choice of meat. There is a strong need for research to improve acceptability, nutraceutical aspects and public perception of chevon.

- **Poultry**

The Georgia poultry industry is constantly threatened by a number of avian diseases that include avian influenza (AI), laryngotracheitis (LT) and exotic newcastle disease (END). If these viruses gain a foothold in the poultry industry, massive economic losses to the state will be unavoidable. The Georgia poultry industry contributes over $13 billion in economic activity to Georgia annually. Disease outbreaks in the state would cause significant disruption in not only the poultry production but in almost all aspects of daily life due to quarantines, inability to move animals and equipment, processing plant shutdowns, loss of consumer confidence, etc. Poultry farmers are the first line defense in regard to disease prevention. Because of genetic selection for increased growth rate, broiler breeders have acquired reduced reproductive traits including decreased egg production; decreased sperm volume, motility and mobility; and reduced hatchability. Part of this program develops methods to improve reproductive efficiency in broiler breeders and extend those methods to poultry producers.

- **Veterinary Entomology**

Insects and mites produce significant losses in animal agriculture, affecting productivity and requiring outlays for control. Often, animal pests affect humans, as well.

- **Nutrient Management Programs**

Nutrient management programs assist farmers in developing and implementing nutrient management plans (NMP) designed to protect Georgia water quality and to enhance environmental stewardship efforts. Providing continuing education for existing farmers and assisting new farmers on NMPs continue to be priorities for this effort.

- **Animal Nutrition**

The animal nutrition program assesses the quality of native forages and the improvement of their nutritional value with dietary supplements. Cool- and warm-season natives (grasses and legumes) are well adapted to the area so that their establishment and maintenance will be affordable. Pasture-based animal agriculture usually needs some level of supplementation to satisfy the requirements of fast-growing, high-producing animals. This program seeks to develop innovative combinations of supplements for native forages. These dietary combinations will decrease the cost of production and increase profit margin for farmers.

- **AWARE**

AWARE stands for Animal Waste Awareness in Research and Extension. Much of our efforts in animal waste management and pollution prevention for animal agriculture fall under the auspices of AWARE. Animal agriculture represents a major component of Georgia's agricultural production. The state leads the nation in poultry production, has a healthy dairy industry and has many swine operations. Over 7 million residents, representing divergent interests, compete for the use of Georgia's natural resources and land. It is imperative that the state's animal agriculture industry not only comply with all pertinent environmental regulations but also operate with best management practices in place. The control of nutrient pollution is of particular importance within the general category of environmental protection.

Food Safety

The Centers for Disease Control and Prevention (CDC) estimates that each year roughly 1 out of 6 Americans (or 48 million people) gets sick, 128,000 are hospitalized and 3,000 die from foodborne diseases. The Economic Research Service (ERS) estimates the cost of foodborne illness from five foodborne illnesses alone at $6.9 billion per year. In recent years, Georgia had the highest incidence of salmonellosis of all 10 sites monitored by CDC's FoodNet system. Infants, young children, the elderly and those with weakened immune systems are most at risk of serious complications. These may include kidney failure, seizures, strokes, heart complications and death.

Easily accessible training for childcare providers, school employees and restaurant workers at the local level is in demand. Employee turnover rates are very high in the food service industry, so the need for education is continual.

A national survey shows that over 50 percent of home canners use methods that put them at high risk for botulism. UGA Cooperative Extension provides leadership for the nation in home food preservation and processing.

A website with science-based recommendations has been developed and continues to be expanded. New regulations such as the Produce Safety Rule that is a part of the Food Safety Modernization Act has mandated that certain large produce growers receive Produce Safety Alliance Grower Training. Smaller farms selling directly to the public also need food safety training. The rising interest in school and community gardens has increased the need for education on safe handling of produce from the garden to the table.

Health and Nutrition

Two-thirds of adults are overweight or obese. Obesity contributes to the development of many chronic diseases including diabetes, hypertension, cardiovascular disease and cancer. Three-quarters of Georgians are inactive, which also contributes to these chronic diseases. Twenty percent of Georgia's children are also overweight or at risk for becoming overweight.

In the U.S., 20.8 million people have diabetes and 41 million have prediabetes. In Georgia, nearly 7 percent of the population have diabetes and it was the sixth leading cause of death. Both diabetes and prediabetes increase risk for cardiovascular disease. People of African, Asian and Latino/Hispanic heritage are more two to four times more likely than Caucasians to develop diabetes. The economic impact of diabetes may be close to $4 billion per year.

The development of an estimated 20 to 40 percent of cancers are affected by dietary choices. Eating more fruits and vegetables, drinking more fluids, eating more whole grains, consuming more nonfat and low-fat dairy foods and being more physically active may help reduce risk for numerous cancers.

Home and Life Skills

Low levels of financial capability are evident across the U.S. and in Georgia, especially among young people and low-income households (median household income was estimated at $53,500 in 2016). Nearly half of respondents in a 2015 Financial Industry Regulatory Authority (FINRA) survey reported having trouble keeping up with monthly expenses and having no money saved for emergencies or retirement.

A total of 45,777 Georgians filed for bankruptcy in 2017, up from 34,018 in 2015. Research shows a correlation between low financial literacy and financial choices that can block a low-income household's pathway to the middle class (17.8 percent of Georgians were below the poverty level in 2016); increased vulnerability to frauds, scams, and predatory lending practices; high levels of indebtedness; lower wealth accumulation; and less retirement savings.

The need for financial education is not limited to these high-need audiences. All consumers need information about financial decisions specific to the various ages and stages of life. Middle- and high-school students need basic information to start them on the right path. Young adults need to know about renting vs. buying a home and financial decisions related to starting a family.

Saving for a child's education, retirement and other long-term goals pose new challenges. Managing risks, investing for long-term goals such as retirement, and learning information about insurance, living wills, durable powers of attorney and estate planning becomes more important over time. As laws regarding health insurance continue to change, consumers are confused and need information to help them make informed health insurance decisions.

One study found that only 57 percent of Americans have a will. Another study found that only 26.3 percent of Americans age 18 and older had an advance directive. This study also found racial and educational disparities in the creation of advance directives and emphasized the need for education to facilitate the creation of these documents.

Extension specialists train agents to provide financial literacy programs for youth, individuals in bankruptcy and other adults based on identified needs. Specialists also develop curricula, print and online consumer resources, and program evaluations.

Plant Production

Four hydroponics systems were installed (2 NFT and 2 DWC) the specialty plants house at the FVSU Agricultural Research Station (ARS). A nanotechnology research laboratory was developed at FVSU ARS.

Researchers conducted preliminary studies on the anit-inflammatory and anti-obesity/adipogenic activities of methanolic extracts of leaf and fruit from Paulownia (a bioenergy crop). Additional studies were conducted on increasing the yield of Paulownia and the nutritional quality of the Paulownia honey.

- **Fruit**

One project will develop the biological basis for enhanced disease management in Southeastern fruit production, with an emphasis on diseases of peaches and blueberries, the two most economically important fruit crops in Georgia. The focus will be on increasing our understanding of the biology and epidemiology of emerging pathogens (e.g., bacterial spot of peach) and of existing pathogens that are difficult to control (e.g., mummy berry in organic blueberries).

- **Peanuts**

Both tomato spotted wilt disease and groundnut rosette disease are viral diseases that cause significant yield losses in peanut. To improve losses, resistance to the two viral diseases is needed. The yield losses result in decreased income and nutritional aspects for growers and consumers.

- **Pecans**

Georgia is the leading pecan-producing state, and pecans are one of Georgia's most valuable horticultural crops. The decision of which pecan cultivar to plant impacts every other decision a grower has to make, from disease control to where he markets his product. Pecan trees require several years of growth before producing a harvestable crop, and several more years to come into full bearing. However, once in production, pecan trees are an extremely long-lived crop. Orchards over 90 years old are still bearing and productive.

Growers must therefore have access to good variety trial data so that they can make knowledgeable decisions. Replicated trials of new cultivars will help keep growers from making costly mistakes in orchard establishment.

- **Vegetables**

A number of diseases severely impact the profitable and sustainable production of vegetables in Georgia. Among them, Phytophthora blight, southern blight, Fusarium wilt, gummy stem blight and downy mildew are the most destructive and most difficult to control. This project is to develop effective and environmentally sound strategies for the management of major vegetable diseases, which will provide the growers useful tools to reduce losses caused by the diseases and will help maintain a safe food supply. Planting seeds are important components of U.S. crop production. High-quality seeds are essential to rapidly establishing plant stands and producing high-yielding crops. Hence, factors that negatively impact seed quality will ultimately reduce crop yield. Plant pathogens including bacteria, fungi and viruses can infect seeds and negatively impact seed quality.

- **Peaches**

Parts of this project will develop applied technology and transfer applied technology to the peach and blueberry industries in Georgia, for which there is greatest production and crop value. The focus will be on technology transfer of information related to diseases of these commodities.

- **Blueberries**

There has been a 300 percent increase of Georgia grown blueberries over the past twenty years. Blueberry acreage, both rabbiteye (Vaccinium ashei) and southern highbush (Vaccinium corymbosum), has been on the rise in the Southeastern U.S. When new blueberry fields are planted, the most critical period for weed control is during the first two years of establishment. During this establishment period, many growers throughout the Southeast experience heavy infestations of yellow and purple nutsedge (Cyperus esculentus and C. rotundus), and annual sedges (Cyperus spp.). At present, there are no herbicides labeled for selective postemergent sedge control during this establishment period (one and two). There are, however, several postemergent herbicides that are known to be safe to plants in the

blueberry family (Ericaeae) that control sedges (e.g., halosulfuron, Sandea, and sulfentrazone, Spartan). The goal of this research will be to evaluate the safety of various postemergence herbicides for sedge control and safety on highbush and rabbiteye blueberries.

- **Crop and Weed Management**

The crop and weed management program has been designed to provide leadership, technical guidance and support, research, and educational information development. The program is applied both locally and nationally on agronomic commodities, weed management techniques, and forages of interest to county Extension agents, growers, students, consultants, industry representatives and other clientele. Successful field experiments have been conducted to evaluate different row spacing and best management practices for energy cane production on marginal lands.

- **Pests**

Insect pest management (IPM) programs in vegetables help growers to manage insect and mite pests of a wide variety of vegetables (e.g., onions, cole crops, sweet corn, cucurbit crops) while minimizing potential adverse effects.

Insect pest and natural enemy monitoring in cotton and soybean production systems are the cornerstone of IPM programs. Additionally, incorporating cultural practices and management of the risk of insect pest outbreaks allows IPM programs to maximize economic returns while minimizing harmful environmental side effects.

- **Genomics and Cultivar Development**

The overall goal of one component of this program is to establish a continuum of basic and applied research directed toward the discovery and characterization of the genetics behind agronomically important plants, and to employ this information to develop new breeding tools. Collectively, the new breeding tools are used to supplement traditional breeding practices, which, along with the new genetic information, will facilitate cultivar development. A major objective will be the education and training of plant breeders.

- **Forestry**

Of Georgia's 24.7 million acres in forestland, 17.96 million acres are owned by private, nonindustrial landowners. Georgia's forest resource creates a 12.7 billion dollar direct economic impact in the state. Several research studies have documented that small, minority and limited-resource landowners and farmers are often not aware of and/or have been denied access to opportunities that will aid in sustaining and/or increasing their land productivity in the area of forest management.

- **Organic Farming**

This is a new initiative to evaluate sustainable and organic practices for vegetable production. In addition, vegetable varieties will be evaluated under sustainable or organic systems.

Sustainability, Conservation, and the Environment

- **Agribusiness, Economics, and Sustainability**

Improving the prospects for economic development in rural areas (domestic and international) continues as an important policy issue. Some rural economies thrive as a result of local industries, recreation and tourism, regional shopping centers, and a healthy agriculture. Many other languish with limited opportunities for rural employment and income generation. It is especially important, in this latter case, to assist local governments and to work on problems and issues related to the development and mobilization of social and human capital.

Parts of this program will determine the impacts of structural changes in the agribusiness sector on market access, bargaining power, concentration, location of production, financial arrangements, rural communities and the environment. We will also evaluate changes in policies and credit risk assessment methodologies used by lenders that would affect their relationship with farmers.

Specialists assist lenders and other institutions servicing the needs of the farm sector in gaining better understanding of farming situations through economic-outlook and information-outreach workshops. We develop analytical tools and information that will enable agribusiness managers to make better economic and business decisions.

- **Environmental Sciences**

The design of the environmental sciences program is to provide leadership in research, teaching and Extension activities related to the inventory, management, protection and enhancement of natural resources on which the human civilization relies for food, clean water and clean air.

The protection and enhancement of natural resources are key issues in the long-term survival of human civilization. As the world population increases, so does the pressure on natural resources to provide food, clean water and clean air and to assimilate wastes produced by the ever-increasing population. Our research programs in environmental sciences are aimed at identifying and understanding processes that lead to resource degradation so that management practices can be developed to minimize the impacts of those processes.

Knowledge in environmental sciences was improved by applied and basic research studies and by dissemination of results through journal articles, conferences, and professional meetings. Extension outputs to improve public understanding of environmental management consisted of bulletins, flyers, short courses, meetings, and web pages related to implementation of environmental management programs.

Concerns about the management and control of natural resources and sustainable agricultural systems have come to the forefront, especially in the increasing numbers of areas where the urban-rural interface is most intense. These concerns have led to the need for analyses of the legislative and regulatory choices for addressing environmental problems incorporating economic efficiency criteria. Another issue has involved increased public pressure for information about the value of nonmarket goods, such as environmental amenities, and the costs and benefits of government regulations.

Urban Agriculture

- **Center for Urban Agriculture**

In order to remain vital and relevant to the state, the College of Agriculture and Environmental Sciences (CAES) must focus resources and talents on the issues involved in urbanization and needs of Georgia's increasing urban and suburban populations. The goal of the Center for Urban Agriculture is to assist in this process.

- **Turfgrass**

The main goals of this program are to develop new and enhance existing turfgrass disease management strategies. These management strategies prevent economic losses, increase efficacy in production and promotes more judicious and timely application of agrochemicals. These goals can be achieved by implementing basic research to elucidate the biology of turfgrass pathogens and identify the causal agents of turfgrass diseases; implementing research trials to measure efficacy and proper timing of fungicides to control different diseases; and implementing statewide and local trainings and programs on turf disease

identification and management.

Youth and Family Development

- **General 4-H**

4-H programs are available through local 4-H clubs, 4-H camps, in-school and after-school programs. With the support of adult mentors, youth select from a menu of hands-on project ideas to complete. Four-H programs are available for children ages 8 to 18, and 4-H Cloverbud programs are available for children ages 5 to 7.

Georgia 4-H has programming throughout the state with specialized educational facilities: Burton 4-H Center on Tybee Island, Fortson 4-H Center in Hampton, Camp Jekyll and 4-H Tidelands Nature Center on Jekyll Island, Rock Eagle 4-H Center in Eatonton, and Wahsega 4-H Center in Dahlonega. Core programs include:

- 4-H county and club meetings, which provide hands-on projects for kids in a positive environment where they receive guidance from adult mentors;
- 4-H environmental education, which provides hands-on learning in Georgia's outdoor classroom;
- 4-H livestock programs in which 4-H'ers learn responsibility by raising and showing livestock;
- 4-H Project Achievement, which serves to showcase 4-H'ers' work and success; and
- 4-H summer camp, which provides adventure, friendship and fun for ages 9 and up.

- **Science, Engineering and Technology**

At issue is the importance of creating environmentally literate citizens and using the outdoors as an extension of the classroom. Many of today's youth are denied the opportunity to learn outside and develop an appreciation of the outdoors.

Camp Jekyll, Rock Eagle 4-H Center, Wahsega 4-H Center, Burton 4-H Center, Tidelands Nature Center and Fortson 4-H Center give children this opportunity.

This issue exists for society in general, but this program seeks to educate youth. The lack of environmental stewardship will result in a public poorly informed about our natural heritage, which will lead to destruction of this heritage, resulting in a degraded environment. This program seeks to reach students using experiential methods that fully engage the learner.

Studies have shown that children spend more time inside playing computer games, etc., than exploring the outdoors. Learning by doing, or experiential education, has been shown to be retained the longest as compared to all learning methods (Lieberman, 1994).

- **Civic Engagement**

The lack of meaningful youth engagement in local communities continues to be an area of emphasis. Georgia 4-H offers youth many opportunities to make positive contributions in their local communities and statewide through our annual 4-H State Council, Teen Summits, Ambassador programs, 4-H Day at the Capitol, National 4-H Conference, Leadership in Action, Step Up and Lead programs, and other events that are coordinated by the state 4-H office. 4-H'ers learn valuable lessons through participating in service projects; attending the citizenship ceremony conducted at State Council; campaigning for local, district and state offices; visiting with their legislators at the Capitol; and other activities.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2018	Extension		Research	
	1862	1890	1862	1890
Plan	583.3	13.2	499.8	41.3
Actual	478.8	35.2	249.6	32.5

II. Merit Review Process

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

- Internal University Panel
- External University Panel
- Combined External and Internal University External Non-University Panel
- Expert Peer Review

2. Brief Explanation

Supervisors are responsible for determining merit increases, which are related to the annual performance evaluation. Throughout the year, comments from external stakeholders are noted. For county Extension faculty, particular notice is taken of county stakeholder input.

Both universities incorporated the items above in their respective merit review processes. All research projects conducted during this year were peer reviewed by both internal and external reviewers. In addition, greater than 20 percent of approved research projects are also associated with multistate/integrated projects that undergo an extensive review by the Southern Association of Agricultural Experiment Station Directors (SAAESD). Extension reviews the quality and relevance of the state program goals at the state, district and county levels. Departmental Extension coordinator contacts provide insight at the state level. The program development team provides the district-level input. This team consists of the district program development coordinators, evaluation specialists, and Extension administrators. County agents provide input directly to the program development team and the state Extension coordinators. The constituents provide input through the county council as part of the Extension leadership system.

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
- Survey of traditional stakeholder groups

- Survey of traditional stakeholder individuals
- Survey specifically with non-traditional groups

Brief explanation.

Each county Extension agent has an Extension leadership group that serves in an advisory capacity. Extension specialists and agents as well as administration are also well connected to industry and commodity groups and allied organizations.

After visiting with local advisory committees, county agents provide data directly to state specialists through listening group meetings, which are conducted annually and by individual departments for a total of 12 or more meetings. The data from these agent/specialist sessions is then analyzed by the state program development team and recommendations are made for next year's programming. County agents also use input from advisory committees to plan, execute, evaluate and communicate programming at the local level.

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
- Open Listening Sessions
- Needs Assessments
- Use Surveys

Brief explanation.

Statewide stakeholders and potential collaborators were identified by faculty and recommendations were made to the dean for statewide advisory committees. The counties used a structured identification process to select a diverse advisory committee at the local level, to include representatives of both traditional and nontraditional stakeholder groups. The majority of counties reassessed and rotated their advisory committee membership this year.

External review teams have also provided suggestions as to new classifications of stakeholders, especially in regard to departmental advisory committees. The most dramatic changes in CAES research programs occur when new faculty are hired. Departmental advisory committees help prioritize the needs of the stakeholders. Stakeholder input is also sought by members of search and screen committees prior to selecting candidates to interview and prior to the final recommendation.

UGA Extension has a strong relationship with commodity groups and industry organizations. We utilize these groups for needs assessments, industry trends and feedback.

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
- Survey specifically with non-traditional groups
- Meeting with invited selected individuals from the general public

Brief explanation.

Individual county-level advisory committees meet up to four times during the year. One youth development statewide survey was conducted to collect county input. The statewide CAES advisory committee met two times during the year. In addition, college administration meets at least annually with the Department of Agriculture, Georgia Farm Bureau and commodity boards to gather input, identify needs and discuss programming priorities.

3. A statement of how the input will be considered

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

Brief explanation.

All input is channeled to college administration so they have the knowledge to make budgetary decisions. All vacant positions in all departments are brought to college-level administration for evaluation based on these criteria before a decision is made to refill. Positions may be redirected as needed. The dean solicits input from all faculty, staff and stakeholders prior to making hiring decisions on major administration positions. County agent and staff positions are reallocated to counties of higher need and those willing to contribute more county funding. Finally, legislative allocations greatly influence the type and amount of new positions added.

Brief Explanation of what you learned from your Stakeholders

-Research efforts of the college must be balanced to both meet the needs of stakeholders, communities, and the economic and environmental sustainability of the state.

-National reputation is important, provided that local needs are being addressed.

-Stakeholders are seeking a greater partnership with the college and are willing to contribute their time, talent and resources to build the overall college. Most are placing the long-term survival and enhancement of the college above the needs of their particular operation, organization or community. They want to be part of the solution and are interested in the overall goals of the college, in most cases.

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}

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	8874726	2614965	5966294	3086955
Actual Matching	8874726	2614965	5966294	3086955
Actual All Other	0	0	0	0
Total Actual Expended	17749452	5229930	11932588	6173910

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

Animal Production

☑ 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
112	Watershed Protection and Management	5%	5%	5%	5%
141	Air Resource Protection and Management	5%	5%	5%	5%
204	Plant Product Quality and Utility (Preharvest)	5%	5%	5%	5%
216	Integrated Pest Management Systems	5%	5%	5%	5%
301	Reproductive Performance of Animals	5%	5%	5%	5%
302	Nutrient Utilization in Animals	5%	5%	5%	5%
303	Genetic Improvement of Animals	5%	5%	5%	5%
304	Animal Genome	5%	5%	5%	5%
305	Animal Physiological Processes	5%	5%	5%	5%
306	Environmental Stress in Animals	5%	5%	5%	5%
307	Animal Management Systems	5%	5%	5%	5%
308	Improved Animal Products (Before Harvest)	5%	5%	5%	5%
311	Animal Diseases	5%	5%	5%	5%
312	External Parasites and Pests of Animals	5%	5%	5%	5%
313	Internal Parasites in Animals	5%	5%	5%	5%
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals	5%	5%	5%	5%
315	Animal Welfare/Well-Being and Protection	5%	5%	5%	5%
403	Waste Disposal, Recycling, and Reuse	5%	5%	5%	5%
601	Economics of Agricultural Production and Farm Management	5%	5%	5%	5%
701	Nutrient Composition of Food	5%	5%	5%	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	15.4	2.0	11.5	6.8
Actual Paid	14.2	2.0	9.6	6.8
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
1534060	726379	1382290	930878
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1534060	726379	1382290	930878
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

Research was conducted. County, regional, state and multistate meetings, trainings, and workshops were held. Field days, on-site visits and tours took place. Diagnostic services were provided.

Research findings were shared via bulletins, newsletters, eXtension, layperson articles, industry publications, peer-reviewed journals, scientific proceedings, conferences, broadcast media, websites, and expos.

General Livestock
We conducted research to develop methods to use DNA information of hundreds of thousands of animals into genetic evaluations. The research resulted in software development and implementation of large-scale genomic.

Updated Georgia Pest Management Handbook.

Aquaculture
Extension is usually the first point of contact for pond owners and local governments seeking technical assistance. Over 250,000 ponds under private owners and municipal governments need technical support. Extension programs target economics of fish management, algae toxins, aquatic weed management and water quality.

Goats
Researchers conducted studies with pulsed ultraviolet light and sonication to inactivate E. coli K 12 on goat meat. This approach enhances inactivation of E. coli and improves the microbial quality of goat meat.

Cattle
Research trials assessed use of selective dry cow therapy in managing mastitis in bred dairy heifers, describe optimal culturing strategies for the rapid identification of mastitis pathogens and identify

successful therapies for mastitis in lactating dairy cattle.

The Georgia Bull Test, Heifer Evaluation and Reproductive Development (HERD), and Beef Challenge programs are administered for the benefit of beef cattle producers. The Georgia Bull Test promotes genetic advancement and provides a platform for evaluation. The Georgia HERD programs utilize best management practices for enhanced development and improved selection of beef breeding females. The Georgia Beef Challenge is a platform for carcass data collection and ranch to rail marketing for small- and medium-sized producers.

One study examined the impacts of heat stress and an immunity booster on lactating cows. Another study was conducted to examine the impact of feeding rate and frequency of milk replacer on preweaning calves.
In heat stress workshops, producers learned the impact of environmental heat stress on dairy cattle and potential solutions from nutrition, reproductive and management perspectives.

The Master Cattlemen's Program was held due to the large need for beef cattle educational at the request of producers and local associations.

Poultry
Research on the effect of poultry litter treatments on ammonia volatilization was conducted.

The animal waste management group is very active on a statewide level, educating livestock and poultry producers with the most up-to-date information in nutrient management, water quality and air emissions.

During each of the farm visits, calibrations of animal waste application systems were conducted.

Equine
Presentations were done at regional hay conferences discussing forage quality and horses, with multiple follow up phone and email correspondence to answer questions in this area.

2. Brief description of the target audience

The target audience includes sheep, goat, beef and pork producers, dairymen, aquaculture producers, county agents, veterinarians, and industry professionals.

3. How was eXtension used?

Although a detailed breakdown in unavailable at this time, overall, 371 questions were answered in eXtension by 79 Georgia experts.

Aquaculture - Six publications listed in eXtension with Gary Burtle as author or coauthor.
eXtension's livestock and poultry environmental learning center webcasts are sometimes used by permitted livestock producers to obtain CEU needed to maintain certification.

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	484887	595883	652988	802463

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	21	21	42

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of significant publications including articles, bulletins and extension publications. (excluding peer reviewed articles)

Year	Actual
2018	77

Output #2

Output Measure

- Number of invited presentations by faculty directly resulting from the success of this planned program.

Year	Actual
2018	115

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of Master Cattlemen certifications granted through this planned program.
2	Increase in the farm gate value of livestock production in Georgia. Reported in millions of dollars.
3	Farm gate value of poultry production in Georgia. Value reported annually in millions of dollars.

Outcome #1

1. Outcome Measures

Number of Master Cattlemen certifications granted through this planned program.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	66

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
To be competitive in the beef market, producers must understand existing beef management practices and be informed of new technologies as they develop.

What has been done
The UGA Beef Team currently offers the Master Cattlemen's Program, which involves detailed, in-depth, educational seminars related to beef cattle.

Results
There were 66 participants in the Master Cattlemen's Program in 2018. There have been 517 graduates of the Master Cattlemen program from 2014 to fall of 2018.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
303	Genetic Improvement of Animals
307	Animal Management Systems
311	Animal Diseases
601	Economics of Agricultural Production and Farm Management

Outcome #2

1. Outcome Measures

Increase in the farm gate value of livestock production in Georgia. Reported in millions of dollars.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1862 Research
- 1890 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	1429

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Livestock production comprises a large portion of agriculture in Georgia and is valued at $1.43 billion.

What has been done
Specialists and agents delivered crucial, research-based information to farmers and producers.

Results
Livestock and aquaculture value decreased by approximately $61 million, a reduction of about four percent.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
141	Air Resource Protection and Management
204	Plant Product Quality and Utility (Preharvest)
216	Integrated Pest Management Systems
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals

303	Genetic Improvement of Animals
304	Animal Genome
305	Animal Physiological Processes
306	Environmental Stress in Animals
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)
311	Animal Diseases
312	External Parasites and Pests of Animals
313	Internal Parasites in Animals
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
315	Animal Welfare/Well-Being and Protection
403	Waste Disposal, Recycling, and Reuse
601	Economics of Agricultural Production and Farm Management
701	Nutrient Composition of Food

Outcome #3

1. Outcome Measures

Farm gate value of poultry production in Georgia. Value reported annually in millions of dollars.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	5470

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Poultry production is Georgia's largest agricultural industry, and agriculture is Georgia's largest overall industry.

What has been done
Extension specialists and agents shared research-based information with producers and poultry industry personnel.

Results
The Farm Gate value for poultry was $5.47 billion, an increase of 2.35 percent.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
303	Genetic Improvement of Animals
307	Animal Management Systems
311	Animal Diseases
312	External Parasites and Pests of Animals
313	Internal Parasites in Animals
315	Animal Welfare/Well-Being and Protection
403	Waste Disposal, Recycling, and Reuse
601	Economics of Agricultural Production and Farm Management

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

• Low milk prices and struggling dairy farmers were barriers to implementation of some methods to effectively manage mastitis in dairy cattle.

• Input cost increases drive interest in aquaculture species with primary consumption niches (sportfish, clams, oysters, grass carp) and enterprises such as aquaponics that are diversified across products.

• Tilapia regulation by the state of Georgia discourage open pond culture activities.

• Drought conditions over the past decade affect pond ecology in Georgia, temperature and flow for trout producers, and nutrient concentrations in streams and impoundments.

• Weather and market conditions continue to be the most impactful variables for producers. Challenges regarding extreme temperatures and precipitation create hurdles in

breeding herds of all sizes. Market conditions impact the prices for bulls, heifers and feeders for each of these programs.

• Global temperatures have increased around 0.2 degrees Celsius per decade since 1980, with no apparent downward trends. This fact, when combined with extended summers and more frequent extreme heat waves, will cause increasing numbers of animals to experience longer and hotter periods of heat stress in the near future.

• The world's population is estimated to reach 9 billion by 2050. This demographic change will increase demand for animal products and will require adaptive measures and advances in agricultural efficiency and productivity. Thus, it is critical to understand how heat stress negatively influence cow productivity and reproduction.

• Due to volatile feed, fuel and fertilizer prices, cattle producers are frequently evaluating novel resources to meet the nutritional needs of their cattle. Additionally, periodic drought forces producers to find alternative feed sources to maintain cattle.

• Due to the permitting process of Georgia Concentrated Animal Feeding Operations (CAFO), all operations must have a certified animal waste systems operator and a nutrient management plan written by a certified planner. The animal waste management group conducts that training on an annual basis, which is well attended every year.

• No new active ingredients were registered in animal agriculture. Market stability allowed producers to benefit from pest suppression investments. We anticipate that with impending changes in poultry production, facilities and management (e.g., enriched cages, free-range operations), pests not seen in commercial production for over 50 years will reappear and resurge (as Europe is already seeing).

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Based on the survey given at a workshop for control of bovine mastitis, which was attended by 23 individuals, all individuals agreed or strongly agreed that they were confident that they could implement changes in management strategies based on what they learned in the session. Ninety percent agreed or strongly agreed that they would implement changes in management strategies based on what they learned in the session.

Problems or cases are received by electronic media, including the distance diagnostic system, samples for analysis, and site visits between agents and citizens. Site visits to ponds, lakes, streams and springs provide rapid responses to aquatic problems, like the Radium Springs evaluation for the city of Albany, Georgia, for restoration of the spring basin at the historic site. About $35 million in aquaculture sales are produced per year by Georgia aquaculture farms, both freshwater and saltwater. Services provided directly to fish culture operations that have annual sales of more than $25 million. There were more than 12,000 public contacts in 2018 through workshops, demonstrations, expositions, cases and calls.

During the 2017-2018 Bull and Heifer Evaluation and Reproductive Development (HERD) Program, 65 Georgia beef producers consigned 340 heifers. These replacement females were evaluated and developed using best management practices for health, nutrition and reproduction. A total of 217 head of bred heifers meeting sale protocol standards were

marketed at auction. The combined offering appraised for $373,650.

In 2017-2018, the Georgia Beef Challenge program resulted in an average net profit of $32.04 per head based on the value that was placed on each animal by USDA Livestock Market Reporters.

At the Calhoun, Georgia, location of the Georgia Bull Evaluation Center, 43 consignors entered 151 bulls on test. At one sale, 65 actual buyers from four states purchasing the 86 bulls that sold for a total of $229,900. At the Tifton, Georgia, location, 35 consignors entered 146 bulls on test. At that sale, over 171 people registered with 51 actual buyers purchasing the 89 bulls that sold for a total of $241,300.

The Master Cattlemen's Program has received favorable evaluations. On a 1-5 graduates evaluation scale, participants were asked to respond with their view of the programs ability to meet expectations. The programs consistently receive an average score of 4.5 where a score of 5 is "Strongly Agree" with meeting the participants expectations.

Through evaluations of short courses and conferences, 89 percent of participants indicated that their knowledge increased on the subject matter.

Approximately 400 producers, industry representatives, professionals, and government agency personnel attended at least one meeting where animal waste management was the main topic.

The methodologies developed by UGA scientists, which combine genomic, pedigree and phenotypic information for the purpose of genetic evaluation, have been used by companies and breed associations in the beef cattle, dairy cattle, poultry, sheep, swine and fish industries.

The heat stress workshop average evaluation was 1.4 (rating: 1 = Excellent, 2 = Very Good, 3 = Staisfactory, 4 = Fair, and 5 = Poor).

Acquired-abilities surveys are conducted at producer meetings and compared over the past two decades.

Key Items of Evaluation

Workshops were both attended and reviewed well. Current research-based information was shared with producers and industry professionals.

Extension continued to provide valuable services to the public.
Most specimens proffered for identification are submitted through county Extension personnel. Queries about pest suppression strategies come through phone calls and via email. Commercial producers use the "Georgia Pest Management Handbook" while hobbyists and those with backyard flocks typically want to discuss suppression options.

Avian influenza (AI) was detected on one farm in northwest Georgia. The outbreak was contained, the birds were depopulated, and no other incidences of AI were detected in Georgia poultry flocks. Nutrient management requests are predominantly for online continuing education training opportunities in self-directed, self-paced formats.

The methodologies developed by UGA scientists, which combine genomic, pedigree and phenotypic information for the purpose of genetic evaluation, have been used by companies and breed associations in the beef cattle, dairy cattle, poultry, sheep, swine and fish industries.

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

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
401	Structures, Facilities, and General Purpose Farm Supplies	5%	0%	5%	5%
405	Drainage and Irrigation Systems and Facilities	5%	0%	5%	0%
501	New and Improved Food Processing Technologies	10%	0%	10%	15%
502	New and Improved Food Products	5%	0%	5%	15%
503	Quality Maintenance in Storing and Marketing Food Products	10%	0%	10%	5%
504	Home and Commercial Food Service	10%	100%	10%	0%
511	New and Improved Non-Food Products and Processes	10%	0%	10%	10%
701	Nutrient Composition of Food	5%	0%	5%	5%
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	10%	0%	10%	10%
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	10%	0%	10%	25%
722	Zoonotic Diseases and Parasites Affecting Humans	10%	0%	10%	5%
723	Hazards to Human Health and Safety	10%	0%	10%	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	3.2	0.3	2.0	9.8
Actual Paid	3.0	0.3	1.7	9.8
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
316955	90797	236289	1334714
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
316955	90797	236289	1334714
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

Research was conducted. County, regional, state and multistate meetings, trainings and workshops were held. Hands-on sessions took place.

Research findings were shared via bulletins, newsletters, eXtension, layperson articles, industry publications, peer-reviewed journals, scientific proceedings, state and national conferences, broadcast media, websites, and expos.

We provided ServSafe education classes to Extension agents and select clientele. We provided food safety education classes to Extension agents and select clientele. We provided training for small farms and large produce growers on food safety to comply with Food Safety Modernization Act (FSMA) regulations. We disseminated print and online curricula and consumer resources. We also provided information to be disseminated by Extension agents to media outlets.

Researchers investigated progeny production of Habrobracon hebetor on diapausing and nondiapausing larvae of Indian meal moth. The influence of grain quantity and grain depth on ability of H. hebetor to locate host was studied. The influence of free space and structural complexity on the ability of the parasitoid to locate host was investigated.
FVSU researchers continued to determine the susceptibility of microbes to various antibiotics. Samples included to Staphylococcus spp. These were tested against antibiotics and probiotics.

2. Brief description of the target audience

The audience includes food industry managers, food service professionals, quality assurance professionals, Hazard Analysis Critical Control Point (HACCP) coordinators, microbiologists, third-party auditors, government inspectors and county Extension agents.

3. How was eXtension used?

Although a detailed breakdown in unavailable at this time, overall, 371 questions were answered in eXtension by 79 Georgia experts.

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	66889	467729	87599	612548

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	4	6

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of significant publications including articles, bulletins and extension publications.

Year	Actual
2018	7

Output #2

Output Measure

- Number of persons taking and passing the HACCP certification exam.

Year	Actual
2018	40

Output #3

Output Measure

- Number of invited presentations by faculty directly resulting from the success of this planned program.

Year	Actual
2018	9

Output #4

Output Measure

- Number of food handlers receiving ServSafe certification from Extension Agent programs.

Year	Actual
2018	2345

Output #5

Output Measure

- Number of Food Preservation website files viewed.

Year	Actual
2018	3370000

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Average percentage of increase food safety test scores as a result of programs conducted statewide.
2	Multiple or repeat attendance by food processing company personnel (ie, company sends more than one person to our course(s) from one year to the next)
3	Number of agents increasing knowledge as a result of food safety training by specialist.
4	Percent of agents demonstrating an increase in knowledge as a result of food safety training by specialist.
5	Percent of persons passing the HACCP certification exam.

Outcome #1

1. Outcome Measures

Average percentage of increase food safety test scores as a result of programs conducted statewide.

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Multiple or repeat attendance by food processing company personnel (ie, company sends more than one person to our course(s) from one year to the next)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

723 Hazards to Human Health and Safety

Outcome #3

1. Outcome Measures

Number of agents increasing knowledge as a result of food safety training by specialist.

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Percent of agents demonstrating an increase in knowledge as a result of food safety training by specialist.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	100

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The CDC estimates that roughly 1 out of 6 Americans, 48 million people, gets sick; 128,000 are hospitalized; and 3,000 die from foodborne diseases annually.

What has been done
Extension specialists trained agents to teach consumer food safety and food service education programs.

Results
One hundred percent of 150 participants showed an increase in their food safety knowledge.

4. Associated Knowledge Areas

KA Code	Knowledge Area
503	Quality Maintenance in Storing and Marketing Food Products
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and

	Naturally Occurring Toxins
723	Hazards to Human Health and Safety

Outcome #5

1. Outcome Measures

Percent of persons passing the HACCP certification exam.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	40

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The Food and Drug Administration (FDA) require mandatory HACCP programs for juice and meat as an effective approach to food safety and protecting public health.

What has been done
Participants were taught a systematic preventive approach to food safety from biological, chemical, and physical hazards in production processes that can cause the finished product to be unsafe and designs measures to reduce these risks to a safe level.

Results
One hundred percent of the 40 participants passed the HACCP certification exam.

4. Associated Knowledge Areas

KA Code	Knowledge Area
503	Quality Maintenance in Storing and Marketing Food Products
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
723	Hazards to Human Health and Safety

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 program continues to be successful and meet the needs of the food service industry in Georgia.

The overall response to training programs and resource materials has been good.

Key Items of Evaluation

The overall response to training programs and resource materials has been good.

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Health & Nutrition

☑ 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
305	Animal Physiological Processes	0%	0%	5%	25%
502	New and Improved Food Products	0%	0%	5%	25%
701	Nutrient Composition of Food	10%	15%	10%	25%
702	Requirements and Function of Nutrients and Other Food Components	10%	10%	10%	25%
703	Nutrition Education and Behavior	10%	10%	20%	0%
704	Nutrition and Hunger in the Population	10%	10%	15%	0%
724	Healthy Lifestyle	10%	10%	10%	0%
801	Individual and Family Resource Management	10%	5%	5%	0%
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	10%	0%	10%	0%
805	Community Institutions and Social Services	5%	0%	5%	0%
806	Youth Development	10%	35%	5%	0%
901	Program and Project Design, and Statistics	5%	0%	0%	0%
902	Administration of Projects and Programs	5%	0%	0%	0%
903	Communication, Education, and Information Delivery	5%	5%	0%	0%
	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	3.8	0.2	3.5	0.8
Actual Paid	3.4	0.0	2.9	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
380345	0	413505	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
380345	0	413505	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

Health and nutrition research and studies were conducted. County, regional, state and multistate meetings, trainings and workshops were held.

Research findings and information was shared via bulletins, newsletters, eXtension, layperson articles, industry publications, peer-reviewed journals, scientific proceedings, state and national conferences, broadcast media, websites, and expos.

Ninety-two cancer prevention workshops with 1099 participants were conducted across Georgia in the reporting year. In addition, nine weight management programs (8 to 12 weeks each), and at least eight diabetes prevention and management programs were conducted reaching more than 150 people. Four peer-reviewed diabetes newsletters were distributed, one peer-reviewed preventative health care publication was produced and distributed, and 10 fact sheets were revised.

Georgia 4-H received the Walmart Healthy Habits grant, which focuses on healthy nutrition, exercise and hunger prevention. Twenty-eight Georgia counties participated during the reporting period, reaching 8489 youth. Additionally, four metro Atlanta counties are participated in the Wellness 360 grant, which focuses on healthy nutrition and exercise in an urban setting and reached 1200 youth and families. Georgia 4-H Health Rocks continues to reach youth yearly with timely education on alcohol use prevention, smoking prevention, over the counter and prescription drug abuse prevention, and opioid use prevention. Georgia 4-H has prioritized the utilization and education of volunteers to reach more youth audiences. Creating leader certifications in food and nutrition projects and 4-H Yoga for Kids is extending the group's capacity to teach youth to life skills in these areas.

In-school classes as well as after-school and 4-H enrichment activities were conducted in a majority of Georgia's counties. 4-H Healthy Living ambassadors were trained as part of the Healthy Habits and Wellness 360 grants, and these trained youth conducted programs in their counties and districts as well as at 4-H Junior Conference and 4-H Fall Forum. Trained 4-H Yoga for Kids leaders conducted programs in their counties, districts and at Senior 4-H Camp. Summer camp classes on healthy living and exercise were conducted at 4-H camps across the state.

UGA Extension identified and developed educational programs for clientele, which included the rural disadvantaged, small-scale family and part-time farmers, community leaders, youth, mall business operators, and other members of the general public in Georgia.

In pig stroke and traumatic brain injury models, we have tested neural stem cell and exosome therapies and have shown significant improvement at the cellular, tissue and functional levels. In addition, using our platform neural stem cell technology, we have developed a high-content neurogenesis screening system that enables detection of toxicants that lead to cell death, changes in neurite outgrowth, branching and differentiation -- all of which could lead to significant neurodevelopment deficits.

2. Brief description of the target audience

Specialists directed efforts primarily to educating and preparing county agents. As a result, agents reached parents, guardians, grandparents, childcare providers and other caregivers to children and youth.

The planned program also directly targeted limited-resource individuals and families.

3. How was eXtension used?

Although a detailed breakdown in unavailable at this time, overall, 371 questions were answered in eXtension by 79 Georgia experts.

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	489482	798566	562535	917749

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	5	9	14

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of significant publications including articles, bulletins and extension publications. (excluding peer reviewed articles)

Year	Actual
2018	55

Output #2

Output Measure

- Number of invited presentations by faculty directly resulting from the success of this planned program.

Year	Actual
2018	25

Output #3

Output Measure

- Number of website hits for diabetes, weight control, and cardiovascular disease.

Year	Actual
2018	9511

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Percentage of participants that are likely to read/use nutrition labels when making food choices.
2	Percentage of participants that lose weight or increase physical activity/exercise or likelihood of engaging in physical activity/exercise.

Outcome #1

1. Outcome Measures

Percentage of participants that are likely to read/use nutrition labels when making food choices.

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Percentage of participants that lose weight or increase physical activity/exercise or likelihood of engaging in physical activity/exercise.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	83

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Two-thirds of adults are overweight or obese. Obesity contributes to the development of many chronic diseases including diabetes, hypertension, cardiovascular disease, and cancer. Three-quarters of Georgians are inactive, which also contributes to these chronic diseases.

What has been done
Extension specialists trained agents to provide training to adults and youth on nutrition and lifestyle choices that will reduce or control chronic disease. Specialists also developed curricula, print and online consumer resources, and program evaluations.

Results
Eighty-three percent of participants lost weight or improved fitness.

4. Associated Knowledge Areas

KA Code	Knowledge Area

724 Healthy Lifestyle

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

External factors that affected outcomes included the addition of resources from the National Institutes of Health, U.S. Department of Defense and the National Science Foundation, which led to additional defining experiments.

Grant funding increased cancer prevention program outreach dramatically.

Several storms caused severe damage in some parts of south Georgia, which affected the type and frequency of programs offered.

The economy was another external factor to affected outcomes because clients may have had conflicting work schedules to attend educational sessions.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Through evaluation, program clients demonstrated an increase in health knowledge.

Cancer prevention program participants indicated a significant increase in their intention to implement nutrition and physical activity guidelines for cancer prevention and get cancer screenings for breast, cervical and colorectal cancer.

On average, participants with diabetes reported a significant increase in their intention to change their nutritional behaviors to better manage their diabetes, like count carbohydrates, substitute high-fiber foods for low-fiber, high=sugar foods, and practice portion control.

More than 200 pounds were lost among Walk-a-Weigh participants and body mass index (BMI) decreased significantly ($P<0.001$). Twenty percent of participants lost at least 3 percent of their body weight, which results in meaningful health outcomes such as improved blood glucose, blood pressure and insulin sensitivity.

Health Rocks programming included a survey that youth who complete the program are asked to fill out to gauge previous knowledge compared to gained knowledge from completing the program. 4-H common measures are used to evaluate the knowledge gained from students participating in both the Healthy Habits and Wellness 360 grant programs.

The test of the neural stem cell and exosome therapies in a pig stroke model led to the replacement and repair of damaged neural networks and suggests that this will occur in human stroke patients. This will lead to improved sensory, motor and cognitive function and improve the patient's life quality. This platform technology can also be adapted to other central nervous system injuries, such as spinal cord injuries or traumatic brain injury. The development of this high-content screening system will help the U.S. Environmental Protection Agency and similar organizations to detect and classify unknown and predicted toxins.

Key Items of Evaluation

Program participants reported a significant increase in their intention to adopt healthier lifestyles.

Research findings will lead to improved sensory, motor and cognitive function and improve stroke patients' life quality.

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Home & Life Skills

☑ 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
607	Consumer Economics	20%	20%	0%	0%
801	Individual and Family Resource Management	20%	20%	0%	0%
802	Human Development and Family Well-Being	20%	20%	0%	0%
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	15%	15%	0%	0%
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	15%	15%	0%	0%
805	Community Institutions and Social Services	10%	10%	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	6.0	1.8	0.0	0.0
Actual Paid	5.5	1.8	0.0	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
608553	635582	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
608553	635582	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

Financial Literacy

One goal of this program is to improve personal financial management skills, practices and knowledge to enhance the economic well-being of Georgia families. To reach this goal, we trained county agents to deliver information on research-based best practices.

In this program, UGA specialists disseminated personal financial literacy fact sheets, provided nine personal financial management education classes to agents and select clientele, and provided information to be disseminated by agents to media outlets. Specialists also developed curricula, print and online consumer resources, and program evaluations.

Resources and materials from like-minded consumer advocacy organizations were disseminated. The program targeted consumer advocacy organizations and partnerships were formed with approximately 50 additional collaborators for program goal enhancement, program funding and coalition creation.

In collaboration with our Extension partners and stakeholders, FVSU faculty members developed a long-range plan for early intervention, providing financial literacy and consumer education to targeted areas throughout the state of Georgia.

Housing

Another goal of this planned program is to improve the quality of the home environment through better air quality and environmental resource management.

In the area of indoor air quality (IAQ), programs and exhibits on a range of healthy housing were conducted. Information on healthy housing was disseminated through several media outlets. Agents received trainings on healthy housing.

2. Brief description of the target audience

Specialists directed efforts primarily to county agents. As a result, agents reached youths, parents, senior citizens and others.

The targeted audiences of the FVSU faculty were all Georgians and residents in surrounding areas, with an emphasis placed on all limited-resource and low-income families and individuals.

3. How was eXtension used?

Although a detailed breakdown in unavailable at this time, overall, 371 questions were answered in eXtension by 79 Georgia experts.

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	240654	170261	309067	218662

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	0	2

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of significant publications including articles, bulletins and extension publications. (excluding peer reviewed articles)

Year	Actual
2018	0

Output #2

Output Measure

- Number of invited presentations by faculty directly resulting from the success of this planned program.

Year	Actual
2018	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Total number of consumers transitioning from rental to homeownership after participating in this program.
2	The number of participants who tested their homes for indoor air quality contaminants as a result of the educational programs conducted by county agents.
3	The percentage of participants who increased their knowledge of Indoor Air Quality issues as a result of the educational programs conducted by county agents.

Outcome #1

1. **Outcome Measures**

Total number of consumers transitioning from rental to homeownership after participating in this program.

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

The number of participants who tested their homes for indoor air quality contaminants as a result of the educational programs conducted by county agents.

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

The percentage of participants who increased their knowledge of Indoor Air Quality issues as a result of the educational programs conducted by county agents.

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

Natural disasters in 2018 increased interest in programs on disaster preparedness and issues related to healthy homes.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Agent knowledge was assessed by evaluation tools specific to the content provided. The evaluation database was used to assess the population's changes in knowledge and intentions to change behavior by those reached through county agents. Most data

collection was obtained at the time of the educational intervention via questionnaire.

Participants of the healthy-home programs indicated an increase in knowledge and intention to adopt safe home practices.

Persons participating in prepurchase counseling or home-buyer education workshops were better prepared to purchase a home.

Key Items of Evaluation

Overall, participants rated programs well and indicated changes in behavior as a result of the information they received.

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Plant Production

☑ 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	5%	5%	5%	5%
111	Conservation and Efficient Use of Water	5%	5%	5%	5%
131	Alternative Uses of Land	5%	5%	5%	5%
136	Conservation of Biological Diversity	5%	5%	5%	5%
201	Plant Genome, Genetics, and Genetic Mechanisms	5%	5%	5%	5%
202	Plant Genetic Resources	5%	5%	5%	5%
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	5%	5%	5%	5%
204	Plant Product Quality and Utility (Preharvest)	5%	5%	5%	5%
205	Plant Management Systems	5%	5%	5%	5%
206	Basic Plant Biology	5%	5%	5%	5%
211	Insects, Mites, and Other Arthropods Affecting Plants	5%	5%	5%	5%
212	Diseases and Nematodes Affecting Plants	5%	5%	5%	5%
213	Weeds Affecting Plants	5%	5%	5%	5%
214	Vertebrates, Mollusks, and Other Pests Affecting Plants	5%	5%	5%	5%
215	Biological Control of Pests Affecting Plants	5%	5%	5%	5%
216	Integrated Pest Management Systems	5%	5%	5%	5%
401	Structures, Facilities, and General Purpose Farm Supplies	5%	5%	5%	5%
403	Waste Disposal, Recycling, and Reuse	5%	5%	5%	5%
404	Instrumentation and Control Systems	5%	5%	5%	5%
405	Drainage and Irrigation Systems and Facilities	5%	5%	5%	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	28.5	0.0	22.0	2.0
Actual Paid	26.5	0.0	17.8	2.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
2852591	0	2575549	273788
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
2852591	0	2575549	273788
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

Plant production research and studies were conducted. County, regional, state, and multistate meetings, trainings, and workshops were held. Field days, on-site visits, tours, and hands-on sessions took place. Diagnostic services were provided.

Research findings and information were shared via bulletins, newsletters, eXtension, layperson articles, industry publications, handbooks, peer-reviewed journals, scientific proceedings, state and national conferences, broadcast media, websites, expos, and trade magazines.

Plant Pests and Diseases
Experiments were conducted to investigate the effects of various fungicide combinations, rates and application programs on fungicide sensitivity.

Over 30 demonstrations were completed. We held special meetings addressing whiteflies and viruses. We updated the Georgia Pest Management Handbook.

In the area of virus control of plant cell division, a viral protein was identified and the proteins effect on gene expression was studied.

Crop and Weed Management
Crop and weed management knowledge was improved through the applied and basic research studies.

Genomics and Cultivar Development
Basic and applied research was conducted to understand the genetics of traits of agronomic importance and the performance of potential genotypes under field conditions.

Research was developed on new cultivars, with emphasis on plants of current or potential importance to

Georgia, which manifest improved agronomic performance or manifest value-added traits.

Blueberries
Research was conducted to control sedges in blueberry crops.

Laboratory and greenhouse studies were carried out to enhance our understanding of pathogen biology.

Fruit
Research was carried out in the laboratory, the greenhouse, on experimental farms, and in collaboration with commercial producers.

Vegetables
We identified two biocontrol agents (BCA) that were antagonistic to A. citrulli, the causal agent of bacterial fruit blotch of cucurbits.

We continued research on developing varieties for organic growers. We also investigated no-till production practices.

Peaches
Research was carried out in the field on experimental farms and in collaboration with commercial producers.

Pecans
We collected and processed data on the pecan selections for nut quality, tree vigor, tree productivity and pest resistance.

Results from research to minimize alternate bearing and help stabilize pecan production were presented at association meetings.

Pecan disease management research was done to improve both the effectiveness and cost of fungicide programs.

Peanuts
Small-plot and on-farm research projects were conducted to determine the response of new cultivars and breeding lines to management tools such as optimum planting date, row pattern, tillage system and insecticide treatment.

Row crops
Two scout schools were conducted during 2018, which focused on scouting insect pests in cotton, peanut and soybean. Programming also included information on natural controls and safety.

Watermelon
We validated the Qdff3-1 locus using QTL-seq on an F6 recombinant inbred line (RIL) mapping population.

2. Brief description of the target audience

The target audience for this program includes county agents, scientific peers, conservation agencies, policy makers, utility companies, landowners, retail establishments, consumers, students, producers, consultants, industry personnel, K-12 teachers, regulatory agencies, agribusinessmen, and small, minority and limited-resource landowners and farmers.

The LIFE program targets minority landowners.

3. How was eXtension used?

Although a detailed breakdown in unavailable at this time, overall, 371 questions were answered in eXtension by 79 Georgia experts.

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	818931	5143446	144537	907793

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

Patent Applications Submitted

Year:	2018
Actual:	12

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	13	211	224

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of invited presentations by faculty directly resulting from the success of this planned program.

Year	Actual
2018	48

Output #2

Output Measure

- Number of significant publications including articles, bulletins and extension publications.

Year	Actual

2018 26

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of disease samples processed by diagnostic laboratory.

Outcome #1

1. Outcome Measures

Number of disease samples processed by diagnostic laboratory.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	93009

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
When problems requiring diagnostics present in the field, time is always a critical factor. From identifying a threat to recommending a treatment plan, timely transfer of information from field to lab is crucial. Rapid diagnosis can make all the difference in successfully preserving a crop or efficiently eliminating a harmful pathogen.

What has been done
Diagnostic services provided included CEQ (pesticide and fruit quality), feeds, water microbiology, waste water, GA EPD, animal waste, SPW plant tissue, water chemistry, soil, and others.

Results
Diagnostic services were provided for 93,009 samples.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
204	Plant Product Quality and Utility (Preharvest)
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Diseases and Nematodes Affecting Plants
213	Weeds Affecting Plants

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

A mild winter followed by a warm, dry spring and summer led to extreme pest pressure from whiteflies. The addition to viral diseases vectored by whiteflies made management almost impossible. A hurricane in late fall helped mediate this situation but was too little too late for most vegetable production.
Hurricane Michael devastated the Georgia cotton crop during 2018.

Heavy rainfall and hurricanes led to flooding in fields, causing crop losses. Wet, humid weather increased the incidence of disease.

Continued federal government oversight via the U.S. Department of Agriculture National Organic Program affected this program.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

In regards to minimizing alternate bearing in pecans, it was found that hedge pruning improves water use efficiency, and there is no difference in the efficacy of different forms of nitrogen. Growers should select the least expensive option.

For the peach rust trial, Abound and Aprovia fungicide treatments provided the highest levels of control, with virtually no disease symptoms at the time of assessment. Orbit, Kocide high rate, Kocide low rate, and Sulfur provided statistically equivalent control that was significantly different from the untreated control.

In the peach scab trial with dormant applications of dormant superior oil plus chlorothalonil fungicide, all treatments provided a statistically significant level of scab suppression. Shuck split is a critical application window for scab control. In this trial, the late dormant application of Bravo (chlorothalonil) plus superior oil consistently reduced scab incidence, whether or not the shuck split application was applied. Additional trials with multiple dormant applications are warranted by these results.

County agents and growers continue to inform direction of the program. Continued commodity commission and industry support indicate satisfaction with direction of the program.

In the cotton and soybean integrated pest management research, yield loss plus control costs for insect pest in cotton was $83.31 per acre; the average number of insecticide applications was 2.4. Cotton control costs and loss information is published annually in the "Beltwide Cotton Conferences Proceedings."

Key Items of Evaluation

County agents and growers continue to inform the direction of the program. Continued commodity commission and industry support indicate satisfaction with direction of the program.

Research continues to yield useful results that are shared with the public.

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Sustainability, Conservation & the Environment

☑ 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	10%	10%	10%	20%
111	Conservation and Efficient Use of Water	10%	10%	10%	25%
131	Alternative Uses of Land	10%	10%	10%	25%
132	Weather and Climate	10%	10%	10%	10%
133	Pollution Prevention and Mitigation	10%	10%	10%	10%
136	Conservation of Biological Diversity	10%	10%	10%	10%
601	Economics of Agricultural Production and Farm Management	10%	10%	10%	0%
602	Business Management, Finance, and Taxation	10%	10%	10%	0%
603	Market Economics	10%	10%	10%	0%
605	Natural Resource and Environmental Economics	10%	10%	10%	0%
	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	21.1	1.2	7.5	4.0
Actual Paid	20.0	1.2	6.0	4.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
2117256	435828	886083	547575
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
2117256	435828	886083	547575
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

Research was conducted. County, regional, state, and multistate meetings, trainings, and workshops were held. Field days, on-site visits, tours, and hands-on sessions took place. Diagnostic services were provided.

Research findings were shared via bulletins, newsletters, eXtension, layperson articles, industry publications, peer-reviewed journals, scientific proceedings, state and national conferences, broadcast media, websites, and expos.

Agribusiness and Economics
This program assisted local entrepreneurs and governments and worked on problems and issues related to expanding employment opportunities and the development and mobilization of social and human capital in agriculture.

Create improved information to assist local governments in cost-effectively meeting demands for public services, financing public programs, providing infrastructure needs and designing incentives for private sector initiatives and involvement.

Economists evaluated changes in policies and credit risk assessment methodologies used by lenders that affect relationships with farmers. We developed analytical tools and information that will enable agribusiness managers make better economic and business decisions. We provided economic analyses to increase farm income, improve productivity and reduce risk.

The Sustainable Agriculture Research and Education (SARE) Program promoted sustainable agriculture practices for all farms and farmers; helped small farms with alternative enterprises, organic production and niche markets; and helped large farms move towards IPM and conservation tillage systems.

Environmental Sciences
Knowledge in environmental sciences was improved by applied and basic research studies and by dissemination of results through journal articles, conferences, and professional meetings.

Priorities for one component of this program included: educating the greenhouse owners on implementing water conservation technology; developing a demonstration project at a commercial greenhouse to show how flow meters can help owner manage water use; and educating greenhouse employees on the best management practices involving use of water.

Field research was conducted to develop improved energy efficiency techniques in poultry houses. Educational meetings were conducted with poultry farmers and poultry industry representatives. Educational materials were prepared and distributed to poultry producers in Georgia. Newsletters were published on poultryventilation.com, which were subsequently reprinted by several industry trade publications and online sites. Two workshops were held with 140 people on site and 250 people online through a live webinar of the workshop. The faculty on this project were invited to give 32 presentation related to energy conservation in poultry production.

Research on camellia oleifera will continue on a limited basis, as research plots in Tifton have been sold for development. A core planting of cultivars has been established at the Durham Horticulture Farm in Watkinsville. F2 seed was collected in 2018.

2. Brief description of the target audience

Audience included poultry farmers, poultry industry environmental personnel, poultry industry flock supervisors and county agents.

Also targeted are public sector (federal and state) decision-makers, agents, environmental interest groups, natural resource users, local entrepreneurs, commercial greenhouse and nursery growers, food product companies, industry representatives, consultants, contractors, media, and the general public.

3. How was eXtension used?

Although a detailed breakdown in unavailable at this time, overall, 371 questions were answered in eXtension by 79 Georgia experts.

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	454282	278687	563963	345972

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	64	120	184

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of significant publications including articles, bulletins and extension publications. (excluding peer reviewed articles)

Year	Actual
2018	8

Output #2

Output Measure

- Number of invited presentations by faculty directly resulting from the success of this planned program.

Year	Actual
2018	33

Output #3

Output Measure

- Total number of site visits made to small, minority, and limited resource landowners and farmers.

Year	Actual
2018	200

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Total number of site visits made to small, minority, and limited resource landowners and farmers

Outcome #1

1. **Outcome Measures**

Total number of site visits made to small, minority, and limited resource landowners and farmers

Not Reporting on this Outcome Measure

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
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

Losses as a result of Hurricane Michael extended beyond the farm sector. This included lost downstream activities as a result of lost inputs for production used in facilities such as cotton gins, pecan shelling facilities, and timer processing plants. UGA specialists estimated losses to related agribusiness industries totaling $360 million.

Research land on the Tifton Campus where the core collection of camellias exist has been sold for development. A backup planting has been established in Watkinsville.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Based on the number of poultry company operations in the state that have contacted the faculty involved in this we can estimate that at least 80% of the poultry farms in Georgia are utilizing the methods that have been covered in these trainings and publications to reduce their energy costs. Camellia oleifera can be grown in Georgia. Biodiesel can be made from this oil.

Key Items of Evaluation

At least 80 percent of the poultry farms in Georgia are utilizing the prescribed methods.

Biofuels can be made from crops grown in Georgia.

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Urban Agriculture

☑ 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
111	Conservation and Efficient Use of Water	9%	0%	10%	0%
112	Watershed Protection and Management	9%	0%	10%	0%
124	Urban Forestry	9%	0%	10%	0%
131	Alternative Uses of Land	9%	0%	10%	0%
133	Pollution Prevention and Mitigation	9%	0%	10%	0%
136	Conservation of Biological Diversity	9%	0%	10%	0%
216	Integrated Pest Management Systems	9%	0%	10%	0%
403	Waste Disposal, Recycling, and Reuse	9%	0%	10%	0%
603	Market Economics	9%	0%	10%	0%
721	Insects and Other Pests Affecting Humans	9%	0%	10%	0%
903	Communication, Education, and Information Delivery	10%	0%	0%	0%
	Total	100%	0%	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	2.5	0.8	4.0	0.0
Actual Paid	2.5	0.0	3.3	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
253563	0	472578	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
253563	0	472578	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

Research was conducted. County, regional, state, and multistate meetings, trainings, and workshops were held. Field days, on-site visits, tours, and hands-on sessions took place. Diagnostic services were provided.

Research findings were shared via bulletins, newsletters, eXtension, layperson articles, industry publications, peer-reviewed journals, scientific proceedings, state and national conferences, broadcast media, websites, and expos.

Master Gardener Program
In 2018, we had 245 new Master Gardener Extension Volunteers (MGEVs) and 2,244 returning, for a total of 2,489 MGEVs. They volunteered a total of 179,433 hours.

All MGEVs are required to complete 42 hours of initial classroom training and examination before volunteering, successfully complete a UGA volunteer agreement and background screening, and complete 50 hours of volunteer service in support of Extension-approved projects.

MGEVs volunteer through:
- Diagnostics;
- Presentations and demonstrations; and
- Community and distribution gardens.

Turfgrass Research
Researchers developed basic research on turfgrass pathogen biology, plant genetic disease resistance and fungicide resistance. We conduct fungicide research trials on main turfgrass diseases each season, resulting in more than 12 trials and evaluating more than 50 treatments in the last two years and in 13 specialty research reports. We also established nematode studies to determine plant pathogen nematode species, and we implemented nematicide trials.

Georgia Center for Urban Agriculture
The Center for Urban Agriculture provided an organization structure designed to facilitate scientific cross-fertilization among investigators, agents, industry and homeowners. It facilitated issue identification. We offered continuing education programs that are relevant to the urban environment.

Translational Genomics of Ornamental Plants
Petunia seeds were mutagenized with ethyl methanesulfonate (EMS) and a high-resolution melting

analysis was used to identify an induced mutation in MLO1.

Managing Plant Diseases in Ornamental Plant Nurseries
Articles and pest alerts were contributed to industry newsletters, blogs, and trade journals. A fungicide efficacy table was updated and distributed as an extension bulletin and on the Southern Nursery Integrated Pest Management (SNIPM) working group webpage.

Breeding Landscape Plants for Urban Use
Crosses were made and plants were evaluated. Three little bluestem plants were patented.
Hybrids of vitex (chaste tree), abelia, Spigelia and Exochorda were evaluated in field plots. Little bluestem seeds collected from Georgia and the New England states were sown and evaluated for landscape potential. Selections of vitex, abelia and little bluestem were sent under restricted testing agreements to several companies for evaluation and potential licensing. A license agreement was developed with a nursery for two abelia selections. Studies to improve both seed and cutting propagation of the native plant Spigelia were conducted and significant progress was made.

2. Brief description of the target audience

The target audience for this planned program includes urban agriculture industries professionals, public policy makers and regulators, county agents, homeowners, scientific peers, golf course superintendents, turfgrass professional managers, landscape companies, sod producers, grounds maintenance personnel, sports fields managers, general green industry personnel, Master Gardeners, arborists, city foresters, ornamental plant breeders and the general public.

3. How was eXtension used?

Although a detailed breakdown in unavailable at this time, overall, 371 questions were answered in eXtension by 79 Georgia experts.

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	341891	3679498	33994	365850

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	10	11	21

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of significant publications including articles, bulletins and extension publications. (excluding peer reviewed articles)

Year	Actual
2018	58

Output #2

Output Measure

- Number of invited presentations by faculty directly resulting from the success of this planned program.

Year	Actual
2018	20

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of website hits, page views, or downloads from the Center for Urban Ag site.
2	Total number of Master Gardener volunteer hours.

Outcome #1

1. Outcome Measures

Number of website hits, page views, or downloads from the Center for Urban Ag site.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	602000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
In order to remain vital and relevant to the state, CAES must focus its resources and talents on the issues involved in urbanization and the needs of Georgia's increasing urban and suburban populations. The goal of the Center for Urban Agriculture is to assist in this process.

What has been done
The Center for Urban Agriculture provides an organization structure designed to facilitate issue identification and scientific cross-fertilization among investigators, agents, industry and homeowners. It offers continuing education programs that are relevant to the urban environment.

Results
Website hits: 602,000 (An increase of 35 percent from last year.)

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
124	Urban Forestry
131	Alternative Uses of Land
133	Pollution Prevention and Mitigation
216	Integrated Pest Management Systems
403	Waste Disposal, Recycling, and Reuse
603	Market Economics

721	Insects and Other Pests Affecting Humans
903	Communication, Education, and Information Delivery

Outcome #2

1. Outcome Measures

Total number of Master Gardener volunteer hours.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	179433

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Consumer clientele make decisions every day how to maintain landscapes. These decisions influence water quality, yard waste management and the quality of community landscapes.

What has been done
Agents trained and managed Master Gardeners, who in turn provide valuable resources and knowledge to Georgians.

Results
In 2018, we had 245 new Master Gardener Extension Volunteers and 2,244 returning, for a total of 2,489 MGEVs. They volunteered a total of 179,433 hours.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
124	Urban Forestry
131	Alternative Uses of Land
133	Pollution Prevention and Mitigation
216	Integrated Pest Management Systems
403	Waste Disposal, Recycling, and Reuse

603	Market Economics
721	Insects and Other Pests Affecting Humans
903	Communication, Education, and Information Delivery

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

Changes in weather patterns affect this program. Time constraints due to additional responsibilities added to PI. PI had to cover salaries for technician and hourly help.

Hurricanes in 2018 significantly impacted ornamental plant production and disease development. New diseases such as boxwood blight were spread through landscape plantings as a result of the cooler, wet weather. The economy is improving, which has increased ornamental plant production and sales over past years. A quarantine on boxwood shipments into Tennessee and Pennsylvania is impacting Georgia producers and requiring nurseries to participate in the Boxwood Blight Compliance Agreement.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Pre- and post-test evaluations of turfgrass trainings were conducted. Implementation evaluations of proposed strategies will be followed for several years. Results of research trials were evaluated. Site survey and direct questioning to training participants of proposed control measures were performed. Detailed observations of site and behaviors of participants can be implemented.

In ornamental plant research, MLO and eIF4E family genes of petunia were isolated and sequenced. The knockout of PhMLO1 resulted in resistance to powdery mildew.

Grower questionnaires were prepared and requested to gauge understanding of material presented during talks and workshops on managing plant diseases in ornamental plant nurseries.

Plants from the breeding program were selected for evaluation and/or licensing by industry.

Key Items of Evaluation

Participant response to workshops and presentations has been overwhelmingly positive. They reported an increase in knowledge and intent to adopt research-based best practices.

Plants from the breeding program were selected for evaluation and/or licensing by industry.

Master Gardener Extension Volunteers demonstrated a wealth of knowledge that they shared with the general public.

V(A). Planned Program (Summary)

Program # 8

1. Name of the Planned Program

Youth & Family 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
723	Hazards to Human Health and Safety	5%	5%	0%	0%
724	Healthy Lifestyle	10%	10%	0%	0%
802	Human Development and Family Well-Being	10%	10%	0%	0%
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	10%	10%	0%	0%
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	5%	5%	0%	0%
805	Community Institutions and Social Services	10%	10%	0%	0%
806	Youth Development	50%	50%	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	8.1	3.0	0.0	0.0
Actual Paid	7.5	2.0	0.0	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
811403	726379	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
811403	726379	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

Georgia 4-H faculty members developed and supported educational opportunities, including individual learning projects, animal projects, entrepreneurship clubs, science clubs, environmental clubs and product evaluation/judging activities.

Personnel from 4-H and the UGA Department of Animal and Dairy Science, in cooperation with staff from the State Department of Education Agricultural Education, offer livestock show projects to 4-H and FFA members in Georgia. In these programs, young people raise and care for cattle, sheep, goats or swine. After the animals are trained, youth compete in shows and use these experiences as the basis for other competitions, including record keeping, public speaking and Quiz Bowl events.

Participants exhibited their livestock projects in October and/or February at the Georgia National Fairgrounds. During the event, 29 scholarships were awarded, record book winners were recognized in 12 divisions and six students were spotlighted for their outstanding commitment to their project area. Youth participated in a variety of State 4-H Horse Program contests, including Horse Quiz Bowl (105 Juniors, 56 Seniors), Hippology (38 Juniors, 17 Seniors), Horse Judging (43 Juniors, 29 Seniors) and Horse Show (181). There were 200 youth in the Horse Project Achievement at the district level. One 4-H member mastered in the Horse Program by successfully completing all requirements in the horseman manuals and passing a written and riding test.

Georgia 4-H provided opportunities for youth and adults to work collaboratively at all levels in a variety of programs. 4-H'ers attending "Citizenship Washington Focus" initiated a service project related to food insecurity and shared in their local communities and at a statewide conference. 4-H Ambassadors were trained to conduct sharing and learning activities within their communities on topics related to STEM (science, technology, engineering and math) and healthy living. Delegates were selected to attend National 4-H Conference in Washington, D.C., where they prepared and presented briefings to various federal agencies. 4-H members from across the state organized and led community service projects as part of Leadership in Action. 4-H professionals and youth members engaged military youth and families in community outreach efforts.

We offered living history, ropes, team building, ecology, outdoor studies, animal studies and environmental education programming to our users. Additionally, the 4-H Ambassador Program offered a Science, Engineering, and Technology (SET) track; the Water Friends curriculum is offered to fifth-grade clubs; and National 4-H Science Day took place in October. In addition, a weather and climate education program was introduced, as well as "Mission Make It: Georgia 4-H Engineering Challenge," and an educational program about zoonotic disease prevention.

Specialists disseminated publications on brain development, healthy relationships and positive parenting. Faculty provided educational classes to help parents, foster parents, and early care and education (ECE) teachers better understand how to provide positive, supportive learning and caregiving.

2. Brief description of the target audience

County agents and volunteers were targeted to multiply the efforts of faculty associated with this program. In many cases, faculty had direct contact with the youth.

All Georgia youth from kindergarten through college are targeted for life-skill development programs. The in-school club program will target fifth through eighth grades. Different activities within the program will target different ages.

Many programs identify more specific audiences. An example of these would be programs that target youth of military families or programs that target audiences at risk. Some programs target low-income and limited-resource families.

With an increasingly urban population a need exists to provide opportunities for young people to learn about animal products, methods of animal production, economics of animal production and environmental issues related to animal agriculture. In addition, youth should be encouraged to develop important life skills including communication skills, leadership abilities, decision making skills and a sense of responsibility.

3. How was eXtension used?

Although a detailed breakdown in unavailable at this time, overall, 371 questions were answered in eXtension by 79 Georgia experts.

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	1571657	2312618	9911534	14584346

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	10	0	10

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of significant publications including articles, bulletins and extension publications. (excluding peer reviewed articles)

Year	Actual
2018	19

Output #2

Output Measure

- Number of invited presentations by faculty directly resulting from the success of this planned program.

Year	Actual
2018	27

Output #3

Output Measure

- Number of Leadership, Entrepreneurship, and Science Meeting sessions coordinated
  Not reporting on this Output for this Annual Report

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Total number of youth participants that will enhance decision making skills and develop positive leadership skills, increase their knowledge of entrepreneurship education, and increase their knowledge of science education.
2	4-H total enrollment

Outcome #1

1. Outcome Measures

Total number of youth participants that will enhance decision making skills and develop positive leadership skills, increase their knowledge of entrepreneurship education, and increase their knowledge of science education.

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	9970

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
It is critical to create and implement youth programs that meet the needs and challenge the strengths of all youth that live in Georgia and throughout America.

What has been done
FVSU 4-H youth programs were offered across the state.

Results
Of youth participants, 9,970 enhanced their decision-making skills and developed positive leadership skills, increased their knowledge of entrepreneurship, and increased their knowledge of science.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #2

1. Outcome Measures

4-H total enrollment

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	169998

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Youth make up almost 25 percent of Georgia's population.

What has been done
4-H is delivered by Cooperative Extension that provides experiences where young people learn by doing. Kids complete hands-on projects in areas like health, science, agriculture and citizenship, in a positive environment where they receive guidance from adult mentors and are encouraged to take on proactive leadership roles. Kids experience 4-H through in-school and after-school programs, school and community clubs and 4-H camps.

Results
A total of 169,998 young Georgians gained experience and knowledge through enrollment in 4-H programs.

4. Associated Knowledge Areas

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

The downturn of the economy resulted in fewer youth involved in horse activities, so numbers have been declining slightly. This is consistent with other equine 4-H youth programs throughout the country. In addition, the rapidly growing interest in organizations such as the Interscholastic Equestrian Association (IEA), which do not require horse ownership, is thought to be pulling youth away from programs which do require ownership, such as 4-H.

The availability of funding to support relationship education programming for foster parents enabled additional training to be provided in this area.

While Georgia 4-H continues to provide meaningful opportunities for youth working in partnership with adults, our priority areas shift annually based on the specific needs identified by the local Extension leadership and program development team. In addition, some collaborators have changed their focus resulting in minor modifications in the programs and/or events delivered by Georgia 4-H.

Our program was affected by ice storms, hurricanes/tropical storms, gas prices, school policy, testing, the economy, etc.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

During the 2017-2018 school year, 2,333 4-H and FFA members exhibited 4,854 animal projects.

Based on national 4-H common measures, pre- and post-testing results, and program evaluations of each respected area, there were increases in youth participants acquiring knowledge in the following areas: science education, where 87 percent of youth participants increased their knowledge of science technology; leadership, where 85 percent of youth participants acquired strategies to enhance their ability to make good decisions; and entrepreneurship, where 88 percent of youth participants learned information that taught them how to start their own business.

A total of 480 youth participated in at least one of the six Relationship Smarts curriculum lessons offered. A brief survey was administered to participants to assess changes in

participants' beliefs related to topics covered during the program and their confidence in their ability to use the skills learned. A majority of adolescents (77.8 percent) felt that they were either a little more confident or a lot more confident than before the program in establishing healthy relationships. Seventy-six percent of the respondents felt better about themselves.

Most youth self-reported that they had increased their knowledge of the subject matter, that they intended to positively change their behaviors, and that they were better prepared to engage in civic and/or leadership responsibilities.

Furthermore, an intensive study of leadership development for 4-H'ers serving in state officer positions was conducted and found the following: "The State Board of Directors (SBD) program, in addition to an average of 7.68 years as a 4-H member, served to improve and sharpen members' leadership and life skills. Results from the Youth Leadership Life Skills Development Scale (YLLSDS) found that members made statistically significant positive changes for 100 percent of the questions for communication; 100 percent for decision making; 100 percent for understanding self; 100 percent for working with groups; 50 percent for management; 80 percent for learning; and 25 percent for getting along with others." The study also found that "Members were aware of their ability to grow and contribute meaningful leadership not only in the context of 4-H but also in their families, schools, and communities. Overall, the SBD experience helped members to sharpen their Leadership Life Skills (LLS) by offering structured training, creating a supportive environment for risk taking, giving members autonomy, holding high expectations for performance and providing feedback." --Kelsey, K., "The Sharpening Stone: A Phenomenological Study of Youth Leadership Experiences as a 4-H State Board of Director".

During the 2017-18 school year, the 4-H Environmental Education Program reached 42,752 participants. Evaluation data collected throughout the year demonstrates a statistically significant increase in participants' 1) positive relationships with their classmates; 2) positive relationships with their teacher; 3) knowledge about the ecosystems of Georgia; 4) knowledge that their behaviors affect the environment; and 5) connection to nature.

Key Items of Evaluation

Participation in 4-H youth programs improves the leadership and life skills of young people. Participants have statistically significant positive changes.

Programs and publications on brain development, healthy relationships, and positive parenting continue to be well received.

VI. National Outcomes and Indicators

1. NIFA Selected Outcomes and Indicators

Childhood Obesity (Outcome 1, Indicator 1.c)	
0	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.