2018 Texas A&M University and Prairie View A&M University Combined Research and Extension Annual Report of Accomplishments and Results

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I. Report Overview

1. Executive Summary

Texas is the second largest state in the nation with approximately 29 million citizens. The size and scope of Texas pose unique challenges with a wide range of diversity including both the agricultural and human sectors. The issues and needs of Texans vary by numerous factors and, in many cases, are complex. Texas is one of the most rural and most urban states in the nation with a majority of its citizens living in 20 of the 254 counties in the state.

AgriLife Extension and AgriLife Research

Texas A&M AgriLife Research (AgriLife Research) and the Texas A&M AgriLife Extension Service (AgriLife Extension) are the land-grant research and Extension components of the Texas A&M System and are headquartered in College Station, Texas. Since its beginning in 1876 as a land-grant institution, Texas A&M University has been a recognized leader in agriculture, food, and natural resources. Today, Texas A&M University, AgriLife Research, and AgriLife Extension continue this legacy through outstanding academic programs, important contributions to science through research and discovery, and life-long learning and youth development through Extension programs.

The work of both AgriLife Research and AgriLife Extension is guided by strategic plans. AgriLife Research developed a strategic plan to focus its resources on issues of highest importance as identified by agency scientists and other stakeholders. The major topical areas in the strategic plan are identified as priorities.

These priorities are vital and equally important to ensuring a positive future for Texas and its citizens. The priorities are as follows:

1) Achieve resilience in food, fiber, and ecological systems through adaptive strategies.
2) Detect, monitor, and mitigate insect vector-borne diseases and invasive species.
3) Enhance agricultural information systems and expand their use through innovative applications.
4) Integrate basic and applied research at the nexus of food and health.

The Extension strategic plan is designed to enable the dissemination of research-based information to the citizens of Texas on issues of importance as identified through grassroots and other stakeholder input processes. This information is intended to allow the citizens of Texas to make sound decisions that will improve the overall quality of life for themselves and all Texans. The goals of the Extension strategic plan are:

1) Ensure a sustainable, profitable, and competitive food and fiber system in Texas.
2) Enhance natural resource conservation and management.
3) Build local capacity for economic development in Texas communities.
4) Improve the health, nutrition, safety, and economic security of Texas families.
5) Prepare Texas youth to be productive, positive, and equipped with life skills for the future.
6) Expand access to Extension education and knowledge resources.

Work on issues of importance in the state is a joint endeavor by both AgriLife Research and AgriLife Extension. Research-based information is translated to practical best management practices and disseminated via multiple channels including the network of agents in all 254 counties in the state.

Both AgriLife Research and AgriLife Extension conduct identification of issues and needs at multiple levels. Grassroots involvement by citizens, advisory groups, and commodity and industry groups are just a few of the ways this information is generated. Work with other states on areas of shared interest is also of high priority. This report addresses programs of primary importance in Texas. The programs selected also address federal initiatives for agriculture and natural resources, individuals and families, communities, and youth and adult leadership development.

Cooperative Extension Program and Cooperative Agricultural Research Center

Extension educators are positioned to fulfill the charge of the Land-grant institution. It is accomplished by packaging research-based information to disseminate to diverse audiences in rural and urban communities.

The **Cooperative Extension Program** responds to the needs of underserved Texans through life-changing opportunities that empower families, promote agriculture, strengthen communities and foster leadership development in youth. Stakeholder groups and other local decision makers input is key in identifying relevant issues while meeting local, state and federal priorities. The population of Texas in 2018 was reported at 28.70 million. Despite its growth and diversified economy, Texas also has had less fortunate history since 1980 of having a larger percentage of its population living in poverty than the overall US average. With poverty rates twice as high as those for white Texans, Hispanic and black residents are disproportionately burdened by poverty, with Hispanics making up more than half of the state's poor population even though they're far from the majority of the state's population. The Cooperative Extension Program has a presence in 35 of the 254 Texas counties. Given the targeted audience that encompasses various ethnic groups, religions, cultural and socioeconomic backgrounds, the outreach methods used to address the identified needs are client focused and culturally sensitive. The present and emerging needs such as Global Food Security and Hunger, Childhood Obesity, Climate Change, Food Safety, Human Development, and Family-Well Being, Youth Development, Individual and Family Resource Management provided the direction for development and implementation of educational outreach methods in the counties. Volunteers throughout the 35 counties are instrumental in the success of Extension outreach supporting the four program areas, Agriculture & Natural Resources, Community & Economic Development, 4-H Youth Development, and Family & Community Health **-** report data states that 5,227 participants adopted Extension educational practices and improved their standard of living.

Socially disadvantaged and limited-resource agricultural producers and rural youth face numerous challenges in obtaining financial resources through commercial lending institutions. Due to the risks involved in farming and ranching, some local banks are unwilling to lend during these times of economic uncertainty. Many of these producers qualify for financing through USDA-Farm Service Agency but are unaware of the services offered through their programs. CEP Agriculture staff provided individual and group trainings to farmers, ranchers, and producers on livestock production, financial management, crop production, and marketing. As a result, 69 program participants were able to submit complete, direct loan applications to USDA-Farm Service Agency because all the obstacles that impeded their full participation were eliminated. Those submitting applications were able to save 2% fee on their loan requests by not utilizing the services of a private loan consultant. The total amount awarded in 2018 was $4,624,820 in support of underserved and low-income farmers and ranchers. This amount multiplied by 2%, totals $92,469.20, which is the amount that an independent loan consultant would have charged each. Therefore, a savings of $1,340 for each of the sixty-nine participants.

Feral swine devastation is an ongoing and increasingly costly problem among producers and landowners throughout the State. Feral hogs are causing thousands of dollars in damage to landscaping, vegetable and fruit crops, underground irrigation systems, and spreading viruses among livestock. Wild hogs occasionally prey on livestock, especially newborn lambs, goats or calves. The total feral swine population in Texas has been estimated recently at 2.6 million, in which one sow (female pig) can reproduce more than 40 piglets in one year causing $52 million in damages to Texans. In collaboration with agencies such as Texas Parks and Wildlife, Fort Bend Master Naturalists Volunteer Group, and the Animal and Plant Health Inspection Services (APHIS), CEP agents conducted 120 site visits and trainings to 217 farmers and ranchers. In 2018, 180 hogs were captures, and reports indicate that feral hogs attribute to

approximately $200 worth of damage per pig for a total of $36,000 saved through capturing these animals. Over the past three years, in Fort Bend County the demonstration project captured 572 hogs.
The Community and Economic Development unit provides research and curriculum-based training and consulting in the areas of small business, housing energy conservation, financial literacy, and non-profit organizations. Outreach activities include business development seminars, one-on-one consultations, assisting clients with writing business plans, housing and emergency management. Impact of outreach programs states that 133 entrepreneurs received State contract training, 181 business loan applications submitted, 16 homes rehabilitated, $1.8 million in FEMA assistance and 398 housing and disaster-related applications were submitted. Clients were assisted in First Time home buyer and low mortgages totaling over $1,136.418. Sixteen homes were saved from foreclosure. Financial literacy training certified 40 adults. Participants enrolled in the IDA program are projected to save $48,000 to be used for higher education, home ownership, small business startup, and in some cases, purchase a car. Staff within the Community & Economic Development unit has demonstrated efforts to provide lending education for small businesses and homeowners. Workshops have been offered throughout the state with an emphasis on lending resources and the application process. Staff continues to assist hurricane Harvey families and individuals through home loan and rehab applications, federally supported program applications such as the Small Business Administration (SBA), Federal Emergency Management Agency (FEMA), Disaster Supplemental Nutrition Assistance Program (D-SNAP), and working with local organization, businesses to provide donated food, water, supplies, clothes and gift cards. Individuals enrolled in the Business in Development certification program submitted approximately $425,320 in State contracts for approval. Reports show that 309 applications were submitted for home loans and rehabilitation 91 of which were approved for funding renovations totaling $507,456. About 166 applicants received assistance as a 1st time home buyer with low-interest mortgages totaling $519,613. Additionally, $1,036,000 in loans have been approved for small businesses and $2,063,069 in small business and non- Harvey related to home loans. Adults and more often youth from underserved communities have limited opportunities such as professional trainings that teach them the use of money, basic bookkeeping, budgeting, credit, and home-ownership.
The CEP 4-H Youth development program is accessible to youth and families 35 Texas counties facilitated by extension agents and program specialists. The target audience includes partnering with underserved youth, families and community organizations to recruit and train volunteers. There are outreach activities such as science experiments and water stream trailer demonstrations as well as literature dissemination at local health fairs and other community events. There is curriculum enrichment provided to youth in schools and afterschool programs in science, healthy living, civic engagement, college readiness, and career exploration. There are community clubs that develop and promote life leadership skills and service to others in partnership with caring adults. There are special interest project clubs in areas such as gardening and robotics. Youth maintain record books and practice to participate in contests such as food challenge, photography, robotics and livestock shows on the county, district, state, and national levels. Special events like camps, summits, and project-oriented days are also sponsored. Local Extension websites, blogs, and Facebook were used to promote and highlight program successes.
CEP Youth development agents and specialists involved approximately 112,091 Texans between the ages of 5 and 19 through a diverse methodology agenda of activities and programs. Peer teaching, hands-on activities, and contests allow youth to demonstrate how their project has improved their confidence, motivation, decision-making, communication, and problem-solving skills. Thirty trainings involved 294 adult and 106 youth volunteer leaders in 10 Texas counties. Trainings included career awareness, goat judging clothing and textiles, photography, robotics, archery certification, and entrepreneurship. There was 2,504 underserved youth who adopted behaviors that lead to a healthy lifestyle: eating breakfast every day or most days, sharing ideas for healthy meals and snacks with their families and paying attention to how much fruit and water they consume each day. Various county adult leaders, 4-H members, and youth ambassadors have traveled to national and state conferences to development in alignment with the 2017 Practical Research Knowledge and Competency for 4-H Agents. They also benefited from a number of local and virtual trainings. Workshops for adult and youth volunteer leaders were offered at the county level and on the campus of Prairie View A&M University. These included 4-H

projects, curriculum enrichment, and grant trainings.
Minorities in Texas face serious health challenges, including higher rates of hypertension, diabetes and heart disease. Planned programs serve to increase knowledge, change behaviors, and increase physical activities in the underserved communities. The Cancer Cooking School reached an audience who are never or rarely screened for cancer and motivated 232 to get a cancer screening. Data revealed that more than 55% of age-eligible participants were not in compliance with recommended Texas citizens, living in rural and urban areas, are socially disadvantaged or low income are experiencing problems with diet-related illnesses such as diabetes, hypertension and elevated cholesterol levels. Children who are food insecure are living in areas where access to retail venues in their communities to purchase healthy foods is limited. The Cancer Cooking School reached an audience who are never or rarely screened for cancer and motivated 232 to get a cancer screening. Data revealed that more than 55% of age-eligible participants were not in compliance with recommended screening recommendations and nearly 30% were not in compliance with colonoscopy recommendations. Following program participation in the Cooking School, 60 of the eligible report they will get a pelvic exam, 86 will get a mammogram, and 86 will get colon screening or colonoscopy. Early detection through screening reduces health care cost as well as improves survival from cancer. A total of 49,745 underrepresented families and youth attended a series of non-formal educational events. Parents of young children and elementary youth participated in a series of nutrition education classes with 951 adults and 3,165 youth receiving completion certificates. A collaborative effort with the Family & Community Health staff and Research scientists taught participants to modify recipes to decrease the number of calories and adopt healthy eating habits. A total of 99 workshops were implemented in Travis County addressing health and wellness health disparities of at-risk groups. Educational programming included hands-on workshops, lectures, health fairs, and community radio. The success of incorporating Bitter Gourd through juicing and meal preparation has been evident in reducing A1C levels of two participants, one whose A1C level decreased from 11.0 to 4.0. One hundred ninety -seven family members improved their mental well-being after participating in the Healing Trauma series. They reported improving their lifestyle through meditation, nutrition, gardening, laughter and setting boundaries. There were 415 of 527 participants in Harris County who reported improvement in one or more food safety practices to include, washing hands before preparing food, washing all items and surfaces after cutting raw meat or seafood, proper thawing of frozen foods and using a meat thermometer.

The Cooperative Agricultural Research Center (CARC) is the organizational unit responsible for coordinating agricultural research within the College of Agriculture and Human Sciences at Prairie View A&M University. The mission of CARC is to conduct basic and applied research in the Agricultural, Environmental and Natural Resources, Food, Plants, and Social Sciences to produce research-based information and technological developments, which improves the socioeconomic conditions of the clientele it serves in Texas, the Nation, and the World, with emphasis on the historically underserved. In that service, CARC coordinates research activities in five major areas: Animal Systems, Food Systems, Plant Systems, Natural Resources, and Environmental Systems, and Social and Allied Programs.
The Animal Systems research is dedicated to advancing the science and understanding of the physiological mechanisms affecting the reproductive performance of grazing ruminants. The use of this information to improve the livelihoods of the people of Texas, the gulf coast region, the nation, and the world, through its international mission. Currently, the Animal Systems Research group has research projects focused on four (4) areas: 1) Animal Health and Well-Being. The primary objective of this project is to reduce parasite through targeted grazing of high tanning forages; 2) Nutrition. The objective of this project is to improve the interaction between feed intake and growth (primarily in goats), thereby advancing the understanding of the physiological mechanisms affecting growth and performance of grazing ruminants (cattle and goats); 3) Functional Genomics. The goal of this project is to develop an understanding of the reproductive process in goats. Progress on this project has been made in three (3) areas;1. High-throughput RNA sequencing of caprine testis using Alpine goats as a model system, 2. Mapping information has provided insights into the top 1,000 highly differentially expressed genes, and 3 identified gene networks important during pre-meiotic and meiotic phases of spermatogenesis, and 4. Reproductive

Biology. The reproductive biology project is studying the molecular mechanisms responsible for pregnancy recognition and formation of the placenta in the goat. Specific carbohydrate antigens, especially H-type 1, are strongly expressed by the cells lining the reproductive tract during pregnancy recognition. Putative counter-receptors for the H-type 1 antigen have been identified on fetal membranes at equivalent stages of pregnancy. Identification and regulation of the proteins carrying the H-type 1 antigen are currently under investigation. Knowledge of factors that regulate uterine expression of the H-type1 antigen may provide novel methods to modulate the window of uterine receptivity for embryo attachment and control fertility.
The genetics characterization, conservation, and preservation group are working on ways to identify character traits that possess corresponding genetic resistance to, or tolerance of, parasite infection. Additional work includes optimizing production systems, live breeding, and value-added products development.
The Food Systems working group focus efforts on issues of the regional and national importance of enhancing nutrition, food safety/quality, food security/insecurity, and the related impacts on the quality of life. Critical issues facing the underserved population locally, nationally and globally involving the incidences of nutritional related illnesses and diseases, such as diabetes and obesity, the increase in foodborne illnesses, and food-borne pathogens. The goals of this group are to: 1) increase the body of knowledge in the understanding of nutrients and mechanisms implicated in illnesses and diseases, 2) to increase the body of knowledge in the areas of quality and safety of meat, milk, and value-added products, and 3) A newly added project addressing the issues of food security. Currently, work involves enhancing the quality of food and food products, examine strategies for mitigating the transmission of natural foodborne pathogens, examine methods for the reduction of natural and introduced toxicants in foods and feed, examine nutrient quality enhancement of food and food products, examine mechanisms involved in nutrient utilization and diseases, evaluate strategies for minimizing the transfer of microbial pathogens during food handling, evaluate strategies for translating nutrition knowledge into better food selection. A considerable effort is undertaken to examine flavor, which is a major attribute that influences the selection and consumption of dairy (goat) foods. Formation of flavor is very complex and results from the interaction of several compounds originating from components of dairy products. The dynamic biochemical and chemical reactions in some dairy products, especially aged goat milk cheeses affect flavor formation during processing and aging. Maturation and aging of cheese are time consuming and expensive process requiring controlled temperature and humidity. Finding practical ways to reduce the length of refrigerated storage and ripening of cheeses is economically important and will save the goat dairy industry a considerable amount of money and, in some cases, will determine the economic failure or success of a goat dairy food processing operation. Modified processing techniques can enhance the formation of flavoring compounds in semi-hard and hard type goat milk cheeses.
The Plant Systems group works on many projects that are the important and vital portion to the regional economy. The unit is dedicated to developing a body of knowledge using a multidisciplinary approach to examining the efficacy of producing high-value, low-volume medicinal and nutritional products. Current projects are focused on three (3) areas.1. Medicinal plants. The specific aim of this project is to develop safer non-caloric sweetener and/or more effective dietary supplements from the Lippa and Hoodia species and related plants. Research has analyzed a zero calorie sweetener metabolomics that has facilitated the discovery of ultra-high accumulations of antioxidants in Phyla dulcis,an otherwise obscure herb of Central America. The chemistry of polymeric plant-derived materials that have facilitated the synthesis of novel biomaterials with potential applications in medicine. 2) Develop locally grown specialty crops that have high economic potential, such as the sweet potatoes, and other newly introduced/ re-introduced crops. The sweet potato project focuses on developing genomics and crop improvements through the development of high yielding insect resistant purple and orange colored sweet potato new lines.
The Natural Resources and Environmental Systems (NRES) evaluated the performance of collard greens in response to organic amendment types and application rates. The NRES team monitored and analyzed soil moisture and nutrient dynamics, soil CO_2 exchange, soil pH, infiltration and root distribution of collard greens in the root zone. The team also investigated (multiple years) the performance of different cover crops treatments (legumes, grain, and legume-grain mixtures) grown in southeast Texas for additional data and quantified weed pressure, biomass production and monitored soil CO_2 and moisture dynamics in

the root zone. The team members have also been developing (i) irrigation scheduling tool to increase water use efficiency in Texas, (ii) android application for location-specific soil and forecasted weather data, (iii) web application for visualizing and predicting groundwater storage in Texas, and (iv) upgrading of Irrigation Water Estimator for Texas (IWET) for multiple users. Additionally, research works have been done to evaluate: i) effects of drought on crop production and cropping areas in Texas, (ii) potential impact of climate change on irrigation water requirements for some major crops in the Northern High Plains of Texas, and (iii) deep learning for soil moisture estimation from thermal images. The team members also evaluated the impact of land-use and climate changes on groundwater storage in Texas; interactions between land use, climate change, and carbon cycle using satellite measurements; hydrologic and hydraulic modeling of Cypress Creek watershed, Texas during Hurricane Harvey and impact of potential mitigation measures; performance of the Multi-Radar Multi-Sensor System over the Lower Colorado River; evaluation and calibration of empirical methods for daily reference evapotranspiration estimation, and spatial interpolation of daily reference evapotranspiration in West Texas.
For dissemination and outreach activities, the team has conducted Leafy Greens Workshop: From Farm to Table and participated in the Agricultural Field Day (Cover Crop Workshop and Soil Health Workshop); Soil Health Project; Research Extension Apprentice Program (REAP), USDA AG Discovery Camp, Research and Extension Experiences for Undergraduates (REEU), Research Experiences for Undergraduate Students, and Career Development Event (CDE) to educate K-12 students from different schools, undergraduate students and other stakeholders in the State. Peer-reviewed articles, workshop presentations, and applied research outreach materials are some of the venues through which research findings were disseminated to different stakeholders within Texas and across the nation and globally.
The Social Systems and Allied program group focuses its research efforts on examining factors impacting the quality of life in rural America. An understanding of these factors is vital in setting policies and programs that promote socioeconomic well-being. These factors are multidimensional and include some key indicators. Research scientists in this group have therefore established research projects that relate specifically to eight key themes: 1) Food security/insecurity, 2) Health disparities, 3) Unemployment and income disparities, 4) Education/vocational, 5) Rural Infrastructure, 6) emergency management, 7) Housing, 8) County revenue. One of the ongoing research and outreach projects deals with engaging local communities in emergency management to establish a coalition of local community leaders to address disaster issues. There is a need to improve disaster management services and develop resilience in communities across America. Texas is in the gulf coast region of the country where natural disasters such as floods and hurricanes are a regular occurrence. The devastating hurricane Harvey in September 2017 impacted many of the community in the service area of this project. Members of the team assisted families that were directly impacted by providing assistance and direction to sources of assistance. The region is also susceptible to various man-made disasters such as the Sunday, March 17, 2019 plant explosion in Deer Park, TX. The explosion resulted in shelter-in-place being issued for residents in the area. The disaster could cause long-term environmental and health issues. Educational and outreach programs are being conducted to work with local communities to develop strategies that lessen the impact on families and communities

Total Actual Amount of professional FTEs/SYs for this State

Year: 2018	Extension		Research	
	1862	1890	1862	1890
Plan	381.0	81.5	148.9	35.0
Actual	398.2	62.5	172.5	29.0

II. Merit Review Process

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

- Internal University Panel

2. Brief Explanation

AgriLife Extension and AgriLife Research
AgriLife Research and AgriLife Extension Administrative Leaders serve as merit reviewers for the Federal Plan of Work, the Federal Report of Accomplishments and Results, and associated grants and contracts. This team is comprised of senior administrative staff, as well as department heads and associate department heads for Extension. This leadership team is responsible for the oversight and management of all programs conducted by research and Extension faculty.
Cooperative Extension Program and Cooperative Agricultural Research Center
Extension programs initiated in the state of Texas are funded in whole or part from Smith Lever or Section 1444 and 14445 funds requiring a merit review process. The review panel is comprised of Cooperative Extension Program administrative leaders, Dean of the College of Agriculture and Human Sciences, Cooperative Agricultural Research Center director, scientists, faculty, and Texas AgriLife middle managers. These help determine if appropriate strategies are designated to reach the limited resource clientele mandated by the United States Department of Agriculture. The plans are reviewed based on needs assessment, planned programs, outcomes and evaluation. This combined leadership team is responsible for the oversight and management of all programs planned and implemented by Extension staff members. All proposed research projects that are funded under either Evans-Allen, Experiment Station (Hatch), or otherwise, undergo a merit review process. Each proposal submitted for support is routed through an internal review committee and if deemed necessary, each proposal is routed through the University Committee on Research. The Research Director selects a set of individuals to serve as members of an internal review panel in consultation with the University's Vice President for Research. At a minimum, three individuals review and evaluate each proposed project prior to approval for external submittal and/or internal fund allocation. Scientific peer review is incorporated in that all project reports including Current Research Information System must show evidence of external review. Written comments should be included with final proposals for campus routing. Routing proposals through quality control check points (Research Director, Dean of the College and Vice President for Research) are designed to ensure that proposals meet RFP guidelines as well as meet scientific merit qualifications. All proposals are checked by our on campus Office of Sponsored Programs.

III. Stakeholder Input

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

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

Brief explanation.

AgriLife Extension and AgriLife Research

Both AgriLife Extension and AgriLife Research use multiple methods to reach stakeholder groups within the State of Texas. AgriLife Extension uses multiple sources of input from various stakeholders. These include local clientele, commodity/special interest groups, trend data monitored by specialists, various county committees, elected officials, and emerging issues. Teams of Extension and research faculty meet to analyze these issues, which lead to priority setting and development of programs to address the needs and issues raised by the various stakeholder groups and methods.

In 2015, AgriLife Extension held open forums to identify issues. These forums were held in each of the 254 counties. Issues identified were entered into a state-wide database and used to guide programming. Local Leadership Advisory Boards (LABs) meet to validate issues raised in the local stakeholder input process in the non-forum years. Leadership Advisory Boards serve as a conduit to local citizens and their needs. These boards are comprised of community opinion leaders charged with providing long-term visioning and advocacy for the local Extension program. Approximately 2,500 individuals serve on Leadership Advisory Boards across the state. This process continues as the local process to raise and validate issues. Another 10,000 citizens serve on program area committees, task forces, coalitions, and youth boards. These volunteers represent specific areas of the local program and are involved in issues identification, program development and delivery, evaluation and interpretation of programs, and management of other volunteers. These volunteers represent all 254 counties in the state. This process is being repeated in 2019.

AgriLife Research Administration, Department Heads, and Resident Directors regularly meet with the major agricultural industries and commodity groups in Texas. AgriLife Research has encouraged the public to participate in helping set priorities, assess current program and process effectiveness, and determine future directions. These processes were open, fair, and accessible to encourage individuals, groups, and organizations to have a voice, and treated all with dignity and respect. Stakeholders were initially identified by membership in listed organizations, though all events were public and were announced in the press and other written notice. Input from these events was captured by AgriLife Research participants, and in some cases, was published for further public use. Stakeholder input has always been critical to AgriLife Research processes and programs, and listed events and organizations continue as essential partners in setting the AgriLife Research agenda and recognizing and addressing emerging issues. A concentrated effort was done for small grains, corn, sorghum, and cotton resulting in a jointly developed strategic plan. AgriLife Research also met with leading animal health companies, large cow-calf operators, stockers, cattle feeders, and leaders in high-throughput sequencing to develop a research strategy to benefit the beef industry.

Cooperative Extension Program and Cooperative Agricultural Research Center

The Cooperative Extension Program (CEP) used various methods to reach stakeholder groups within the State of Texas. Multiple sources of input were gathered from stakeholders including local clientele commodity/special interest groups, various county committees and elected officials. CEP also used media outlets such as public service announcements and online communications.Focused programs were conducted and analyzed, which led to priority setting and development of educational programs addressing the needs and issues raised by various stakeholder groups in the stakeholder input process. Extension used Leadership Advisory Boards (LABs) to validate issues raised in the local stakeholder input process. LABs serve as a conduit to local citizens and their needs. These boards are comprised of community opinion leaders charged with providing visioning and advocacy for the local Extension program. Additional citizens serve on program area committees, task forces, coalitions, and youth boards. These volunteers represent specific areas of the local program and are involved in issues identification, program development and delivery, evaluation and interpretation of programs, and management of other volunteers. These volunteers represent the counties in the state serviced by Cooperative Extension and

Research.

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

1. Method to identify individuals and groups

- Use Advisory Committees
- Use Internal Focus Groups
- Use External Focus Groups
- Open Listening Sessions
- Needs Assessments
- Use Surveys
- Other (Meetings with various stakeholder groups)

Brief explanation.

AgriLife Extension and AgriLife Research
The basis for Texas Extension's relevance in the State of Texas is grassroots involvement. Texas Extension engages the local Leadership Advisory Board in the identification and validation of new and emerging issues. Information from other stakeholders is obtained in various ways. Regular meetings are held with various commodity and interest groups. These groups provide input into programmatic decisions including development of new efforts, modification of existing efforts, and termination of programs that are no longer relevant. Finally, various subject matter groups employ the use of surveys and other needs assessment processes to gain information specifically about their subject area. Data from these processes are used to develop programs to address issues. For research, the above listed groups and organizations provide invaluable input into the stakeholder process. Also, research maintains an active contact list and engages stakeholders on a regular and ongoing basis.
Cooperative Extension Program and Cooperative Agricultural Research Center
Cooperative Extension used open listening sessions in 35 counties as a means of getting grassroots involvement in its program planning and data collection process. These sessions allow local clientele to give their opinion on issues of importance to their communities. Additionally, Leadership Advisory Boards and other program advisory committees and/or groups were used to provide input on program direction and implementation. Cooperative Extension staff also meet with various commodity and interest groups that provided insight into issues facing the targeted audience.

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)
- Survey of the general public
- Meeting specifically with non-traditional groups

- Survey specifically with non-traditional groups
- Meeting specifically with non-traditional individuals
- Survey specifically with non-traditional individuals
- Other (Modified Nominal Group Process)

Brief explanation.

AgriLife Extension and AgriLife Research
Both AgriLife Extension and AgriLife Research use multiple methods to reach stakeholder groups within the State of Texas. AgriLife Extension uses multiple sources of input from various stakeholders. These include local clientele, commodity/special interest groups, trend data monitored by specialists, various county committees, elected officials, and emerging issues. Teams of Extension and research faculty meet to analyze these issues, which lead to priority setting and development of programs to address the needs and issues raised by the various stakeholder groups and methods.
Methods of data collection include surveys, focus group sessions, data collected as a result of program evaluations, expert panels, meetings with stakeholders, and open forum type meetings to solicit input. All data from all sources is considered when decisions are made regarding the future directions of Research and Extension efforts.
Cooperative Extension Program and Cooperative Agricultural Research Center
Data was collected via numerous methods from the stakeholders mentioned in the previous section including meeting with advisory committees, holding open forums with clientele and other groups and collected needs assessment and/or surveys at educational programs across the state. Likewise, Extension staff members identify needs while conducting research and working with clientele.

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
- Other (Strategic plans)

Brief explanation.

AgriLife Extension and AgriLife Research
The basis for AgriLife Research and AgriLife Extension's relevance in the State of Texas is grassroots involvement. AgriLife Extension has utilized Open Listening Sessions as part of the grassroots Texas Community Futures (TCFF) Process in the past. These sessions provide local clientele the opportunity to voice their opinion on issues of importance to their lives and the lives of others in their community. These sessions were last conducted in 2015. Local Leadership Advisory Boards (LABs) lead efforts to raise new and validate current issues being addressed in local communities. The process allows for flexibility in approaches based on community resources. The TCFF process is being repeated again in 2019.
Face-to-face meetings and an online data collection effort are part of the options offered. Approximately 2,500 individuals serve on Leadership Advisory Boards across the state. In addition, another 10,000 citizens serve on program area committees, task forces, coalitions, and youth

boards. These volunteers represent specific areas of the local program and are involved in issues identification, program development and delivery, evaluation and interpretation of programs, and management of other volunteers. These volunteers represent all 254 counties in the state.
Both AgriLife Extension and AgriLife Research utilize various methods to analyze and incorporate input from stakeholders. Teams of Extension and research faculty meet based on need to analyze these issues, which leads to priority setting and development of programs to address the needs and issues raised by the various stakeholder groups and methods. Strategic plans and roadmaps for AgriLife Research and AgriLife Extension have been developed to guide our efforts.
Cooperative Extension Program and Cooperative Agricultural Research Center
The Cooperative Extension Program used various methods to reach stakeholder groups within the State of Texas. Extension used multiple sources of input from stakeholders including local clientele, commodity/special interest groups, emerging issues, various county committees and elected officials. Extension staff analyzed these issues, which led to the priority setting and development of programs to address the needs and issues identified by stakeholders. Extension also used Leadership Advisory Boards (LABs) to validate issues raised in the local stakeholder input process. LABs serve as a conduit to local citizens and their needs. These boards are comprised of community opinion leaders charged with providing long-term visioning and advocacy for the local Extension program. Additional citizens serve on program area committees, task forces, coalitions, and youth boards. These volunteers represent specific areas of the local program and are involved in issues identification, program development and delivery, evaluation and interpretation of programs, and management of other volunteers. These volunteers represent the counties in the state serviced by the Cooperative Extension Program and Research Center.

Brief Explanation of what you learned from your Stakeholders

AgriLife Extension and AgriLife Research
Information from key stakeholder groups both informs and validates the strategic plans, and research and programming efforts for both AgriLife Research and AgriLife Extension. This information allows both agencies to remain relevant and accountable for the public funds entrusted via partnerships with local, state, and federal governments.
Cooperative Extension Program and Cooperative Agricultural Research Center
Health issues such as chronic diseases and childhood obesity are major concerns within the targeted audience. Family financial stability, community economics, sustainable agriculture, parenting education and youth development are also issues of high importance.

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	6773564	4604631	8054569	5371812
Actual Matching	6773564	1762916	8500555	2211424
Actual All Other	52039410	0	24614778	0
Total Actual Expended	65586538	6367547	41169902	7583236

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous				
Carryover	9363346	139057	0	2019537

V. Planned Program Table of Content

S. No.	PROGRAM NAME
1	Economics and Management for Sustainable Agriculture
2	Livestock Production
3	Crop and Forage Production
4	Water & Natural Resources Management
5	Range Management
6	Climate Change
7	Sustainable Energy
8	Community Resource and Economic Development
9	Chronic Disease, Health, and Wellness
10	Childhood Obesity
11	Food Safety
12	Global Food Security and Hunger
13	Fostering Strong Families
14	Life Skills for Youth (includes Character Education and Leadership)
15	Adult Leadership and Volunteer Development

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Economics and Management for Sustainable 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
601	Economics of Agricultural Production and Farm Management	0%	80%	0%	0%
602	Business Management, Finance, and Taxation	25%	10%	25%	0%
604	Marketing and Distribution Practices	25%	10%	25%	0%
605	Natural Resource and Environmental Economics	10%	0%	10%	0%
606	International Trade and Development	10%	0%	10%	0%
608	Community Resource Planning and Development	5%	0%	5%	0%
610	Domestic Policy Analysis	25%	0%	25%	0%
	Total	100%	100%	100%	0%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2018	Extension		Research	
	1862	1890	1862	1890
Plan	15.0	4.0	10.0	0.0
Actual Paid	25.5	4.0	13.0	0.0
Actual Volunteer	0.0	34.0	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**
433767	294696	757284	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
433767	112827	192505	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
3332509	0	279898	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

AgriLife Extension and AgriLife Research
Numerous activities, events and experiences will be conducted to address the needs of producers and other clientele in the area of economics and management. These include but are not limited to workshops, one-on-one intervention, marketing clubs, cooperatives, popular press articles, extension publications, and other methods as needed. These educational approaches focus on the identified needs of those who participate in our programs.

Work of AgriLife Research and AgriLife Extension is conducted jointly where research-based information is generated and then transferred to clientele. This work is conducted primarily on campus with dissemination efforts both on campus and at various research and extension centers across the state.

Collaborative efforts are also an important part of this area. Work with various commodity groups and other agencies are routinely conducted by both AgriLife Research andAgriLife Extension faculty. Examples of this work include cooperating with Grain and Livestock organizations on risk management and Biofules programming and the Texas FSA office on Farm Program education, and price forecasts for lending purposes for the coming year.

Cooperative Extension Program
Several outreach activities were conducted to address the needs of underserved producers in the area of economics and management related to farm sustainability. Much of the work was conducted through one-on-one meetings with producers along with workshops, meeting and other educational events.

2. Brief description of the target audience

AgriLife Extension and AgriLife Research
The target audience for the economics and management program includes all Texas producers. Specifically, commercially viable agricultural producers are targeted, but additional efforts are targeted to small scale operators, part-time producers, new/young landowners/producers, and commodity groups.

The target audiences are very diverse in knowledge, skills, attitudes, and aspirations to learn and adopt important strategies to be successful. Therefore, the methods used in this area vary depending on which audience is being addressed.

Cooperative Extension Program

Our programs will assist a diverse audience, with emphasis on the under-served, hard to reach, and have limited social and economic resources to improve their quality of life; this will include farmers and ranchers, private land and forest owners, military veterans and their families.

3. How was eXtension used?

Ask an expert questions were responded to be faculty members.

The Cooperatives Community of Practice for eXtension is supported by Texas AgriLife Extension personnel. It provides a resource to individuals and groups interested in cooperative agricultural business practices.

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	162336	458648	85412	0

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

Patent Applications Submitted

Year:	2018
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	3	85	88

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of group educational sessions conducted.

Year	Actual

2018	3380

Output #2

Output Measure

- # of research-related projects.

Year	Actual
2018	35

Output #3

Output Measure

- # of one-on-one technical assistance/consultations.

Year	Actual
2018	341

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Percent of producers that report a savings in money or increased profit by best management practices adopted.
2	% of target audience that reports an increased knowledge of economics and management strategies.
3	Number of producers who conduct whole farm or ranch risk assessment evaluations.
4	% producers that reports an increased knowledge on farm financial management plans and marketing plans to sustain their agribusinesses.
5	Number of producers receiving financial assistance thru USDA/FSA and other traditional Ag lenders.

Outcome #1

1. Outcome Measures

Percent of producers that report a savings in money or increased profit by best management practices adopted.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	80

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Producers attending in-depth workshops are learning the information needed to improve their risk management skills, and increase their economic returns. This improvement in risk management skills, and increased economic returns should improve the long-run viability of the agricultural sector, and result in improved economic returns to related businesses and employment in the region as well.

What has been done
A 2.5 year post survey was mailed during summer 2018, to participants of the 2016 Master Marketer program held in Abilene, Texas, to determine knowledge gain, adoption of new practices, and economic impact. The survey was an in-depth 14-page survey that was followed up with reminder postcards and phone calls. The survey was done 2.5 years after the initial program to allow time for adoption of new practices and to identify economic impacts.

Results
Results from survey questions indicated: an increase in the use of a marketing plan from 38% pre-Master Marketer to 100% post-Master Marketer, an increase in determining production costs and incorporating those into the marketing plan from 53% pre-Master Marketer to 93% post-Master Marketer, and an increase in building profit and growth needs into price targets from 40% pre-Master Marketer to 87% post-Master Marketer. The evaluation also showed an increase in participants using market fundamentals in developing their personal market outlook from 29% pre-Master Marketer to 94% post-Master Marketer, an increase in their ability to manage price and production risk from a 2.8 pre-Master Marketer to a 5.2 (on a 7-point scale with 7 being excellent) post-Master Marketer, and knowing when to use forward cash contracting from 46% pre-Master Marketer to 86% post-Master Marketer. The 2016 Master Marketer education had an average individual economic impact of a 2.4% increase in gross farm income $38,781/year for

graduates of the Abilene class.

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
604	Marketing and Distribution Practices
605	Natural Resource and Environmental Economics
610	Domestic Policy Analysis

Outcome #2

1. Outcome Measures

% of target audience that reports an increased knowledge of economics and management strategies.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	85

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Low agricultural prices and reduced agricultural incomes over the last several years have increased farmers and ranchers awareness of a need for better risk management practices. Producers attending in-depth workshops learned the information needed to improve their risk management skills. This improvement in risk management skills, and increased economic returns should improve the long-run viability of the agricultural sector, and result in improved economic returns to related businesses and employment in the region as well.

What has been done
Pre-test and post-test instruments and retrospective post-tests were used to determine knowledge gained at in-depth workshops that spanned from 8 to 40 hours in length such as Ranch Management University, Advanced Topics Series, Risk Management and Crop Marketing Workshops, Cotton and Grain Risk Management and Marketing Workshops, Profitability Workshops, Ranchers leasing Workshops, QuickBooks Pro for Farmers and Ranchers Workshops, Training Socially Disadvantaged Farmers, and similar workshops.

Results
To-date, about 607 farmers have attended the Training Socially Disadvantaged Farmers sessions. On average, evaluation results indicate that there was a 71% increase in knowledge and 67% of respondents anticipate a positive economic benefit as a direct result of the workshops. Each educational workshop is expected to generated an economic impact of $2,376 per participant. At the QuickBooks Pro for Farmers and Ranchers Workshop, pre- and post-test results indicated 100% of participants attending indicated they had gained knowledge, and showed a 54% increase in knowledge due to the workshop. Participants said the information learned in the workshop would be worth an average of $2500 to their operation. At Ranch Management University workshop in Spring and Fall 2018, participants showed that there was an increase in knowledge/understanding as a direct result of the workshops. In addition, respondents anticipate a positive economic benefit as a direct result of the information presented at the workshops.

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
604	Marketing and Distribution Practices
605	Natural Resource and Environmental Economics

Outcome #3

1. Outcome Measures

Number of producers who conduct whole farm or ranch risk assessment evaluations.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	115

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The FARM Assistance model (financial simulation strategic planning tool) was used to complete 115 analyses for producers, for demonstrations or agent planning purposes. Survey respondents showed that as a result of participating in FARM Assistance, 90% claim a better understanding of

the financial aspects of their own operations, and 95% claim an improved ability to assess the financial risks and potential impacts of strategic decisions they make. A comparison of various scenarios analyzed showed that strategic planning tools can have economic benefits.

What has been done

Participants are able to analyze their own economic situation over a 10-year planning horizon using the FARM Assistance model. Producers were able to utilize their own financial, yield, and production information to analyze alternative strategic opportunities such as adding or reducing acreage, changing the crop/livestock mix, changing the machinery complement or purchase/lease arrangements, financing options, irrigation investments etc., to determine long run impacts on the operations financial situation for planning purposes.

Results

The outcome of client participation is measured through participant evaluations. Client assessments (over the last 2 years) of the FARM Assistance program indicate a very positive impact on management ability. As a result of participating in the FARM Assistance program, 90% claim a better understanding of the financial aspects of their operation and 95% claim an improved ability to assess the financial risks and potential impacts of strategic decisions they make. One of the objectives of the program is to help managers become more comfortable with formal financial analysis, and 90% indicated that they would be more likely to use a formal financial analysis (like FARM Assistance) to help make decisions in the future. 97% of respondents indicated they would recommend FARM Assistance to another producer. Finally, in responding to anticipated economic value, respondents estimated an average $26,871/person annual benefit to their operation as a result of their FARM Assistance participation.

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
604	Marketing and Distribution Practices
610	Domestic Policy Analysis

Outcome #4

1. Outcome Measures

% producers that reports an increased knowledge on farm financial management plans and marketing plans to sustain their agribusinesses.

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual

2018 90

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Majority of the farms in Texas are considered small. Many of these operations have less than 50 acres and are being operated by socially disadvantaged and non-traditional producers. Many of these producers find it difficult to obtain adequate financial resources to properly operate their farming businesses. They are also often deficient in knowledge about farm management and marketing. Because these operations are a vital part of our rural Texas economy, it is important to provide outreach and education on these topics to the audience.

What has been done

Various workshops, educational programs, and other hands-on activities were conducted related to economic management. These educational events focused on a variety of topics including but not limited to recordkeeping, marketing, financial resource acquisition, and other general production and management practices. Some of the programs where the training activities took place include a Governmental Assistance Program, a Ranchers Outreach Program, a Fruit and Vegetable Conference and a Beef Cattle Production Seminar.

Results

Extension staff members provided one-on-one consultations and technical assistance to over 1400 socially disadvantaged and traditionally underserved agricultural producers. One hundred & forty-three (143) of these producers were helped with farm business planning and marketing. Survey results indicate the following:

94% of the program participants gained the knowledge to develop a farm operating budget for their operation in 2018.

90% of the program participants said that they gained the knowledge necessary to keep production and financial records for securing financing for their farming and ranching operations.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation
604	Marketing and Distribution Practices

Outcome #5

1. Outcome Measures

Number of producers receiving financial assistance thru USDA/FSA and other traditional Ag lenders.

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	69

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
According to the 2012 USDA census, 40% of the Texas farms are less than 50 acres in size.Many of them are operated by Socially Disadvantaged and traditionally underserved agricultural producers. Often, these producers find it difficult to manage their farming/ranching operations. These difficulties stem from their inability to obtain adequate financial resources as well as a lack of knowledge in the areas of farm management and marketing. This audience plays a vital role in sustaining the economies in many of the rural communities across the state. It is for this reason, it is extremely important that they are properly serviced.
Socially disadvantaged and limited‐resource agricultural producers and rural youth face numerous challenges in obtaining financial resources through commercial lending institutions because of the risks involved in farming and ranching and the local banks unwillingness to lend during these times of economic uncertainty. Many of these producers qualify for financing through USDA‐Farm Service Agency but are not aware of their programs. CEP staff provided individual and group trainings to farmers, ranchers and producers on livestock production, crop production, financial management, marketing and applying for assistance under USDA programs.

What has been done
Various workshops were conducted that concentrated on USDA and other loan programs for farmers and ranchers. Extension staff members also conducted business planning webinar training series. The program delivery focuses on increased community awareness by way of mass marketing, social networking, and information delivery both group and one-on-one via our network of Extension staff. Some of these outreach efforts were in conjunction with other educational programs such as the South Texas Bull Gain Test, various county Ag tours and field days and production training meetings. Additionally, we partnered with USDA and several Community-Based Organizations to strengthen our outreach efforts.

Results
As a result, (69) sixty-nine program participants were able to submit complete, direct loan applications to USDA-Farm Service Agency because all the obstacles that impeded their full participation in the Program were removed. They were able to save a 2% fee on their loan requests by not utilizing the services of a private loan consultant. The total money requested for 2018 amounted to $4,624,820 in loans to support underserved and low-income small farmers and ranchers. This amount multiplied by 2%, totals $92,496.40, which is the amount that an independent loan consultant would have charged. This was an average savings of $1,340 for each of the sixty-nine participants. Extension staff members provided one-on-one consultations and technical assistance to over 1400 socially disadvantaged and traditionally underserved

agricultural producers. One hundred & forty-three (143) of these producers were helped with farm business planning and marketing.

Survey results indicate the following:

92% of the program participants gained knowledge of USDA - Farm Service Agency Direct and Guaranteed Loan Programs.
72% of the program participants stated that they had gained the ability to complete a USDA - Farm Service Loan application without needing additional assistance.
94% of the program participants gained the knowledge to develop a farm operating budget for their agricultural operations.
90% of the program participants said that they gained the knowledge necessary to keep production and financial records for securing financing for their farming and ranching operations.
69% socially disadvantaged agricultural producers were able to submit a loan application to USDA Farm Service Agency in 2018. The amounted requested by these individuals was $4,624,820.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
604	Marketing and Distribution Practices

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 Programmatic Challenges

Brief Explanation

Spring 2017 wildfires, and a summer 2017 hurricane redirected some program activities throughout 2018. In addition, budget reductions as a result of anticipated and actual reduced state appropriations in 2017 resulted in a reduction in FTEs available to carry out educational activities in 2018. That impact will carry into the future. While faculty picked up additional responsibilities, some educational opportunities were missed due to redirected efforts and reduced faculty numbers.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Clientele/participants involved in Master Marketer, Ranch Management University, Advanced Topic Series Workshops, Risk Management and Crop Marketing Workshops Profitability Workshops, Cotton and Grain Risk Management and Marketing Workshops,

Ranchers leasing Workshops, QuickBooks Pro for Farmers and Ranchers Workshops, Training Socially Disadvantaged Farmers, and FARM Assistance are evaluated in several ways, depending on the length of the training activity, whether we are trying to identify short-term knowledge gains, or adoption/change of practices and economic impacts over time. Pre-tests and post-tests are used at the beginning and end of selected programs to better identify knowledge gains. Retrospective post evaluation surveys are used to identify adoption/change of practices and economic impacts over time. Results indicate that producers are learning, and adopting/changing practices, and these changes are producing economic benefits.

Key Items of Evaluation

Clientele/participants involved in Master Marketer, Ranch Management University, Advanced Topic Series Workshops, Risk Management and Crop Marketing Workshops Profitability Workshops, Cotton and Grain Risk Management and Marketing Workshops, Ranchers leasing Workshops, QuickBooks Pro for Farmers and Ranchers Workshops, Training Socially Disadvantaged Farmers, and FARM Assistance are evaluated in several ways, depending on the length of the training activity, whether we are trying to identify short-term knowledge gains, or adoption/change of practices and economic impacts over time. Pre-tests and post-tests are used at the beginning and end of selected programs to better identify knowledge gains. Retrospective post evaluation surveys are used to identify adoption/change of practices and economic impacts over time. Results indicate that producers are learning, and adopting/changing practices, and these changes are producing economic benefits.

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Livestock 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
301	Reproductive Performance of Animals	10%	20%	10%	20%
302	Nutrient Utilization in Animals	25%	20%	25%	10%
303	Genetic Improvement of Animals	5%	10%	5%	10%
304	Animal Genome	0%	0%	0%	10%
305	Animal Physiological Processes	0%	0%	0%	20%
306	Environmental Stress in Animals	5%	0%	5%	0%
307	Animal Management Systems	20%	20%	20%	20%
308	Improved Animal Products (Before Harvest)	20%	0%	20%	0%
311	Animal Diseases	0%	10%	0%	0%
312	External Parasites and Pests of Animals	0%	10%	0%	0%
313	Internal Parasites in Animals	5%	10%	5%	10%
315	Animal Welfare/Well-Being and Protection	10%	0%	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	35.0	7.0	20.0	9.0
Actual Paid	29.5	4.0	26.9	9.0
Actual Volunteer	0.0	30.0	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**
501808	294696	961744	1667115
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
501808	112827	1110181	686304
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
3855255	0	1904279	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

AgriLife Extension and AgriLife Research
Research as well as group and individual education will be ongoing across the 7 key subject matter/commodity areas. Methods of education include public meetings, individual support, printed and video/DVD materials and web-based materials. Collaboration with breed associations, commodity groups and corporations will target research and educational needs of a diverse livestock industry across the state, involving both youth and adults.

Cooperative Extension Program and the Cooperative Agricultural Research Center
The Cooperative Extension Program, in conjunction with the Cooperative Agricultural Research Center, conducted in the county and on-campus educational programs for Texas Producers. The hands-on caprine artificial insemination workshop trained 10 producers, and 75% of the participants anticipating benefitting economically from the techniques learned at this event. Agents in Waller, Houston, Fort Bend, Willacy, and Hidalgo Counties conducted horn fly control demonstrations on 6 farms using the VetGun instead of traditional ear tags. The ease of application contributed to 60% of participants reporting they will continue to use this method of horn fly control. County agents conducted 23 Livestock based educational programs making direct educational contact with 259 producers and landowners. Parasites in livestock continue to be an area for which constant education is needed. Three parasite control programs were conducted, and 86% of the participants reported that they plan to adopt the practices of proper management of pastures, lots and livestock. Also, 93% of the participants anticipated benefitting economically as a direct result of what they learned from the parasite workshops.

2. Brief description of the target audience

AgriLife Extension and AgriLife Research
The target audience is composed of beef cattle, horse, dairy, sheep, goat and swine producers/owners/users, commodity group leadership, associations and registries, and youth enrolled in 4-H and FFA livestock projects.

Cooperative Extension Program and the Cooperative Agricultural Research Center
Beginning Farmers/Ranchers; Limited Resource Farmers/Ranchers; Socially Disadvantaged Farmers/Ranchers, and Military Veterans. 4-H and Youth associated with this audience. Undergraduate students in the College of Agriculture and Human Sciences.

3. How was eXtension used?

The Texas AgriLife EDEN disaster management website is linked to the National EDEN website and the eXtension network. Animal Science faculty continues to update and develop educational materials dealing with management of livestock during and following catastrophic events such as wildfires, drought and floods. Additional programs were added covering topics of equine management and selection. There are now nine courses now on eXtension Online Campus. Online certification course for Beef Quality Assurance Certification, Beef Literacy,, Beef Cattle Production, Cattle Nutrition-Feeds and Feeding, Cattle Value-Feeder Calf to Boxed Beef, Creating Value through Low-Stresss Livestock Handling, Market Cow Management, Master Cattle Transporter and Beef Health-Herd Management Calendar. One course of study in Beef Cattle Production ANSC 302 also utilizes eXtension. In addition, there are two online training courses in Horse Evaluation and Judging.

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	194317	760369	234718	0

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

Patent Applications Submitted

Year:	2018
Actual:	6

Patents listed

* COMPOSITIONS AND METHODS OF ENHANCING IMMUNE RESPONSES
* VACCINE VECTORS AND METHODS OF ENHANCING IMMUNE RESPONSES
* COMPOSITIONS AND METHODS OF ENHANCING IMMUNE RESPONSES TO EIMERIA OR LIMITING EIMERIA
* MONOCLONAL ANTIBODY AGAINST NOVEL EPITOPES OF FOOT-AND-MOUTH DISEASE VIRUS PROTEIN 3ABC AND USES THEREOF
* COMPOSITIONS AND METHODS OF ENHANCING IMMUNE RESPONSES TO EIMERIA
* COMPOSITIONS AND METHODS OF ENHANCING IMMUNE RESPONSES TO EIMERIA

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	0	198	198

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of group educational sessions conducted.

Year	Actual
2018	11609

Output #2

Output Measure

- # of research-related projects.

Year	Actual
2018	102

Output #3

Output Measure

- # of one-on-one technical assistance/consultations.

Year	Actual
2018	57

Output #4

Output Measure

- # of graduate/undergraduate students involved in research projects.

Year	Actual
2018	6

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	% of livestock owners/producers that adopt or plan to adopt best management practices to improve quality and profitability.
2	% of livestock owners/producers/commodity group representatives that report increased knowledge of best management practices to improve quality and profitability.
3	% of livestock owners/producers that report a savings in money or increased profit by best management practices adopted.
4	% of producers who gain knowledge and skills to implement herd health best management practices.

Outcome #1

1. Outcome Measures

% of livestock owners/producers that adopt or plan to adopt best management practices to improve quality and profitability.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	80

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Best management practices to ensure quality, profitability, productivity and optimal utility help clientele make changes to improve livestock, management, resources and time to increase income and improve profit opportunities.

What has been done
Programs conducted include TAMU Beef Cattle Short Course, Texas Beef Quality Producer, Beef and Pork 101, Beef 706, Grassfed Beef Conference, Pasture Management Workshops, Bull Selection Workshops, Low-Stress Livestock Handling, Stockmanship schools, Vector Bourne Disease, Mare/Foal Workshop. Youth programs included the 47th Annual Summer Horsemanship Schools, Camps for Beef Cattle, Horses, Sheep and Goats. Ambassador programs in beef and equine. In addition to specialist driven programs listed above Animal Science Extension faculty support producer education through delivery of educational programs at 142 county programs.

Results
From measures including beef/dairy cattle, sheep/goats, horses and meats, 71% to 99% reported intent to adopt at least one best management practice. 57% to 93% expected to increase income or profitability by adoption of best management practices. 89% indicated they intended to adopt one or more of the practices associated with low-stress livestock handling and effective stockmanship practices. 72% to 91% of respondents indicated they would implement changes to their selection criteria as they purchase breeding stock. 62% to 89% reported elimination of non-productive practices, 67% indicated they would utilize hay analysis, and 89% use body condition scoring as a management tool.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
303	Genetic Improvement of Animals
306	Environmental Stress in Animals
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)
313	Internal Parasites in Animals
315	Animal Welfare/Well-Being and Protection

Outcome #2

1. Outcome Measures

% of livestock owners/producers/commodity group representatives that report increased knowledge of best management practices to improve quality and profitability.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	87

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Increased knowledge prompts adoption of best management practices to ensure quality, profitability, productivity and utility of livestock, management, resources and time. Knowledge of best management prompts time savings, increased confidence in management decisions and problem solving for producer and youth involved in the livestock industry.

What has been done
Programs conducted include TAMU Beef Cattle Short Course, Texas Beef Quality Producer, Beef and Pork 101, Beef 706, Grassfed Beef Conference, Pasture Management Workshops, Bull Selection Workshops, Low-Stress Livestock Handling, Stockmanship schools, Vector Bourne Disease, Mare/Foal Workshop, Horse Breeders School. Youth programs included the 47th Annual Summer Horsemanship Schools, Camps for Beef Cattle, Horses, Sheep and Goats. Ambassador programs in beef and equine. In addition to specialist driven programs listed above Animal Science Extension faculty support producer education through delivery of educational

programs at 142 county programs.

Results
73% to 100% reported improved decision making ability. 69% to 100% reported increased confidence in management ability. 88% indicated knowledge gains of 67% to 94% for sire selection protocols, breeding mares and cows, loss of forage production potential, cattle handling, food safety control, natural resource management, financial management of ranches, livestock evaluation and general livestock and ranch management.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
303	Genetic Improvement of Animals
306	Environmental Stress in Animals
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)
313	Internal Parasites in Animals
315	Animal Welfare/Well-Being and Protection

Outcome #3

1. Outcome Measures

% of livestock owners/producers that report a savings in money or increased profit by best management practices adopted.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	67

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Animal management systems must go beyond striving to improve quality of life, quality of production and increased knowledge to achieve a level of sustainability. For production systems

to be sustainable they must be profitable. To improve profitability income needs to increase and costs need to be lowered or controlled. A continued push was made through programming to encourage producers to look at enterprise diversification and adding stocking rate flexibility into their production systems. Additional emphasis was placed on securing supplemental forages in the face of drought during the hay production season, culling herds early or searching for additional pasture acres.

What has been done
Economic benefit was measured from responses from participants in the TAM Beef Cattle Shortcourse, Beef Quality Assurance programs, Southwest Beef Symposium, Beef 706, Reproductive Management Shortcourse, Cattle Handling and Dairy Programs as well as surveys conducted at county and regional programs.

Results
55% to 100% of the participants in these programs indicated they would benefit economically through adoption of management practices outlined in these programs. Participants in Quality Assurance programs indicated increased income from $18 to $115 per head. Of the Beef 706 participants 92% indicated they would benefit economically by an estimated $41.00/head of animal owned. Reproductive management practices on beef and dairy operations indicated returns of $50 to $90 per head. Economic impact across the livestock sector is projected to be between and $1.2 and $24 million from adoption of management practices. Of those attending stockmanship trainings 83% indicated they would benefit financially through savings in facility design and construction costs or in saved time, labor and injury expense.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
303	Genetic Improvement of Animals
306	Environmental Stress in Animals
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)
313	Internal Parasites in Animals
315	Animal Welfare/Well-Being and Protection

Outcome #4

1. Outcome Measures

% of producers who gain knowledge and skills to implement herd health best management practices.

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	90

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Livestock production is a major part of Texas agriculture. Of the states 248,809 farms, nearly 55% raise cattle, sheep and/or goats. A significant portion of these operations are considered small farms of less than 50 acres and are operated by Socially Disadvantaged and traditionally underserved agricultural producers. The number of Black and Hispanic farmers have increased over the past 5 years. It is imperative that these producers continue to learn proper and up to date livestock and forage management techniques to ensure effective management and perpetuity of their agricultural enterprises.
In addition, feral swine damage is an ongoing and increasing issue among our producers and landowners throughout the State. Hundreds of thousands of undeveloped acreages in the State is allowing feral hogs to reproduce at an uncontrollable rate. Feral hogs are causing thousands of dollars in damage to landscaping, vegetable and fruit crops, underground irrigation systems, and spreading bacteria to rancher?s livestock. Wild hogs occasionally prey on livestock, especially newborn lambs, goats or calves. The total feral swine population in Texas has been estimated recently at 2.6 million, in which one sow (female pig) can be responsible for reproducing more than 40 piglets in one year causing $52 million in damages to Texans.

What has been done
In collaboration with the Corporative Agriculture Research Center and other supporting organizations, i.e., USDA and Texas Dept. of Agriculture, outreach programs were conducted at the county level and on campus at PVAMU to address critical issues facing limited resource farmers and ranchers in Texas. Programs were held in the areas of pasture management, small ruminant production, and beef cattle selection. CEP agents conducted eight on-farm horn fly control result demonstrations, six (6) programs on parasite control in livestock and four forage production and maintenance workshops. Extension collaborated with CARC staff in conducting two on-campus workshops related to small ruminant parasite control and artificial insemination in goats. Livestock-related topics such as hay utilization and integrated parasite management (IPM) were presented at our annual Agricultural Field Day which attracted over 100 producers and students to campus.

Results
In collaboration with agencies such as Texas Parks and Wildlife, Fort Bend County Master Naturalists Volunteer group, and the Animal and Plant Health Inspection Service (APHIS) CEP staff conducted approximately 120 site visits and has conducted training sessions to 217 farmers and ranchers. 98% of producers who participated in the demonstration and the feral hog program

indicated they would adopt some sort of eradication plan using one of the trapping system alternatives, or some type of feral swine management plan. In 2018, 180 hogs were captured, and research suggests that feral hogs attribute to approximately $200 worth of damage per pig for a total of $36,000 saved through the program. Over the past 3-years the demonstration project has captured 572 hogs.

Artificial Insemination Workshop (Workshop conducted on campus limited to 10 attendees)
Seventy-five percent of the respondents anticipate benefiting economically as a direct result of what they learned at the workshop.
Livestock Workshops via County Agents (Total Contacts for 5 agents= 259)
* Eighty-four percent of participants plan to adopt practices they learned from educational workshops.
* Seventy-three percent of surveyed participants adopted forage and hay practices as a way to improve livestock management and health.
* In Willacy Co., 86% of surveyed participants noted seeing a slight financial increase by implementing changes in their management practices from previous programs.
Integrated Parasite Management Workshops/ Presentations
* 93% of the participants anticipated benefiting economically as a direct result of what they learned from the workshop.
* 86% of the participants reported that they will adopt the practices of proper management of pastures, lots and livestock.
Horn Fly Demos (6 demos were conducted using the CO2 Vet Gun?)
* Under optimal conditions, a reduced fly count lasted an average of 4 weeks after the first treatment
* 60% of participants said they would continue to use the VetGun? for horn fly control on their farms. South Texas producers were shown to have applied the 2nd treatment 4 days sooner than East Texas producers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
303	Genetic Improvement of Animals
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
315	Animal Welfare/Well-Being and Protection

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

Livestock ownership, production and use in Texas continue to be influenced by fluctuating markets, natural disasters and significant climatic shifts in weather patterns. 2018 continued the ups and downs of livestock production in Texas. In many parts of the state record rainfall was recorded in the winter and early spring of 2018. Following a wet cool season weather pattern occurred one of the driest growing seasons in Texas history across much of the state. To conclude the year with one of the wettest fall periods. Weather related challenges continue to alter program delivery and adoption of some management practices. Production costs and incentives for livestock production, management, and use are influenced by economic changes. Input prices, agriculture valuation, and health care costs are all factors. Public policy changes and government regulations challenge educators to provide up-to-date, neutral information that helps livestock participants make decisions. Population shifts and use of available land for productive and meaningful livestock production bring opportunities and challenges to livestock owners/producers/users and the associations/corporations/groups that make up this diverse industry.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Outcome measures include pre-post knowledge assessment, adoption of best management practices and elimination of non-beneficial practices, and change in confidence/competence. Changes in time and money spent/saved/invested for livestock production were measured in select programming areas.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Crop and Forage 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	10%	20%	10%	20%
201	Plant Genome, Genetics, and Genetic Mechanisms	0%	10%	0%	20%
202	Plant Genetic Resources	10%	20%	10%	20%
205	Plant Management Systems	30%	0%	30%	0%
206	Basic Plant Biology	0%	10%	0%	10%
212	Pathogens and Nematodes Affecting Plants	10%	0%	10%	0%
213	Weeds Affecting Plants	10%	20%	10%	20%
216	Integrated Pest Management Systems	30%	20%	30%	10%
	Total	100%	100%	100%	100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2018	Extension		Research	
	1862	1890	1862	1890
Plan	50.0	5.0	85.0	6.0
Actual Paid	43.0	6.0	63.4	5.0
Actual Volunteer	0.0	1247.0	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**
731450	442045	4196613	926174
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
731450	169240	4811826	381280
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
5619524	0	8885611	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

AgriLife Extension and AgriLife Research
Provide training and program materials to County Extension Agents to conduct educational programs at the county level. Technical assistance is provided to agents by specialists in the area of result demonstrations and applied research. Provide multi-county, regional and statewide educational programs via specialist faculty to various stakeholders. Coordinate and collaborate with state and federal agencies in crop and forage activities.

Cooperative Extension Program and Cooperative Agricultural Research Center
Programs conducted by the Cooperative Extension Program and Cooperative Agricultural Research Center, Prairie View A&M University were geared towards educational programs for County Agents and their clientele; relative to subject matter workshops/field days/ tours for crop producers and future producers on relevant production issues and technologies spanning high tunnels, organic and container gardening. For example, we conducted workshops on container gardening and vegetable production during our Colleges Annual Ag Field Day, a Spring and Summer Vegetable Production Workshop, a Fall Vegetable Production Workshop, and followed up with other vegetable and forage production workshops in the counties. We also provided workshop presentations on-campus relative to high tunnel production of high-value specialty vegetables and medicinal plants. The Cooperative Extension Program also provided one-on-one technical assistance and training to individual clientele and large groups with interest in production agriculture. We also conducted on-farm demonstrations with selected farmers to address relevant production practices to improve the quality of their forage and hay as well as tomato and watermelon production.
Efforts to improve the income situation of the target limited resource clientele identified by the Cooperative Extension Program was also addressed by conducted variety trials of fruit and vegetable crops on the Prairie View A&M University farm as well as on-farm demonstrations in the counties. A series of programs were conducted in three counties relative to specialty crops; with a focus on production, marketing and use of numerous specialty crops. Variety trials, fertilizer treatments along with different cultural practices were implemented to evaluate the relationship between plants and growth factors, appropriate crop management practices and pest control methods. The Cooperative Extension Program also conducted programming in the areas of the development of community gardens in both urban and rural areas to address the needs of the clientele.

2. Brief description of the target audience

AgriLife Extension and AgriLife Research
The target audience for this program consists of agricultural producers who produce food, fiber, and

forages in the state. Specific focus is on those commodities listed in the program overview. In addition, these programs are interpreted to the urban public through various methods.

Cooperative Extension Program and Cooperative Agricultural Research Center
Our programs will assist a diverse audience, with emphasis on the underserved, hard to reach, and have limited social and economic resources to improve their quality of life; this will include farmers and ranchers, private land and forest owners, military veterans and their families.

3. How was eXtension used?

SCSC Extension Unit personnel are routinely called upon to provide information via eXtension's "Ask the Expert".

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	95747	309317	7983	0

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

Patent Applications Submitted

Year:	2018
Actual:	5

Patents listed
* FUNGAL ENDOPHYTES FOR IMPROVED CROP YIELDS AND PROTECTION FROM PESTS
* FUNGAL ENDOPHYTES FOR IMPROVED CROP YIELDS AND PROTECTION FROM PESTS
* SMOOTH DELIGHT TWO
* SMOOTH TEXAN TWO
* SMOOTH ZEST TWO

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	3	627	630

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of group educational sessions conducted.

Year	Actual
2018	85351

Output #2

Output Measure

- # of research-related projects.

Year	Actual
2018	168

Output #3

Output Measure

- # of one-on-one technical assistance/consultations.

Year	Actual
2018	55

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	% of crop and forage producers that adopt or plan to adopt best management practices to improved quality and profitability.
2	% of crop and forage producers that report increased knowledge of best management practices to improve quality and profitability.
3	# of farmers who gained knowledge on specialty/alternative cash crops investigated by research.
4	# of farmers who adopted or planning to adopt specialty/alternative cash crops investigated by research.

Outcome #1

1. Outcome Measures

% of crop and forage producers that adopt or plan to adopt best management practices to improved quality and profitability.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	80

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Texas is the largest cotton producer in the US and is second in population. All agricultural commodities and the economic impacts these industries have on communities are important, as is the need to understand how to manage resources in an environmentally sound manner. Finally, water conservation and water quality may be the most important aspects as Texas continues to increase its population. Texas A&M AgriLife Extension is well-positioned to address these needs for the foreseeable future.

Waller County is one of the largest Watermelon producing areas in Texas. Even though science and technology create a competitive edge to farmers who use it, in the past, several of the Waller County Watermelon Farmers have not adopted nor implemented these production practices to their farming operations. Most farmers use the traditional way of growing their crops. Research has shown that using Black Plastic Mulch and irrigation to grow Watermelon will significantly increase production. Black plastic mulch will increase soil temperature, reduce soil compaction, provide weed control and increase plant growth; whereas irrigation will also promote faster growth, and increase flowering thus increase production. There will be an initial cost of production, however the cost will be offset by increased return for better quality fruits, greater yield, and earlier harvest. Rising input costs and various production-related challenges, including droughts conditions, plant diseases, invasive species and other pests have placed serious stress on limited resource farmers throughout the state of Texas.

What has been done
Extension specialists from the Soil and Crop Sciences Extension unit delivered almost 513 face-to-face educational activities resulting in nearly 40,000 direct contacts for the calendar year 2017.

There was over $4.75 million raised to support extension educational activities.

On-farm demonstration plots were conducted in two counties as well as on the Prairie View A&M university Farm to evaluate and compare some of the newer watermelon varieties to those that local producers are presently growing. Educational programs were conducted to present the findings to producers. The plan compares and measures the growth, production, and yield of Watermelon grown on Black Plastic Mulch versus traditional ways of growing. This demonstration was conducted at Walker's Farm; a farmer who produces Watermelon on a large scale, the traditional way. To help Waller County Watermelon Farmers to improve and increase production we demonstrated that growing Watermelon on Black Plastic Mulch would yield a greater amount than the traditional way of growing. Setting up the experimental design our goal was to compare and contrast the root growth, number of fruit set per plant, disease resistance, weed control, and overall production. This project was monitored on a weekly basis in addition, we did face some challenges which will be used as a learning experience for our next Watermelon trial.

Efforts to enhance growers of new and improved varieties to improve their overall yield and market sales a Watermelon Taste Test was conducted using six different watermelons varieties as part of an educational program. Forty-nine (49) participants return surveys and provided feedback relative to the varieties.

Results

Extension personnel from the Soil and Crop Science Texas A&M AgriLife Extension Service unit have had a significant impact on the way citizens of Texas view agricultural production, natural resource management, and conservation of water. Positive impacts have increased financial returns for landowners and water conservation and quality in Texas has improved due to Extension efforts. With an ever increasing per capita demand for resources, Texas A&M AgriLife Extension Service personnel will play an increasingly important role in food and fiber production, conservation of limited water resources, and the overall well-being of Texas citizens and beyond.

The economic benefit resulting from the increased use of new hybrid varieties of melons and tomatoes have increased producers? net returns by 25%.

Results from the Watermelon Taste Test indicated that some of the local farmers suggested the Charleston Grey is best for people with diabetes because of its lower sweetness level. The biggest ?potential money-maker? is the Summer Flavor 720.

67% of participants definitely will soil test prior to planting grass seed.

75% of participants? probably or definitely will plant cool season grass as a result of this program.

83.3% of participants will benefit economically as a direct result of this Extension program Spring Pasture Producer Field Day.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
202	Plant Genetic Resources
205	Plant Management Systems

212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
216	Integrated Pest Management Systems

Outcome #2

1. Outcome Measures

% of crop and forage producers that report increased knowledge of best management practices to improve quality and profitability.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	87

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Small scale and limited resource producers are not familiar with modernized farming techniques and methods and the availability of USDA farm loans through Natural Resource Conservation Service and, the Farm Service Agency programs. Changing global markets and the management of agricultural production and price risk have farmers seeking ways to maximize production efficiency to maintain competitiveness. Small scale and limited resource producers need more information relative to planting and harvesting their crops in a timely manner to get the highest prices for there crops to improve profitability. Limited resource farmers need educational programs relative to effective ways to use sustainable agriculture practices, enhance knowledge, behavior, and skills in their operations. Programs geared towards helping the limited resource farmers to maximize their marketing skills will help them to gain a greater return on their investments to support their operations.

What has been done
One on-farm demonstration was conducted in Houston County to evaluate new tomato varieties and a tomato variety trial was also conducted on the Prairie View A&M University Farm. Educational programs were conducted to present the findings to producers. The number of home gardens in any given year fluctuates greatly with people?s interest and the economy. When economic conditions are weak, the number of households using home gardens tends to increase. Vegetable gardening is not only a hobby but also extends the family budget by freeing up limited funds for other food purchases. Research conducted by the U.S. Department of Agriculture

indicated approximately one in three households have some kind of garden, including backyard fruit trees, vegetable plots, berry patches, etc. The average value of the home garden was estimated at $512 for 2017. The basis of this value was a 2008 survey conducted by the vegetable industry that indicated that the average garden produced commodities valued at roughly $525 per garden. This value is updated each year based on the year-to-year price change experienced in a mix of vegetable and fruits that are typically produced in Texas. Spring and Fall Forage Crop Programs were conducted to provide producers research-based information relative to improving the pasture land.

Results

100% of participants state they will plant grass seed for soil health or cattle grazing.

43.5 % indicated that they definitely will plant a garden.

37.5% indicated that they already have adopted planting a garden.

62.5% of participants probably or will adopt crop recommended crop rotations for insect and disease management (12 in attendance).

68.8% of attendees had an increase of new knowledge about soil preparation and soil requirements for certain types of plants and fruits (11 of 16 participants).

100% of participants probably or definitely will use the sustainable production practices recommended during the Spring Tomato Care Program (18 participants).

62.5% of participants probably or definitely will adopt composting for organic matter (12 participants).

87.5% of participants had an increase in knowledge about composting for organic matter (12 participants).

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
202	Plant Genetic Resources
205	Plant Management Systems
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
216	Integrated Pest Management Systems

Outcome #3

1. Outcome Measures

# of farmers who gained knowledge on specialty/alternative cash crops investigated by research.

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	231

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Issues regarding the balance between Texas? water supply and demand have brought about the need for more efficient use of this vital resource in regard to crop production. New drought tolerant, specialty market and/or niche crops could make excellent alternative cash crops for farmers. Many of these crops have low water requirements and could possibly be the answer to conserve water and serve as another cash crop for producers. We also provided workshop presentations on-campus relative to high tunnel production of high-value specialty vegetables and medicinal plants.

What has been done
The Prairie View A & M University's Cooperative Extension Program often collaborates with industry groups and with other government entities to deliver educational programs. Programs for crop producers cover variety testing, soil nutrient management, irrigation efficiency, disease, and pest identification and control, commodity marketing, financial risk management, and farm bill education. A series of programs were conducted in three counties relative to specialty crops, with a focus on production, marketing and use of numerous specialty crops. Workshop presentations were also conducted on the Prairie View A&M University campus relative to high tunnel production of high-value specialty vegetables and medicinal plants.
A Cooperative Extension Program Landowner?s Meeting was conducted as a Bi-State Conference with the University of Arkansas Pine Bluff. Twenty-two (22) producers participated in this conference.

Results
83% of the producers gained new knowledge about raising specialty crops for their farm operation for their 2019 project (5 of 6 attendees).

100% of the attendees had an interest in raising specialty crops in their farm operation (41/41 participants).

100% gained knowledge about different varieties of specialty fruits and vegetables (22/22). 95% are willing to adopt specialty crops in their farm operation (21/22).

4. Associated Knowledge Areas

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

Outcome #4

1. Outcome Measures

# of farmers who adopted or planning to adopt specialty/alternative cash crops investigated by research.

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	231

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
It has been determined by Prairie A&M Cooperative Agriculture Research Specialist that growing high-value specialty fruits and/or vegetables can be an effective and sustainable means for small acreage producers in Texas to diversify their farm operations and increase their incomes. Small and limited-resource horticulture producers lack education on farming practices that are necessary to produce a profitable crop.

What has been done
An Area Horticulture Program Committee was organized, and the county Extension agents were able to identify a group of then (10) producers from the four county area which includes Cameron,

Hidalgo, Starr and Willacy Counties. The agents introduced an emerging issue identified by the College of Agriculture and Human Sciences at Prairie View A&M University to work in the area of Specialty crops and how some international crops are being introduced into the U.S. food market and the impact they are contributing to farmers. They also illustrated the impact that specialty crops are making throughout the nation with these crops. Eight (8) planning meetings were provided with the committee to introduce the program goals.

A series of Specialty Crops Program was conducted in three different counties to introduce new niche market crops to fruit and vegetable producers to expand their market potential. Agents were able to plan and organize a four-hour training on the program activities and practices to learn about growing these specialty crops. This program introduced over (15) varieties of vegetables and fruits that are not common in our region but are slowly being introduced at farmers markets and road side stands to gain another profit for farmers. Our goal is to have producers plant these crops and sell at farmers markets. We also discussed farm planning factors that producers will need to incorporate into their farm business plan to become financially established.

Spring and Fall Forage Crop Programs were conducted providing producers research-based information relative to improving the pasture land.

Results

86% of participants in the specialty crops project will adopt practices learned through our trainings and will adopt practices to teach other members they will mentor.

94% have learned new information on these crops that they had not learned before.

96% of participants will continue to follow and attend Extension programs.

100% of the attendees had an interest in raising specialty crops in their farming operation (41 of 41 the participants).

100% of the limited resource producers will adopt and raise specialty crops (6 of 6 attendees).

4. Associated Knowledge Areas

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

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

Crop and forage production in Texas has been influenced by natural disasters such as hurricanes, floods, drought and wildfires. Production costs and incentives for production, management and use are influenced by economic changes. Higher fuel prices, fertilizer prices, equipment costs, and fees associated with technology in genetically modified crops are all factors. Public policy changes and government regulations challenge educators to provide up-to-date, neutral information that helps producers make economically viable decisions. Texas is facing a critical situation in meeting anticipated water demand as a result of population growth and unanticipated water demand due to drought and high temperatures. Population shifts and use of available land for productive and meaningful crop and forage production bring opportunities and challenges to producers/users and the associations/corporations/groups that make up this diverse industry.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

New Technologies and Techniques in Crop Production

Every year, farmers across the state face new challenges for crop production. To meet the needs of these producers, numerous row-crop tours and update meetings are held by AgriLife Extension to educate growers on the latest technologies and techniques that can help overcome these obstacles. At one such event held in Colorado County in June, attendees were presented with the latest information on weed management and crop variety selection. Fifty-five of the 91 attendees completed surveys to help gauge their increase in understanding and intention to adopt recommended practices.

- 63% indicated an increase in their understanding of the value and limitations of new transgenic crop technologies.
- 68% indicated an increase in their understanding of management strategies for herbicide resistant weeds.
- 67% reported intent to adopt AgriLife Extension recommendations for choosing crop varieties for next year.
- 78% indicated an intent to adopt AgriLife Extension recommended practices for managing herbicide resistant weeds.

Respondents reported an average anticipated economic benefit of $6.42 per acre. Given the acreage managed by these respondents, this represents a total economic benefit of $438,546.

Variety Testing

Variety testing remains one of the most important decision farmers will make each year. Selecting the best yielding varieties can lead to yield increases over 20% from the best yielding to worst yielding commercial varieties. High yields lead to increased ginning and increase in related jobs for the state. Additionally, cotton fiber quality is critically important to increase farm income and maintain our export markets. Cotton fiber quality affects the price by 10% or more in the current international market.

- Educational contacts through 155 formal educational meetings are in excess of 9,000 annually
- Over 50 on-farm variety evaluation trials across the state
- Over 20 popular press articles and interviews over variety evaluation annually
- Average yields and quality has increased over other past decade, resulting in an additional $67/acre in value or a cumulative benefit of $335 million for Texas.
- Value added impacts associated with ginning the additional production is $57 million and an additional 589 jobs.

Managing Nitrogen Costs and Protecting Water Resources

Nitrogen fertilizer is often one of the largest production costs that farmers incur each year. Correct rate, placement, and application timing of nitrogen can increase the nitrogen use efficiency and decrease the potential for accumulation in the soil, ground water, and surface water. Nitrogen is constantly cycling in the soil due to decomposition of organic matter, nitrogen fertilizer applications, leaching, and denitrification. However, soil samples collected in cotton and other crops have indicated an accumulation of nitrogen in soil, soil residual nitrogen. Previous research has proven that this soil residual nitrogen is available to the plant and should be credited to the recommended N fertilizer applications. Utilization of this soil residual nitrogen saves the farmer fertilizer expenses and reduces the likelihood of nitrate movement into surface and groundwater. Previous surveys have found the following.

- Since 2007, over 19,000 producers have seen the presentations on crediting soil residual nitrogen
- Over $23/acre of average cost savings when nitrogen fertilizer is credited in cotton
- Adoption of these recommendations reduces N application by millions of pounds annually

Soil, Water, and Forage Testing Laboratory

The Texas A&M AgriLife Extension Soil, Water and Forage Testing Laboratory is housed within the Department of Soil and Crop Sciences. The laboratory works closely with Specialists, County Extension Agents, researchers, urban/governmental authorities to promote soil health, nutrient management and overall landscape stewardship. Soil samples are received from clientele thought the state including homeowners, sporting venues, municipalities, governmental agencies, ag retailers, agricultural consultants, property owners and agricultural producers. The laboratory works closely with county Extension agents to hold soil testing campaigns, which serve as primers for education events and focused agricultural and urban soil management efforts. A strong component of these campaigns is the collection of additional client data. This data is then utilized to estimate the status of soil fertility and overall economic impact or potential impact of agricultural soil sampling and proper fertilization within the state.

During the first 11 months of 2018, the laboratory analyzed agricultural soil samples that represented approximately 729,000 acres of fertilized rowcrop and forage production. The laboratory and Soil and Crop Science Extension Specialists have worked aggressively to address the over application of nitrogen fertilizers. The over-application of nitrogen can be a significant factor in the degradation of shallow drinking water and impairments to surface

waters through the leaching and runoff of nitrate-N. The over-application of nitrogen can also increase the requirement for herbicide, fungicide and harvest aid chemicals. An estimated the plant availability of 15.2 million pounds of residual nitrate-N in the soil analyzed. This represented a reduction in nitrogen fertilizer recommendations approximating $9.883 million. On a per acre basis, an average reduction of 20.9 lbs per acre for a cost savings of $13.59 per acre.

The reduction in fertilizer inputs is always a desirable goal, however, over the past two years, the Soil, Water and Forage Testing Laboratory has observed a slow decline in the average availability of plant available phosphorus in Texas rowcrop and forage production acreage. The failure of agricultural producers to address these nutrient limitations is a major factor limiting yields and overall return on investments. In 2018, 81.4% of all samples were considered deficient in plant available phosphorus. A conservative financial evaluation, based on the individual sample data's level of phosphorus yield sufficiency suggests the potential for these acreages to increase net revenue by approximately $108.3 million, or an average return of $148 per acre. Other factor yet to be considered are benefits from more rapid maturation of the crops, reduction in pesticide usage from more vigorous growing crops and potential increases in food/feed value to higher overall mineral content and reduction of pathogens including

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Water & Natural Resources Management

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	0%	45%	0%	25%
111	Conservation and Efficient Use of Water	50%	20%	50%	25%
112	Watershed Protection and Management	50%	5%	50%	25%
125	Agroforestry	0%	25%	0%	0%
132	Weather and Climate	0%	5%	0%	25%
	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	20.0	5.0	10.0	8.0
Actual Paid	21.0	3.0	18.5	6.0
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**
357220	221022	994877	1111409
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
357220	84620	1090548	457536
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
2744419	0	4381911	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

AgriLife Extension and AgriLife Research

Publish research findings generated through evaluation of best management practices to efficiently manage available water resources, to limit off-site contaminant transport from production, processing, and landscaping systems, to utilize alternative water sources and to remove contaminants from impaired/alternative water sources.

Develop and conduct research and educational programs utilizing direct and indirect educational methods to support efficient utilization and conservation of water resources, to develop alternative water supplies, to implement best management practices on agricultural production and landscapes to protect water resources from contaminants, to promote proper management of surface and groundwater resources, to enhance rainwater harvesting and to remove contaminants from impaired water supplies.

The work of AgriLife Research and AgriLife Extension is conducted jointly where research-based information is generated and then transferred to clientele.

Continue the development of educational resources such as articles, fact sheets, bulletins, curriculum materials, short course manuals, and other teaching materials.

Cooperative Agricultural Research and Extension Program

The water and natural resources management program provides research-based information and training to assist our target audience in becoming more efficient and effective in their production practices. Areas of focus include improving soil health, water quantity and quality, and assessing the impacts of climate change on agriculture. Improved production practices through improved water and natural resources management will ensure long-term sustainability and profitability of small farms and ranches. The Cooperative Agricultural Research Center (CARC) and Cooperative Extension Program (CEP) have collaborated in conducting research trials, demonstrations, workshops, training, and other educational programs in target counties and on campus. We have also partnered with USDA agencies such as Natural Resources Conservation Service (NRCS) and Farm Service Agency (FSA), as well as various Community Based Organizations to strengthen our efforts and broaden our reach.

The Natural Resources and Environmental Systems (NRES) of CARC evaluated the performance of collard greens in response to organic amendment types and application rates. The NRES team monitored and analyzed soil moisture and nutrient dynamics in the root zone, soil CO_2 exchange, soil pH, infiltration and root distribution of collard greens. The team also repeated the performance of different cover crops treatments (legumes, grain, and legume-grain mixtures) grown in southeast Texas for additional data. They quantified weed pressure, biomass production and monitored soil CO_2 and moisture dynamics in the root zone. The team members have also been developing (i) irrigation scheduling tool to increase water use efficiency in Texas, (ii) android application for location-specific soil and forecasted weather data, (iii) web application for visualizing and predicting groundwater storage in Texas, and (iv) upgrading Irrigation Water Estimator for Texas (IWET) for multiple users. Works have been done to evaluate: i) effects of drought on crop production and cropping areas in Texas, (ii) potential impact of climate change on irrigation water requirements for some major crops in the Northern High Plains of Texas, and (iii) deep learning for soil moisture estimation from thermal images. The team members also evaluated the impact of land-use and climate changes on groundwater storage in Texas; interactions between land use, climate change, and carbon cycle using satellite measurements; hydrologic and hydraulic modeling of Cypress Creek watershed, Texas during Hurricane Harvey and impact of potential mitigation measures; performance of the Multi-Radar Multi-Sensor System over the Lower Colorado River; evaluation and calibration of empirical methods for daily reference evapotranspiration estimation in West Texas, and spatial interpolation of daily reference evapotranspiration in West Texas.

Research experiments, demonstrations, workshops, trainings and other educational programs conducted in target counties and on campus include Leafy Greens Workshop: From Farm to Table; Agricultural Field

Day (Cover Crop Workshop and Soil Health Workshop); Soil Health Project; Feral Hog Workshops; CEP 8th Bi-State Annual Small Scale Producers Conference at the Southwest Center in Texarkana; CEP Landowner's Meeting & Farm Tourism Conference; Winter Pasture Program and Winter Pasture Demonstration; Spring Pasture Producer Field Day; Fall Gardening Program; and Spring Tomato Care Program. The team has participated in the Research Extension Apprentice Program (REAP), USDA AG Discovery Camp, Research and Extension Experiences for Undergraduates (REEU), Research Experiences for Undergraduate Students, and Career Development Event (CDE) to educate K-12 students from different schools, undergraduate students and other stakeholders in the State. Peer-reviewed articles, workshop presentations, and applied research outreach materials are some of the venues through which research findings were disseminated to different stakeholders within Texas and across the nation and globally.

2. Brief description of the target audience

AgriLife Extension and AgriLife Research
Programs focusing on the issue of water address target audiences including but not limited to agricultural producers, homeowners, landscape managers, industry practitioners, water resource managers, technical service provider, and others who identify themselves with this issue.

Cooperative Agricultural Research and Extension Program
The target audiences that benefited from the water and natural resources management programs include farmers, ranchers, landowners, homeowners, managers and leaders of landscaping companies and industries, water and natural resources personnel, researchers, and other individuals and groups with an interest in water and natural resources management.

3. How was eXtension used?

SCSC Extension Unit personnel are routinely called upon to provide information via eXtension's "Ask the Expert".
eXtension website was used to access educational resources such as articles and research-based information that address soil and water management issues. The "Ask an Expert" feature was used to answer specific soil and water management questions that were submitted by producers. The eXtension website was also used to access webinars and other online workshops that provided information about soil and water best management practices.

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	227512	950051	228250	0

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

Year: 2018

Actual: 1

Patents listed

* METHOD AND SYSTEM FOR REDUCTION OF IRRIGATION RUNOFF

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	0	269	269

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of group educational sessions conducted.

Year	Actual
2018	7448

Output #2

Output Measure

- # research-related projects.

Year	Actual
2018	61

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	% of participants who report an increased knowledge of best management practices related to water management.
2	% of participants who report the plan to or have adopted best management practices related to water management.
3	% of participants who report an increased knowledge of best management practices related to cover crops, nutrient management, micro irrigation and water capture.
4	% of participants who adopted best management practices related to cover crops, nutrient management, micro irrigation and water capture.
5	% of participants who report an increased knowledge of best management practices related to soil and water management.
6	% of participants who report the plan to or have adopted best management practices related to soil and water management.

Outcome #1

1. Outcome Measures

% of participants who report an increased knowledge of best management practices related to water management.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	77

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Water quantity and water quality are the most critical issues facing Texas and its citizens. The Texas A&M AgriLife Extension Soil and Crop Science Extension Unit has several programs designed to help educate citizens regarding water conservation practices and methods to reduce bacterial contamination of Texas waterbodies.

Urban water use increases 35-70% during the summer irrigation season due to landscape and related irrigation water use. Much of this water demand represents over-irrigation of water in the landscape and on turf areas, resulting in waste of limited water resources and increases in costs of water and related infrastructure requirements.

What has been done
Extension specialists from the Soil and Crop Sciences Extension unit delivered almost 350 face-to-face educational activities resulting in over 40,000 direct contacts for the calendar year 2017. There was approximately $1.48 million raised to support extension educational activities.

Urban water conservation programs provide information and education through websites; short courses (CEU opportunities) for TCEQ licensed irrigation professionals; rainwater harvesting and irrigation seminars; Master Gardener Specialist training; County Agent training and support; exhibits and demonstrations at fairs and trade shows; demonstrations and mass media outreach (weekly television program in DFW). The Water My Yard (watermyyard.org) program provides local evapotranspiration-based turf water requirement (lawn water requirement) recommendations to over 15,000 subscribers in 58 cities. The School of Irrigation Program conducted 17 landscape irrigation short courses, serving 386 licensed irrigation professionals and municipal water staff, providing 3,792 state required CEUs.

Results

Extension personnel from the Soil and Crop Science Texas A&M AgriLife Extension Service unit have had a significant impact on the way citizens of Texas view the conservation of water and aspects impacting water quality. Positive impacts have increased the public's awareness regarding water conservation and quality in Texas. With an ever increasing per capita demand for resources, Texas A&M AgriLife Extension Service personnel will play an increasingly important role in how Texans use our limited water resources, and the overall well-being of Texas citizens and beyond.

Texas Watershed Stewards

Texas Watershed Stewards (TWS) is a science-based training program designed to educate stakeholders about watersheds, types and sources of water pollution, water law, state and federal water agencies and organizations, best management practices (BMPs) that minimize or prevent water impairment, and community-driven watershed planning. The program was developed through a collaborative effort between the Texas A&M AgriLife Extension Service and the Texas State Soil and Water Conservation Board, in cooperation with other state and federal water and natural resource management and planning agencies, including the Texas Commission on Environmental Quality, local Soil and Water Conservation Districts, Texas Water Development Board, state River Authorities, Texas Forest Service, Texas Department of Agriculture, United States Department of Agriculture, Natural Resources Conservation Service, and others. TWS is delivered as an intensive, one day, seven hour or four hour training, that utilizes a variety of teaching aids (PowerPoint slides, videos, hands-on stations) and group participation to engage participants in the learning process. Most importantly, the program empowers citizens to become actively involved in local watershed planning efforts to improve and protect their water resources.

Implementation of the TWS program has facilitated initiation of new water quality improvement projects, increased stakeholder involvement in existing watershed protection efforts, and has motivated individual citizens to take greater personal responsibility for protection of their water resources.

Program effectiveness was evaluated using pre- and post-tests at TWS events to determine changes in knowledge and understanding, as well as intentions to adopt appropriate Best Management Practices (BMPs). A 6-month follow-up evaluation was employed to assess actions taken and to verify BMP adoption. Overall, knowledge gained by individuals participating in the training was an impressive 33.8%. Additionally, over 64% of participants reported an intention to adopt BMPs to help protect their watershed, and 97% believed the TWS program enabled them to be a better steward of their watershed. Results of the 6-month, follow-up evaluation showed that 83% of respondents have adopted one or more BMPs. Over 85% of respondents indicated they now more closely monitor individual actions that might impact water quality, and 83% have either adopted or maintained management practices that have a positive impact on water quality. Finally, an overwhelming 98% of respondents were satisfied with the TWS training materials, and 81% have used those resources since the training.

Ten Texas Watershed Steward workshops were delivered in impaired watersheds of Texas during the 2017 calendar year, reaching 319 stakeholders through 1,276 contact hours.

With estimated potential savings of over 778 million gallons of water and $2,800,000 annually, WaterMyYard was recognized with a Texas A&M AgriLife Superior Service Award at the 2019 AgriLife Program Conference. Surveys from School of Irrigation Program courses indicated 97% overall satisfaction rate; 87% average increase in knowledge, and 78% of students anticipating economic benefits.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management

Outcome #2

1. Outcome Measures

% of participants who report the plan to or have adopted best management practices related to water management.

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

% of participants who report an increased knowledge of best management practices related to cover crops, nutrient management, micro irrigation and water capture.

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	87

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Many of our target clientele often lack the knowledge and resources to operate viable and sustainable farming and ranching operations. Effective and efficient management of water and natural resources play a significant role in every farming and ranching operation. As a result, the Natural Resources and Environmental Systems (NRES) unit of the Cooperative Agricultural Research Center (CARC) in collaboration with the Cooperative Extension Program (CEP) provides research-based information and educational programs to assist the target clientele in implementing nutrient management practices such as use and benefits of cover crops, efficient water management, and irrigation systems. Understanding how organic amendment types and rates affect the soil-water-plant-atmosphere continuum has become imperative as the use of organic amendments in conventional and organic agricultural production is increasing. Cover

crops are known for their benefits to farmers and ranchers since they can improve soil quality and health, suppress weeds, reduce pollution and erosion, among other environmental benefits. Information on the most suited cover crop for Southeast Texas is lacking. Thus, this study evaluated the performance of four different cover crops. Measurement of soil CO2 from the soil is important to understand the soil carbon sequestration which further helps to understand soil nutrients and overall the soil health. It is always a question which agricultural management practices is best to improve the soil health and ultimately agricultural production and reduce the impact on the environment. Therefore monitoring CO2 flux for particular agricultural management practices will help farmers/growers and decision makers to use the findings in improving soil health and agricultural production and assess environmental quality. A major drought can reduce crop yields and crop hectarages because less water and soil moisture are available for the crop growth during the drought. During a drought, farmers may consider reducing their cropping hectarage and would only plant drought-tolerant crops. However, it is important to understand the spatiotemporal variability of drought impact on crop yield and cropping areas to plan and mitigate its potential negative impact on agriculture. The irrigation scheduling tool will help increase irrigation water use efficiency in agricultural crops and urban landscape in Texas, eliminating over and under irrigation applications. Future irrigation water requirements for different crops will be affected by the variation of rainfall and evapotranspiration that are projected to be impacted by future climate change. Thus, there is a need to investigate the potential impact of climate change and increasing climate extremes on the sustainability of agricultural production systems.

What has been done

We have conducted research, developed and implemented programs, training, demonstrations, workshops and other educational programs to address nutrient management, irrigation and water management issues affecting our clientele. We conducted field experiments to investigate the effect of organic amendment types (Chicken manure, Cow manure, and Milorganite) and application rates on selected soil physical, chemical, and hydrologic properties, soil organic carbon and carbon dioxide emission, nutrient concentrations and water dynamics within and below root zones of collard greens. We also conducted field experiments to evaluate the performance of four different cover crops, using four combinations and a control treatment. Soil CO2 flux was measured for cover crops and leafy greens experimental plots. For cover crops project, soil CO2 flux was measured for four different types of cover crops either planted alone or in combination to understand the impact of cover cropping in soil health. For the leafy greens project, the effects of organic amendments and their application rates on soil health and quality were studied using three organic amendments with three application rates. We have assessed the impact of drought on annual spatial cropping area of all four major crops in the state. We analyzed the impact of drought on crop yields and cropping areas before, during and after the 2011-2013 severe drought in three different periods, 2008-2011, 2011-2013 and 2013-2016. The annual crop yields of all four major crops during the period of 2008-2016 were compared based on the deviations from baseline data. The relative change in crop yield and cropping area across Texas were analyzed to reveal the impact of drought on them. Finally, to assess if irrigation mitigated drought effects, the irrigated and rainfed crop yield data were compared. Irrigation scheduling tool was developed to provide water requirements of different crops grown in Texas. A well-equipped testbed was developed to monitor CO2 and hydrometeorology at the University Farm. The study was conducted to analyze the potential impact of climate change on irrigation water requirements for four major crops (corn, cotton, sorghum and winter wheat) in the Northern High Plains of Texas. Research scientists and students presented their research findings at local, national, and international workshops and conferences. They also disseminated research findings through peer-reviewed journal articles. We conducted several workshops to demonstrate and disseminate best management practices through Leafy Greens Workshop, a session on the performance of legume and grain cover crops under southeast Texas conditions workshop during our Annual Agricultural Field Day, and feral hog workshop. Feral hog workshop focused on

eradication methods that were conducted in Fort Bend and Jefferson County. In addition, NRES team has participated in the Research Extension Apprentice Program (REAP), USDA AG Discovery Camp, Research and Extension Experiences for Undergraduates (REEU), Career Development Event (CDE) and other stakeholders in the state. Ten students actively participated in applied research activities and gained practical skills on monitoring and measuring soil CO2 flux, the fate of nutrients uptake and leaching, irrigation water uptake and drainage, developing irrigation scheduling tools, and estimating irrigation water requirements of different crops.

Results

We increased knowledge of researchers, students and other stakeholders on how organic amendment types and rates affects the soil-water-plant-atmosphere continuum, performance of cover crops grown in southeast Texas, spatial and temporal variations of CO2 in different organic amended collard greens plots and different cover crops, potential impact of climate change on irrigation requirements of different crops, impact of drought on crop yields and cropping areas of four major crops, and effective water resources management through hands-on activities and laboratory and modeling experience. Ten graduate and undergraduate students were trained in conducting quality and problem-solving research. More than 80 people participated in the Leafy Greens Workshop. A program evaluation completed at the workshop revealed that 59% of participants increased their level of understanding the fate of nutrients and water content dynamics within and below the root zone. Similarly, 63% and 65% of participants increased their level of understanding in land preparation, organic amendment application and soil Carbon Dioxide (CO2) emission, respectively. 100% of the participants who attended the cover crops session of Agricultural Field Day reported an increase in knowledge of the benefits of cover crops. A feral hog workshop was conducted in Fort Bend County, 70 participants attended. 87% of the participants reported an increase in knowledge of eradication methods. In addition, a feral hog presentation was done in Jefferson County, 50 agricultural producers attended. In addition, NRES research team enhanced knowledge of youth, K-12 students and University students about cover crops, nutrient management, micro-irrigation, and water use efficiency.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
125	Agroforestry
132	Weather and Climate

Outcome #4

1. Outcome Measures

% of participants who adopted best management practices related to cover crops, nutrient management, micro irrigation and water capture.

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	60

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Many of our target clientele often lack the knowledge and resources to operate viable and sustainable farming and ranching operations. Effective and efficient management of cover crops, soil nutrients and irrigation, research-based farm management best practices must be provided and adapted to increase production and crop yields. Practices such as the use of proper irrigation system and organic amendments help to increase soil nutrients and maintain optimum soil moisture which supports plant growth and development. NRES unit of the CARC collaborates with the CEP in providing applied research-based information and educational programs such as field demonstrations to the target clientele in implementing nutrient management practices including use and benefits of cover crops, efficient water management and irrigation systems.

What has been done
We conducted several workshops to demonstrate and disseminate best management practices related to cover crops, nutrient management, micro-irrigation through Leafy Greens Workshop, a session on the performance of legume and grain cover crops under southeast Texas conditions workshop during our Annual Agricultural Field Day, and feral hog workshop.

Results
60% of participants of the Leafy Greens Workshop responded that they would definitely use conservation practices, i.e., avoid applying irrigation water more than the quantity of water needed to replace the soil moisture deficit in the root zone. 33% of participants responded that they would probably use conservation practices. 100% of the participants who attended the cover crops session of Agricultural Field Day reported that they would adopt practices such as growing cover crops for weed control and to improve soil health. Some of the participants reported that they have never used cover crops before but plan to start growing cover crops as a result of what they have learned from the workshop. 84% of the feral hog workshop participants stated that they plan to adopt eradication methods taught at the workshop.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management

125 Agroforestry

Outcome #5

1. Outcome Measures

% of participants who report an increased knowledge of best management practices related to soil and water management.

2. Associated Institution Types

- 1890 Extension
- 1890 Research

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)

Efficient soil and water management play a critical role in the profitability and sustainability of every farming and ranching operation. Many of our target audience lack the knowledge, skills, and expertise needed to make informed decisions about proper soil and water management which can lead to low yields and reduce production. In an effort to address critical soil and water management issues, the NRES unit of CARC collaborate with the CEP program to conduct basic and applied research, developed educational workshops, field demonstrations, trainings, and other educational programs to assist producers in developing and implementing best management practices. Information is also transferred to our target audience in the form of factsheets, newsletter, magazines, through presentations/seminars, and peer-reviewed publications. Research at the NRES of the CARC focused on soil quality and soil health, surface, and groundwater quantity and quality issues. Groundwater is an important source for drinking water, industry and agriculture with the latter being the largest consumer of groundwater resources in Texas. In semi-arid and drought-prone areas, groundwater becomes a primary source to fulfill irrigation water demands. Hence it is imperative to have the best management practices to conserve groundwater. Study on the impact of land-use and climate changes on groundwater storage in different climate zones in Texas will help to determine the pumping rate and groundwater availability for irrigation and municipal use. Climate change, land-use change, and urbanization also affect runoff responses of watersheds. The Multi-Radar Multi-Sensor (MRMS) precipitation data are available with high spatial and temporal resolutions which can be used for increased accuracy and prediction capability of hydrologic models; however, its accuracy in estimating precipitation is yet to be fully investigated. Physically based distributed hydrological models will help to understand the impacts of extreme rains on watershed runoff responses and evaluate the impact of potential mitigation measures.

What has been done

Two soil health practices workshops were conducted during our annual Agricultural Field Day. One of the workshops provided hands-on activities for the participants and focused on soil pH, nutrient content, soil density, and soil texture while the second workshop focused on soil health practices applied on the PVAMU farm. Several meetings have been held on campus for the soil health project which was launched in 2018. Other educational programs and activities that addressed issues related to water and natural resources management include the CEP 8th Bi-State Annual Small-Scale Producers Conference at the Southwest Center in Texarkana; CEP landowners meeting and farm tourism conference; winter pasture program and winter pasture demonstration; spring pasture producer field day; fall gardening program; the spring tomato care program; and the feral swine workshops.

Field and lab experiments were conducted on effective water resources management practices through soil moisture monitoring and evaluation, groundwater monitoring and evaluation, soil samples collection and analysis, hydrological modeling from field scale to watershed scale, and analysis of groundwater levels, precipitations and other climate variables at different climate zones. The team members evaluated the impact of land-use and climate changes on groundwater storage in Texas; interactions between land use, climate change and carbon cycle using satellite measurements; hydrologic and hydraulic modeling of Cypress Creek watershed, Texas during Hurricane Harvey and impact of potential mitigation measures; performance of the Multi-Radar Multi-Sensor System over the Lower Colorado River. The groundwater monitoring tool is under development which will help farmers, ranchers, growers and water resource managers to monitor and evaluate groundwater storage at specific locations. A series of training was conducted to train/educate farmers, students, researchers, extension specialists to use best irrigation practice to conserve groundwater resources and help in water resources management. Research scientists and students disseminated research findings through a presentation at workshops/conferences and peer-reviewed publications. In addition, NRES team has participated in the Research Extension Apprentice Program (REAP), USDA AG Discovery Camp, Research and Extension Experiences for Undergraduates (REEU), Research Experiences for Undergraduate Students, Career Development Event (CDE), World Water Day to educate K-12 students from different schools, undergraduate students and other stakeholders in the state. NRES team organized Soil Physics Workshop to provide knowledge on the science of the analytical measurements of soil moisture content and soil water potential to more than 40 students of College of Agriculture and Human Sciences (CAHS). Four graduate and undergraduate students actively participated in applied soil and water management related research activities and gained practical water management skills.

Results

100% of the participants of the soil health workshops reported an increase in knowledge of soil health practices. 100% of the participants also reported that they anticipated benefitting economically as a direct result of participating in the workshops. Participants also indicated that they will recommend soil health practices to others. 53 participants attended the soil health project that was launched on campus. 100% of the participants who attended the CEP 8th Bi-State Annual Small-Scale Producers Conference at the Southwest Center in Texarkana reported an increase in knowledge about forestry management and wildlife practices, and 83% reported an increase in knowledge of the role of a forest consultant. 100% of the participants who attended the CEP landowners meeting and farm tourism conference reported an increase in knowledge about the NRCS Environmental Quality Incentive Program. 88% of participants who attended the fall gardening program reported an increase in knowledge about composting for organic matter. The NRES research team of CARC increased knowledge of researchers, students and other

stakeholders on effective water resources management through hands-on activities, field, and laboratory experiments and modeling experience. The research team also increased knowledge to understand the impact of land-use change and climate variability on groundwater storage, monitoring the groundwater resources which can help to manage water resources efficiently; performance of Multi-Radar Multi-Sensor Precipitation; hydrologic analysis of Cypress Creek watershed during Hurricane Harvey and impact of potential mitigation measures to reduce flooding. In addition, NRES research team enhanced knowledge of youth, K-12 students and University students about natural resources and water management. In addition, 127 farmers, researchers and extension specialist were trained in India under the USAID Farmer-to-Farmer Program on best irrigation method not only conserve the groundwater but also, address the salinity issues of soil and water.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
132	Weather and Climate

Outcome #6

1. Outcome Measures

% of participants who report the plan to or have adopted best management practices related to soil and water management.

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	80

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Best management practices related to soil and water management plays an important role in farm productivity and sustainability. Farmers and ranchers need applied research-based information that is practical and can help them make informed decisions to improve soil health and water management. To assist farmers in soil and water management, researchers at the NRES of the

CARC collaborated with CEP in developing educational programs with a focus on soil quality and soil health, surface, and groundwater quantity and quality issues.

What has been done

Soil health workshops focused on educating and training producers about soil health management practices were conducted during annual Agricultural Field Day. Winter pasture program and demonstration were conducted to educate and train producers on pasture management fertilization and soil testing. Other programs were conducted to educate and train producers on how to implement soil health practices such as composting and crop rotation.

Results

80% of the participants of the soil health workshops reported that they plan to adopt soil health practices such as conduct soil pH test, check soil texture and density. 100% of the participants reported that they would use soil pH test to inform their production practices. The winter pasture program and demonstration covered topics such as different varieties of cool-season grasses to plant, proper planting and fertilizing requirements, benefits of cool-season grass varieties and soil health practices. 67% of participants plan to adopt soil testing before planting grass seeds, and 75% of participants plan to adopt cool season grass planting on their farm based on the increase in knowledge from the program. Additionally, 83% of the participants stated that they would benefit economically as a direct result of participating in the program. 100% of participants who attended the spring pasture producer field day reported that they would benefit economically as a direct result of their participation in this program. 100% of participants also reported that they would adopt production practices such as planting grass seeds for soil health and cattle grazing. The topics that were covered during the fall gardening program include a variety of vegetables to grow during the winter, soil health with crop rotation, container gardening, composting, and importance of soil testing. 63% of participants reported that they would adopt crop rotation for insect and disease management and composting for organic matter. 100% of participants who attended the spring tomato care program reported that they would adopt sustainable production practices taught during the program.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
132	Weather and Climate

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Other (Other Program Areas)

Brief Explanation

* Success in securing funding through grants and contracts
* Weather patterns: both drought and flood impact interest in water management strategies. Commodity and energy prices
* Other emerging issues in communities (health, economics, etc.) can affect whether water management is a priority for individuals, businesses, families, communities. Regulatory and budgetary issues; ability to retain / recruit qualified staff

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Lone Star Healthy Streams

Bacteria is the leading cause of water pollution in the state of Texas. According to the2014 Texas Water Quality Inventory and 303(d) List, 589 waterbodies were impaired in Texas; of these, approximately 43% of the impairments were due to excessive bacteria.

Bacteria impairment is a serious problem. When found in water, fecal bacteria can act as indicator species and can suggest the presence of pathogenic organisms like bacteria, viruses, or parasites that can cause waterborne illnesses including typhoid fever, dysentery, and cholera. In addition to the potential health risks, elevated bacteria levels can also cause unpleasant odors, cloudy water, and increased oxygen demand.

Across the state, water quality management agencies and local stakeholders are helping combat bacteria pollution through management strategies and watershed plans that help restore water quality. One vital component of this approach, however, is educating citizens about bacteria, its common sources, and methods that can be used to help minimize or prevent bacteria from entering our waterways.

In response to this critical educational need, the Lone Star Healthy Streams (LSHS) program was created to inform, and thereby engage landowners in actively managing their land and utilizing effective conservation practices that specifically help reduce bacterial loading to Texas streams and rivers. During 2017, 10 workshops were held across the state in impaired watersheds with 160 stakeholders attending and indicating a 97% customer satisfaction with the program.

Geronimo and Alligator Creek Watershed Protection Plan

Goal: To effectively coordinate the implementation of the Geronimo and Alligator Creeks Watershed Protection Plan (GACWPP). Geronimo Creek is listed for non-support of the water quality standard for contact recreation in the Texas Integrated Report of Surface Water Quality. The goal of the GACWPP is to restore water quality in the creeks.

- Total Contacts: 7,656
- Contact Hours: 4,025

Programs conducted

- 5th Annual Geronimo and Alligator Creeks Clean Up Event- 198 volunteers removed 1,950 pounds of trash and debris from the creek banks and area roadways.
- Two Homeowner Maintenance of Septic System workshops- 110 homeowners were certified to maintain their aerobic septic systems, which will help protect area creeks from pollution.
- Lone Star Healthy Streams- 49 landowners were educated regarding methods to protect Texas waterways from bacterial contamination originating from livestock operations

and feral hogs that may pose a serious health risk to Texas citizens.

- Healthy Lawns Healthy Waters- 40 homeowners were shown ways to improve and protect water quality of area rivers and creeks, by enhancing their awareness and knowledge of best management practices, in regard to lawn and turf management.
- Texas Well Owner Program- 120 private water well owners were taught about their local groundwater sources, septic system maintenance, well maintenance, water conservation, water quality, and water treatment for their water well.
- Low Impact Development Workshop- 38 decision makers were introduced to the concept of low impact development practices and structures, in order to reduce impacts of stormwater runoff from urban areas.
- Soil Testing Campaign- 28 landowners submitted soil samples for lab analysis of nutrient concentrations. Results were returned and interpreted, in order for landowners to properly apply the correct type of fertilizer in the most appropriate manner, which will protect surface water quality of area creeks and rivers.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Range Management

☑ 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	50%	0%	50%	0%
121	Management of Range Resources	50%	0%	50%	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	17.0	0.0	15.0	0.0
Actual Paid	9.1	0.0	9.8	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**
154795	0	595214	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
154795	0	399351	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
1189248	0	4420557	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

AgriLife Extension and AgriLife Research

Primary activities in this program focus on development and implementation of research and educational

programs to support proper management and restoration of native rangelands for clientele. Applied research and result demonstrations to support improved rangeland management will also be conducted. Training and support for County Extension Agent and Specialist training will be provided on appropriate and timely aspects of rangeland management. Emphasis will be placed on continued development of appropriate publications, websites, online courses, and other teaching materials.

Unit members made 291presentations with 16,110 face-to-face contacts supporting adult educational events (164supporting county programs, 8510 contacts). Included in these events were the Range Management and Brush Busters workshops conducted at the TAMU Beef Cattle Short Course. Ninegroup trainings were conducted involving 260 Extension-faculty contacts. Eleven educational events were conducted for youth with 543 face-to-face contacts.

One-hundred thirty-four evaluations of existing county-level applied research projects were conducted in 110 counties and 92new projects established in 84 counties.

The Texas Range Facebook Page had 96 educational posts, 207,997 views, and 2224 followers. Five new and 2 revised Extension publications, 4 peer-reviewed papers, 3 proceedings/posters, and 5 videos were completed.

Work of AgriLife Research and AgriLife Extension is conducted jointly where research-based information is generated and transferred to clientele.

2. Brief description of the target audience

AgriLife Extension and AgriLife Research
The target audiences for this program include federal and state agencies, youth and adults. The adult audiences specifically include traditional landowners, operators, absentee landowners, and "new", novice landowners that either just bought land or have made a career off the land and has returned to it.

3. How was eXtension used?

We have two training courses on the eXtension moodle site and are active in the eXtension ask the expert community.

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	28692	51516	4095	0

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

Patent Applications Submitted

Year:	2018
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	0	107	107

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of group educational sessions conducted.

Year	Actual
2018	1193

Output #2

Output Measure

- # of research-related projects.

Year	Actual
2018	47

Output #3

Output Measure

- # of result demonstrations conducted.
  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	% of Land Managers who report increased knowledge leading to better decision-making for wise pesticide use.
2	% of livestock producers who report increased knowledge of rangeland monitoring, watershed management, weed and brush control.

Outcome #1

1. Outcome Measures

% of Land Managers who report increased knowledge leading to better decision-making for wise pesticide use.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	83

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Brush management is a major concern of landowners in Texas to maintain pasture productivity and wildlife habitat. The Brush Busters program provides landowners with do-it-yourself methods for brush maintenance.

What has been done
Unit specialists provide education a variety of ways including applied research/demonstration support, problem solving and presentations at educational events.

A specific example is a 4-hour workshop conducted during the 2018 Texas A&M Beef Cattle Short Course to demonstrate equipment needs and application methods for brush species featured in Brush Busters publications.

Results
One-hundred eighteen landowners participated in this workshop. A retrospective-post evaluation was conducted with this workshop. Increase in understanding of the nine topics presented averaged 66% with a range of 43 to 96%. Participants represented 78 Texas counties and Kansas and reported owning or operating 158,575 acres (average 1687 acres/person). Total estimated acreage represented was 199,066. Ninety-eight percent of those returning the evaluation indicated that the information received would help them make better management decisions. Ninety-six percent of these participants indicated that they planned to do some form of brush management in the near-future.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
121	Management of Range Resources

Outcome #2

1. Outcome Measures

% of livestock producers who report increased knowledge of rangeland monitoring, watershed management, weed and brush control.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	49

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Beef cattle producers need an understanding of how to lower costs on rangelands through thoughtful management.

What has been done
Unit specialists provide education a variety of ways including applied research/demonstration support, problem solving and presentations at educational events.
A specific example is a 3.5-hour workshop was conducted during the 2018 Texas A&M Beef Cattle Short Course. Five ESSM Extension Unit members made presentations during this workshop featuring short presentations dealing with using drones the legal way, stocking rates to avoid buying hay, targeted grazing, prescribed burning on the cheap, low-input native plants, and brush control options and costs.

Results
One-hundred seventy-eight landowners participated in this workshop. A retrospective-post evaluation indicated an average increased understanding of 7 teaching points evaluated of 61% with a range of 43 to 85%. These participants represented 69 different Texas counties and 1 Louisiana parish and reported owning or operating a total 75,887 acres, average ownership was 925 acres/participant). Based on this average, total estimated acres represented was 164,730. Ninety-eight percent of those returning the evaluation indicated that information received would help them make better management decisions. Intent to adopt management practices was:

drone-use (23%), planting/replanting native seed (33%), use of cost-effective brush management options (61%), incorporate prescribed burning as an integrated approach (17%), adjust stocking rates to save hay costs (58%) and use some form of targeted grazing (51%).

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
121	Management of Range Resources

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Increased understanding of teaching points for the two outcome measures averaged 61 and 66% with a range of 43 to 96%. Intent to adopt practices ranged from 23 to 61%. Ninety-eight percent of participants indicated that information presented would help them make informed decisions. Ninety-six percent of participants planned to do some form of brush management in the near-future.

Client estimated economic benefit from 12 evaluated educational events involving Unit members was $20.9 million involving over 3.2 million acres.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Climate Change

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	0%	0%	20%	0%
112	Watershed Protection and Management	0%	0%	20%	0%
132	Weather and Climate	100%	0%	0%	0%
133	Pollution Prevention and Mitigation	0%	0%	20%	0%
201	Plant Genome, Genetics, and Genetic Mechanisms	0%	0%	20%	0%
206	Basic Plant Biology	0%	0%	20%	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	5.0	0.0	1.5	0.0
Actual Paid	1.0	0.0	2.4	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**
17010	0	109732	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
17010	0	153973	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
130687	0	671223	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

AgriLife Extension
Develop and conduct educational programs utilizing direct and indirect educational methods to increase knowledge of and support adoption of management practices to mitigate effects of weather and climate change.

AgriLife Research
The general research response to this pressing issue is to generate reliable, verifiable data regarding carbon sequestration, carbon cycling, and interrelationships of cropping systems, livestock production and climate change. In the United States, agricultural practices account for approximately 80% of total anthropogenic emissions of nitrous oxide, a highly potent greenhouse gas with substantially higher global warming potential than carbon dioxide. Research at Texas A&M AgriLife Research is currently investigating climate-smart agricultural practices that can reduce nitrous oxide emissions. At the forefront of our research is the development of climate-smart crops, which we define as crops that can substantially reduce greenhouse gas emissions by inhibiting nitrification in soils, thus preventing the loss of nitrogen fertilizers as nitrous oxide. AgriLife Research will also leverage and share research findings by joining other states in climate monitoring networks such as AmeriFlux and/or Drought-Net.

2. Brief description of the target audience

Research products and educational programs focusing on the issue of weather and climate change address target audiences including but not limited to producers, corporate businesses, landscape managers, water resource managers, decision makers, and others who identify themselves with this issue.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

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

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

Patent Applications Submitted

Year:	2018
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	0	80	80

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of educational programs conducted.
  Not reporting on this Output for this Annual Report

Output #2

Output Measure

- # of research related projects.

Year	Actual
2018	24

Output #3

Output Measure

- # of graduate/undergraduate students involved in research projects.
  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	# of people reporting knowledge gained through participation in educational activities.
2	# of people reporting a willingness to adopt practices through participation in educational programs.
3	Research efforts related to climate change and Methane
4	Research efforts related to climate change and animal enteric gas production
5	Research efforts related to climate change and water

Outcome #1

1. **Outcome Measures**

# of people reporting knowledge gained through participation in educational activities.

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

# of people reporting a willingness to adopt practices through participation in educational programs.

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

Research efforts related to climate change and Methane

2. **Associated Institution Types**

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Reducing methane emissions.

What has been done
AgriLife Research has made preliminary discoveries of utilizing live yeast to help decrease methane emissions by 14%--17% from growing beef cattle on high roughage diets when compared to cattle not administered live yeast.

Results

Feeding live yeast to finishing steers reduced methane production by 5.7%, improved dry matter digestibility by 2.3%, improved digestible energy by 3.1%, and improved metabolizable energy by 4.4% without affecting intake. Under thermoneutral conditions, ruminal pH of steers tended to spend over 200 min/day more than controls, above acidosis thresholds. Subsequently, two trials were performed to determine the effects of live probiotic yeast on ruminal parameters and in vitro gas production in beef cattle fed growing and finishing diets in a confinement setting. The main variable examined reflective upon the contribution to climate change was methane production. Hydrogen is produced by several hydrolytic and fermentative processes in the rumen and is mainly used to reduce carbon dioxide into methane by methanogens. The ability for hydrogen to be utilized by methanogens is beneficial to the degradation of plant cell wall carbohydrates in the rumen; however, as a result of this process, methane is eructated and/or excreted by ruminants at 400 to 500 liters per day in adult cattle. This represents an 8?12% loss of carbon and available energy in the diet. Naturally, the amount of methane produced and expelled varies according to the type of diet (forage vs. concentrate) and the type of production system (intensive vs. extensive) because methanogens are the most active in the pH range of 6.5-8.0, and each of these production variables easily affect the pH. Furthermore, methane is classified as a greenhouse gas, and emissions need to be decreased by any means possible as it contributes to global warming and consequently climate changes. Various strategies have been investigated in order to alleviate ruminant methane production. Very little information regarding probiotic yeasts dealing with their potential effects on hydrogen transfer mechanisms and methanogenesis in vivo exist up to now. With our research efforts, we discovered probiotic yeasts may have the ability to alter the rumen microbial population thus rumen environment and subsequently reduce methane emissions from cattle fed in confinement settings. Future investigation of such implications is crucial to determine the specific role of probiotic yeasts as an ecological tool to control methane emissions from the rumen. I don't think any specific external factors directly affected the outcomes of my research, but I can see how appropriation and public policy changes could affect the amount of monetary support this type of crucial research gets awarded.

4. Associated Knowledge Areas

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

Outcome #4

1. Outcome Measures

Research efforts related to climate change and animal enteric gas production

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Condensed tannins (CT) could potentially serve as a natural feed additive to improve nutrient efficiency within the animal, reduce enteric gas production, and possibly mitigate unmanaged excreta emissions.

What has been done
This was accomplished by performing whole-animal respirometry for enumeration of gaseous emissions with the use of metabolism stands for total collection of feces and urine. Animals used for respirometry we also utilized to determine manure gas flux via static chambers at two locations during two seasons. Diets for all trials consisted of the same high-roughage total mixed ration with dietary treatments being the addition of quebracho tannins (QT; Schinopsis balansae) at 0, 1.5, 3, and 4.5% of DM. From the respirometry trial we observed no effect on fiber digestibility that is commonly seen with QT.

Results
We noted a large shift in the route of N excretion with fecal N per unit of total N excreted and urinary N increasing 14 and 38%, respectively, with no effect on N retention. Energetically, we saw a linear reduction in methane and heat production with increased QT provision, but no difference in daily retained energy. Total CO2¬e produced decreased linearly with increased QT rate due to an average reduction of 5 and 10% for CO2 and CH4, respectively. However, there were no treatment differences for retained energy or N per unit of CO2 equivalent produced, although means indicate that QT0 and QT3 had the greatest animal efficiency. When investigating manure gas flux all cumulative gas calculations were performed on a DM basis to enable integration with respirometry and metabolism work. At the College Station location there was an 11 and 35% decrease in cumulative CO2 and CO2e (CO2 + CH4 + N2O), respectively, on average with QT addition. However, there were no treatment effects for all other parameters with the Stephenville location having no treatment effects. We did observe that CH4 accounted for the bulk of CO2e when CO2 was not included, however, CO2e including CO2 demonstrated that CH4 and N2O had extremely negligible contributions. Based upon this work it appears that neither CH4 or N2O should be of major concern from manure, rather CO2 evolution is the major issue within unmanaged manure. Although we did not investigate urinary gas flux, it is safe to speculate that N2O emissions would decrease in the range of 14% due to the shift in N excretion from the urine to the feces. However, urinary N forms need to be investigated as lesser urea could potentially enable lesser volatilization. In summary, QT demonstrated the potential to maintain animal production while decreasing GHG emissions. The largest issue within these trials was having a large enough sample size to encompass the animal variability that has large implications on results.

4. Associated Knowledge Areas

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

201	Plant Genome, Genetics, and Genetic Mechanisms
206	Basic Plant Biology

Outcome #5

1. Outcome Measures

Research efforts related to climate change and water

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
AgriLife Research has identified large discrepancies in water footprint estimates of beef cattle production that range from 94 ̵ 23,965 gal/lb. Clarifying uncertainties in beef water footprint evaluation has the potential to increase water-use efficiency, sustainability, and profitability of Texas beef production, an $11 billion industry. Historically, Texas cattle production levels and market prices have shown low resilience to water resource limitations such as drought or availability.

What has been done
Current cattle research is making advances toward improving cattle dry matter intake (DMI) feed efficiency which has the potential to be improved through precision feeding techniques; DMI and voluntary water intake affect one another. However, evaluation of precision cattle water use is far behind DMI research efforts. Consideration of water use efficiency is of paramount concern, as water is the most limited cattle nutrient/resource. Further, cattle production also, directly and indirectly, alters water use for the production of forage and grain feed inputs and servicing of cattle (manure management).

Results
Current beef water use and water price estimates range from 2,100 to 14,191 L of H2O/kg boneless beef and 0.01 to 10.00 $/m3 H2O, which equates to an 86% variability in beef cattle water costs ($3 million to $22 billion). Risk of drought conditions increases the uncertainty of water costs and associated changes in grain crop, pasture or forage, and cattle inventory/prices. In 2011, Texas experienced the worst drought in the past 50 years which resulted in a 1.4 million head reduction of the Texas cattle population (11% decline, sharpest drop in the past 75 years). The drought increased crop prices that attributed to drastic declines in Texas cattle numbers and

market prices. Thus, strategies to improve cattle water use efficiency and decrease cattle market price volatility are needed to mitigate challenges created by water resource availability and drought. To understand and mitigate beef cattle water challenges a Beef Water Footprint decisions support tool (DST) has been developed that indicates a potential 8.2% to 11.5% reduction in beef cattle water use. DST estimates equate to a potential 274 thousand to a 2.6-billion-dollar reduction in annual water costs. Moreover, the DST is likely to strengthen domestic and international beef cattle market competitiveness by the identification of high-cost and low water-use efficiency hotspots across Texas.

4. Associated Knowledge Areas

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

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Other (changing programming areas)

Brief Explanation

In spite of increased competitiveness for funding to support this critical effort, AgriLife Research has continued to conduct research in nitrous oxide emissions, carbon sequestration, and reduction of methane in both cropping and livestock systems.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

See outcomes.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Sustainable Energy

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	100%	0%	10%	0%
111	Conservation and Efficient Use of Water	0%	0%	10%	0%
201	Plant Genome, Genetics, and Genetic Mechanisms	0%	0%	50%	0%
205	Plant Management Systems	0%	0%	10%	0%
402	Engineering Systems and Equipment	0%	0%	20%	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	1.0	0.0	1.0	0.0
Actual Paid	1.0	0.0	1.9	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**
17010	0	155498	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
17010	0	119419	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
130687	0	210497	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

AgriLife Extension

Agricultural producers and the energy industry have a keen interest in the role that agriculture will play in contributing to renewable energy for America, and are looking to AgriLife Extension to help define which second generation crops will fit this market and how they will be produced. Texas is a major livestock feeding state and faces a feed grain deficit at current production levels, making second generation crops the only practical feed stocks for bioenergy. AgriLife Extension has responded through applied research and demonstrations of candidate oilseed and lignocellulosic feedstock crops; holding workshops and field days for agricultural producers; and by meeting with commercial interests from the energy sector to interpret potential for a variety of plant based bioenergy options. As crop-based bioenergy other than the traditional ethanol from feed grains is still in its infancy, actual adoption of second generation bioenergy is limited. Research involved the development of cropping system BMPs, testing and development of novel dedicated oilseeds and lignocellulosic bioenergy crops, advanced plant breeding systems, micro- and macro-algae, logistics and conversion technologies. Our focus is on second generation oilseeds and lignocellulosic feed stocks rather than on corn, soybeans, and other crops that can be used for food and feed. Drought and salinity tolerance, adaptation to marginal growing conditions and wide hybridization are emphasized in research in order to increase adaptation and sustainability of alternative energy systems. Organic residuals at livestock production systems offer a concentrated source of feedstock for the bioenergy production. Demonstration of identification, selection, harvesting and transportation of quality organic residuals for entering bioenergy production is critical to ensuring a sufficient energy resource.

AgriLife Research

Research involves cropping systems, novel dedicated energy crops, advanced plant breeding systems, micro- and macro-algae, novel oilseeds, logistics and conversion technologies. Our focus is on lignocellulosic and unique plant oil feedstocks for liquid motor fuels rather than on corn, soybeans, and other crops that can be used for food and feed. Drought tolerance and wide hybridization are emphasized in breeding research in order to increase adaptation and sustainability of alternative energy systems. Best management practices are needed to identify, collect, separate, transport and process these organic residuals. Development of best management practices will ensure to availability of quality organic residuals for entering bioenergy production.

Research also includes developing novel technologies to generate synthesis gas and/or electricity from dairy waste, municipal solid waste and sewage sludge.

2. Brief description of the target audience

The target audience includes traditional petroleum and natural gas energy companies, farmers, landowners, seed companies, start-up companies in bioenergy, electric generating companies, and the general public.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

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

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

Patent Applications Submitted

Year: 2018

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	0	9	9

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of educational programs conducted.
  Not reporting on this Output for this Annual Report

Output #2

Output Measure

- # of research-related projects.

Year	Actual
2018	14

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	# of people reporting knowledge gained through participation in educational activities.
2	# of people reporting a willingness to adopt practices through participation in educational programs.

Outcome #1

1. **Outcome Measures**

# of people reporting knowledge gained through participation in educational activities.

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

# of people reporting a willingness to adopt practices through participation in educational programs.

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

Brief Explanation

Advances in technologies such as hydraulic fracturing have greatly increased the production of oil and natural gas in Texas. This huge increase in supply and global economic conditions have impacted the price of crude oil. This, in turn, has diminished funding from the private sector to support research in sustainable, alternative sources of energy. AgriLife Research has continued to conduct research in bioenergy, carbon sequestration, and reduction of methane in both cropping and livestock systems with the limited funding we have available.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

No evaluation results for 2018.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 8

1. Name of the Planned Program

Community Resource and Economic 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
504	Home and Commercial Food Service	5%	0%	0%	0%
602	Business Management, Finance, and Taxation	10%	60%	0%	0%
608	Community Resource Planning and Development	50%	20%	0%	0%
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	30%	0%	0%	0%
806	Youth Development	5%	10%	0%	0%
903	Communication, Education, and Information Delivery	0%	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	30.0	15.0	0.0	0.0
Actual Paid	7.0	8.5	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**
119073	626230	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
119073	239757	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
914806	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

AgriLife Extension

Provide training and curriculum materials to County Extension Agents and volunteers for the purpose of conducting educational programs on community leadership, workforce preparedness, adult and youth entrepreneurship, emergency management, and nature based tourism at the county level. Specialists will provide in-depth educational programs to targeted audiences relative to community and economic development strategies, based on local needs. Provide multi-county, regional and statewide educational programs on various topics to business owners and community stakeholders utilizing specialist faculty and other government and private sector partners. Coordinate and collaborate with state and federal agencies in rural development activities as well as work with regional rural development centers in curriculum and professional development. Provide technical assistance to communities in analysis of various socioeconomic databases or surveys. Continue to foster working relationships with rural community colleges to obtain support and follow-up for local educational activities. Expand web-based information delivery relative to community resource and economic development topics.

Cooperative Extension Program

The Community and Economic Development Unit of the Cooperative Extension Program provide Research and curriculum-based training and consulting in the areas of small business, housing, energy conservation, financial literacy and non-profit organization. Though services are open and available to all, the target is limited resource audiences primarily in rural counties of Texas. Activities include conducting educational programs, business development seminars, one-on-one consultations, assisting clients with writing business plans housing and emergency management/response. As a result, 113 CED related workshops have been held, 133 entrepreneurs training in State contracting, 181 business loan applications submitted, 16 homes rehabilitated, 1.8 million in FEMA assistance and 398 housing and disaster related applications totaling $1,136,418.

2. Brief description of the target audience

AgriLife Extension

Primary target audiences for the program consist of residents, elected and appointed officials, community leaders/potential leaders (including youth), individuals with specific workforce training needs, and existing and potential business owner/managers in and around the over 1,200 communities in all 254 counties of the state of Texas.

Cooperative Extension Program

Rural communities, low-income individuals, underrepresented groups, limited resource business owners and small farm and potential small farm producers.

3. How was eXtension used?

The Cooperatives Community of Practice for eXtension is supported by Texas AgriLife Extension personnel. It provides a resource to individuals and groups interested in cooperative agricultural business practices. A focus for the community of practice is youth leadership, with the intent of drawing talented youth to careers in cooperatives. Such careers are typically located in rural communities and help to strengthen rural economies. In addition, several faculty members answer ask an expertquestions that come in through eXtension.

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	100408	139081	95380	0

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

Patent Applications Submitted

Year:	2018
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	44	0	44

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of group educational sessions conducted.

Year	Actual

2018	4014

Output #2

Output Measure

- # of state or regional leadership conferences held for county officials or industry groups.

Year	Actual
2018	3

Output #3

Output Measure

- # of one-on-one technical assistance/consultations.

Year	Actual
2018	133

Output #4

Output Measure

- Estimated hours spent consulting individuals

Year	Actual
2018	2373

Output #5

Output Measure

- # of youth trained in entrepreneurship.

Year	Actual
2018	546

Output #6

Output Measure

- # of volunteers involved in CED activities.

Year	Actual
2018	208

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Percent of landowners/managers participating in group educational meetings on effectively evaluating nature-based tourism resources that increased their knowledge.
2	Percent of participants of in-depth leadership educational programs who increase knowledge of community and individual leadership principles.
3	Number of participants in workforce development or continuing education training activities conducted who increase knowledge to support their current employment needs.
4	The number of participants who enroll in Individual Development Account programs.
5	Dollar amount of small business and home loans assisted with throughout the State of Texas.
6	Percentage of youth who start selling products or plan to sell products and services who received training on Entrepreneurship or financial literacy.
7	Dollar amount of small business and agri-businesses applying for financial assistance in support of their enterprise
8	Number of community gardens developed, farmers markets, community supported agriculture and/or income generated through the TASTE program.

Outcome #1

1. Outcome Measures

Percent of landowners/managers participating in group educational meetings on effectively evaluating nature-based tourism resources that increased their knowledge.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	75

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Natural resources owners and communities are looking for ways to generate additional income, and to attract positive growth opportunities, to maintain the economic viability of their enterprises and communities. Entrepreneurs are looking to diversification or nature tourism as strategies to expand nontraditional or other activities for economic development, and communities are looking for ways to enhance their community assets to attract positive growth. Entrepreneurs want information on what other successful operations are doing, and communities want to support local business, and provide nature based amenities that help enhance community growth and vitality prospects and attract new business opportunities.

What has been done
Educational activities made up of workshops, webinars, and tours were conducted statewide for natural resource owners, entrepreneurs, and community leaders. Technical assistance was provided to individual business owners relative to recreational and nature tourism opportunities, rural and urban communities in park development and watershed development planning and enhancement.

Results
The Texas Community Watershed Program conducted seven Community Health and Resource Management (CHARM) workshops for community and/or state leadership 321 participants. Facilitated the Galveston Bay Coalition of Watersheds stakeholder group and hosted the Galveston County Post-Harvey Community Open House. Conducted one day conference on managing health (mental, physical, and financial) in the wake of disasters. Six Smart Cities Discovery Workshops and Harvey Forums conducted with 305 participants. There were 2,240 volunteer hours contributed to Exploration Green and Sheldon Lake State Park wetland habitat restoration projects. There were 2,000 participants for Parks 101, Crime Prevention Through

Environmental Design (CPTED) and Community Assessments & Playability workshops. In 2018, six Ranchers Leasing Workshops were conducted across Texas to an audience of 470. Pre-test and post-test scores indicated at 92.25% improvement in participants' basic knowledge of contract law and lease terminology, and an average of 112.88% increase in knowledge gained relating to evaluating, negotiating and drafting grazing, hunting and livestock leases.

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
608	Community Resource Planning and Development

Outcome #2

1. Outcome Measures

Percent of participants of in-depth leadership educational programs who increase knowledge of community and individual leadership principles.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	80

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Issues identification processes at the local level continue to emphasize the importance of leadership to foster sustainable and vibrant communities. Community stakeholders must be prepared to build on local strengths through leadership and partner with others to create support for economic development and quality of life. This is particularly true given the importance of regionalism to development.

What has been done
The Texas Rural Leadership Program, Developing Critical Thinking Leaders, Texas Agricultural Life Leadership, Texas Event Leadership Program, Texas Friendly Hospitality, and the Commissioners Court Leadership Academy are curriculum-based programs that help develop leadership in various areas of Texas organizations and communities. The Stronger Economies Together and other CRED programs work to bring community members together to enhance those skills and develop plans for communities to move forward.

Results
The V. G. Young Institute of County Government conducted educational schools, providing training related to the duties and responsibilities of the county officials. In 2018, 3,470 individuals took part in Extension and Extension supported programs, with 27,212 continuing education hours awarded. The Texas Rural Leadership Program (TRLP) has worked with AgriLife Extension agents and community leaders to provide leadership training. The target communities are currently working on putting together projects that benefit their communities while using leadership training skills. The Texas Friendly Hospitality Instructor Training was revised and is available for new instructor training and existing instructor re-training, statewide. Texas Friendly Hospitality Instructor Trainings were conducted in New Braunfels (21 new instructors), Fort Worth (6 new instructors). Texas Friendly Hospitality Customer Service Workshops were conducted in Fort Worth including a separate workshop for County extension agents (84 workshop participants; 20 extension agent participants). Texas Friendly Ambassador program (youth) trained intructors at a statewide conference in San Antonio (30 high-school teachers).

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
806	Youth Development

Outcome #3

1. Outcome Measures

Number of participants in workforce development or continuing education training activities conducted who increase knowledge to support their current employment needs.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	655966

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Local community leaders, resource owners, and other businesses need a well-trained workforce and the ability to provide greater knowledge and tools to potential employees to meet the challenges of increased globalization, increased international trade, and an increasingly

competitive business environment. Communities are concerned about individual, community and regional economic viability, maintenance/improvement of quality of life, and sustainability/growth. Providing the existing labor force with the tools and training to remain competitive in today's ever more competitive labor environment, and providing job opportunities that will attract youth back to the community are of major importance.

What has been done
Educational activities made up of workshops, webinars, and online training materials were conducted/provided statewide for training new and existing labor force participants, to increase knowledge, to improve workforce skills, and to enhance/expand job opportunities. These efforts should increase job opportunities, earning potential and provide employers with a more efficient/competitive workforce.

Results
In 2018, county Extension agents and their community partners conducted 27 child-care conferences reaching 2,183 child-care providers and directors. Evaluation results indicate that 99% of participants acquired new information, plan to utilize the information to improve their programs, and consider themselves better equipped to work with children. In addition, child-care professionals completed 649,667 online courses (1,193,695 clock hours). 98% of participants learned new information from the courses. During 2018, 490 food service employees participated in the Food Safety: It's Our Business Certified Food Manager program. Another 11,187 individuals completed the Food Safety: It's in Your Hands food handler's program either face-to-face or online. Also during 2018, 576 individuals completed the Cooking up a Cottage Food Business online. An additional 420 individuals completed a Cottage Food or Farmers Markets for Consumers course online, and 2297 individuals completed the Food Safety in the Classroom online course, which is approved for Continuing Education Units (CEUs for child-care providers).

4. Associated Knowledge Areas

KA Code	Knowledge Area
504	Home and Commercial Food Service
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
806	Youth Development

Outcome #4

1. Outcome Measures

The number of participants who enroll in Individual Development Account programs.

2. Associated Institution Types

- 1890 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)
Underserved adults and youth often lack the financial literacy needed to properly manage their finances and make informed decisions on how to budget, save, balance and spend their income. Often, they have limited opportunities and exposure to training that teach them about the use of money, basic bookkeeping, budgeting, credit and home-ownership. Often than not, society neglects to provide free or low-cost training in budgeting and simple accounting. School districts are not incentivized to provide the much-needed training in financial literacy which leads to bad credit, increased debt, and lack of access to capital.

What has been done
In 2018, our CED specialist staff provided several 6-session educational trainings throughout the year to adults and youth encouraging participants to save money and invest in themselves. These adult and youth groups received training in bank services, credit, budgeting, saving, credit cards, borrowing, and home ownership. This financial literacy training certifies eligible participants allowing them to participate in the Individual Development Account (IDA) savings match programs identified by the staff. Monies deposited in the IDA accounts are matched 2 to 1 by our partnering agencies. This money may be used to start a business, pay for tuition, or purchase a home.

Results
40 individuals have completed the financial literacy training. Participants enrolled in the IDA program are projected to save $48,000 which can be used for higher education, home ownership, small business startup, and in some cases, purchase a car. This additional economic boost will create jobs as our clients buy homes and graduate from college with less debt. In addition, this makes them more likely to have better-paying jobs and brings higher tax revenue into the State.
Other Impacts:
* Start the pre-approval process for obtaining a mortgage
* Help improve students? standard of living, knowledge on starting a small business, purchasing a home, and best practices for budgeting and saving money
* Decrease in the amount of loans or money needed to attend school, open new banking accounts, starting a small business, or purchasing a home

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
806	Youth Development

Outcome #5

1. Outcome Measures

Dollar amount of small business and home loans assisted with throughout the State of Texas.

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	1287918

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
When it comes to access to capital, historically, limited resource individuals are the lowest percent of loan participants. Entrepreneurship and homeownership are linked to economic prosperity, yet minorities and low income individuals have a much more difficult time getting approved for financing to support these goals. Due to limited exposure to knowledge and resources, generations of minority business owners have been lacking what it takes to be successful and sustainable business owners. Statistics show that minority owned businesses are much more likely to fail, especially start-ups and micro businesses. Likewise, minorities across the nation also lack in the area of homeownership when compared to non-minority groups. Unemployment, salary inequities, access to home loans, and education are just a few items that affect homeownership. With the addition of hurricane Harvey, one of the worst Texas storms in United States recorded history, access to capital among limited resource clientele became more of a necessity.

What has been done
Staff within the Community & Economic Development Unit has made a concerted effort to provide lending education for small businesses and homeowners. Staff conducted workshops throughout the State with an emphasis on lending resources and the application process. Staff provided workshop training and one-on-one technical assistance to individuals seeking funding to support small business development and homeownership. Staff has also and continues to, assist hurricane Harvey victims through home loan and rehab applications, federally supported program applications such as the Small Business Administration (SBA), Federal Emergency Management Agency (FEMA), and Disaster Supplemental Nutrition Assistance Program (D-SNAP). They are working with local organizations, and businesses to provide donated food, water, supplies, clothes, and gift cards.

Results

As a result of the CED staff efforts, 398 applications have been submitted for home loans and rehabilitation with 90 currently approved for funding renovations for a total of $815,418. In 2018, clients were assisted in 1st time home buyer and low-interest mortgages totaling over $1,136,418. Sixteen (16) homes were saved from foreclosure.
$151,500 in loans have been approved for small businesses.
$1,287,918 in total small business and non-Harvey related home loans.

HURRICANE HARVEY RECOVERY EFFORTS
3Homes gutted and repaired through volunteer efforts
15Harvey workshops
40Persons trained and First Aid certified by Red Cross to do CPR and use defibrillators
153 Applications and resource material distributed
639 Individuals assisted
$57,636In material/supplies donated to support home rehabilitation
$1,800,000 in estimated FEMA assistance received
$301,167in resources distributed (food, water, gift cards, supplies, etc)
$75,000in disaster loans funded

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
608	Community Resource Planning and Development

Outcome #6

1. Outcome Measures

Percentage of youth who start selling products or plan to sell products and services who received training on Entrepreneurship or financial literacy.

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	546

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Youth, specifically those from underserved communities, have limited opportunities and exposure

to training that teach them about the use of money, basic bookkeeping, budgeting, credit, and home-ownership. Young people are more likely to prefer self-employment than adults, but at the same time their rate of self-employment is much less. This is accounted for by barriers related to lack of awareness, orientation of education and training, lack of experience, fewer financial resources, limited networks, and market barriers.

What has been done
CED specialist and county staff have initiated and conducted financial literacy and youth entrepreneurship trainings encouraging participants to save money, invest in themselves and start a business. Curriculum based training has been delivered in classrooms, community centers, and camps across the State. Training includes Individual Development Account (IDA) financial literacy training to youth, entrepreneurship training in school districts across the State of Texas, and partner with local community organizations to provide youth entrepreneurship workshops and seminars.

Results
In, 2018 we had approximately 546 youth trained in entrepreneurship. As a direct result of training, some youth have indicated they would like to start selling products and/or services or plan to start a business.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
806	Youth Development

Outcome #7

1. Outcome Measures

Dollar amount of small business and agri-businesses applying for financial assistance in support of their enterprise

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	151500

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Higher than acceptable unemployment among majority and minority population groups continue to threaten the health and prosperity of families and communities. Non-traditional skills set and education are needed to allow a paradigm shift that improves economic outcomes. Minority agricultural producers, agri-businesses, and startup micro-businesses, the majority of whom are first generation entrepreneurs, continue to suffer from a lack of qualified technical assistance, financial record-keeping, and access to capital. The unemployment rate for minorities continues to be significantly higher than unemployment in the majority population (exceeding 20% in some communities). Pervasive layoffs and continuing high unemployment numbers have forced a new wave of aspiring entrepreneurs who are ill-equipped to survive in an already tough marketplace flooded with displaced public and private sector individuals attempting to earn a living as business owners. lack of training and network is one of the reasons why there are Minority owned businesses generating minimal income and failing at a much higher rate than those businesses owned by non-minority entrepreneurs. Due to pervasive poverty, USDA has deemed 96 of the 254 counties in the State of Texas as counties needing special attention focused on community and economic development.

What has been done

In 2018 staff in in Harris, El Paso, Liberty and Zavala counties conducted the Businesses In Development (BID) program; a 12-week state contracting training course. The workshops focused on training new and existing businesses on how to get and successfully execute State contracts for business. CED staff also provided one-on-one counseling to individuals in an effort to assist them in starting a business, maintaining their business, developing business plans, and applying for small business loans.

Results

Participants in programs and one-on-one consultations reported an increase in knowledge, skills, and small business improvement through sustainability, increased capacity, job retention or expansion, and profitable business practices. As a result of the BID program, approximately 279 hours of training has been delivered, 809 hours of 1 on 1 consulting, 93 courses were presented, 129 HUB profiles were reviewed, 133-course participants and 26 new Historically Underutilized Businesses (HUBs) established. Approximately $1,341,599 in State contracts were submitted to the State of Texas for approval with $376,049 being approved.
Other areas of impact include:

2,373 Small Business Consulting Hours
113 Community and Economic Development Workshops
31 State contracts submitted
28 Businesses started
48 Debt repayment plans
76 credit reviews
181 Business loan applications assisted with
61 Non-profit businesses assisted

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

Outcome #8

1. **Outcome Measures**

Number of community gardens developed, farmers markets, community supported agriculture and/or income generated through the TASTE program.

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

Brief Explanation

Spring 2017 wildfires, and a summer 2017 hurricane redirected some program activities throughout 2018. In addition, budget reductions as a result of anticipated and actual reduced state appropriations in 2017 resulted in a reduction in FTEs available to carry out educational activities in 2018. That impact will carry into the future. While faculty picked up additional responsibilities, some educational opportunities were missed due to redirected efforts and reduced faculty numbers.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Clientele/participants involved in Community Resource Economic Development programs are evaluated in several ways, depending on the length of the training activity, whether we are trying to identify short-term knowledge gains, or adoption/change of practices and economic impacts over time. Pre-tests and post-tests are used at the beginning and end of programs to better identify knowledge gains. Retrospective post evaluation surveys are used to identify adoption/change of practices and potential economic impacts over time. Results indicate that participants are learning, and adopting/changing practices, and these changes are producing potential economic benefits. As a result of the Community and Economic Development staff's efforts, limited resources individuals across the State of Texas have experienced positive outcomes in small business creation, business expansion, home ownership, foreclosure prevention, financial literacy, emergency preparedness, and youth entrepreneurship. Businesses have gained access to millions of dollars in contract opportunities, individuals have received hundreds of thousands of dollars for homeownership and rehabilitation, and hundreds of youth have been trained in entrepreneurship.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 9

1. Name of the Planned Program

Chronic Disease, Health, and Wellness

☑ 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	35%	15%	35%	0%
724	Healthy Lifestyle	65%	35%	65%	0%
802	Human Development and Family Well-Being	0%	50%	0%	0%
	Total	100%	100%	100%	0%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2018	Extension		Research	
	1862	1890	1862	1890
Plan	25.0	4.0	2.4	0.0
Actual Paid	36.6	4.0	29.2	0.0
Actual Volunteer	0.0	956.0	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**
622583	294696	81484	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
622583	112827	314776	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
4783130	0	2933409	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

AgriLife Extension and Cooperative Extension Program

Diabetes Programs

County Agents partner with local health care professionals to plan, implement and evaluate Do Well, Be Well with Diabetes, ¡Si, Yo Puedo Controlar Mí Diabetes! or Wisdom, Power and Control for underserved people with type 2 diabetes. Programming focus on management of dietary and self-care components for those individuals.

Exercise and Wellness Programs

Walk Across Texas! (WAT!) is an eight-week program to help people of all ages support one another to establish the habit of regular physical activity. Adults and youth are challenged to virtually walk 832 miles across Texas. Participants are recruited locally through groups/organizations such as worksites, schools, and churches. Individuals, adult teams of up to eight team members, and youth teams combine and report mileage based on a variety of physical activities. Registration, mileage entry and evaluation are conducted through the WAT! website (http://walkacrosstexas.tamu.edu/). The WAT! website is open access and all program resources to support implementation are available online, available to download.

Cancer Prevention Programs

County Extension Agents will work with local volunteers, regional cancer prevention program specialists, and patient navigators to implement Friend to Friend, an evidence-based program, to increase the number of women in rural, frontier, and border counties who find breast and cervical cancer earlier, when treatments are most effective. Each event will include a presentation by a local physician, a chance to meet and make appointments with nearby clinical sources of mammograms and Pap tests, and a discussion group for networking support and finding solutions for problems like cost and transportation.

Cooperative Extension Program:

Childhood Obesity

Poor health, obesity, poor nutrition, and limited physical activity are significant health concerns that disproportionally affects minority and low-income populations. The Family & Consumer Sciences unit strives to provide educational opportunities and resources via informal education classes to those who are most at risk. Programs serve to increase knowledge, change behaviors, and increase physical activity Topics focused on portion control, serving size, lifestyle changes, health consequences of excess weight, and physical activity. Classes were conducted with targeted audiences at community centers, senior activity centers, senior wellness centers, school programs, and faith-based institutions. The prevalence of overweight/obesity has epidemic consequences for youth and adults. Health issues for children include bone and joint problems, sleep apnea and social and psychological issues.

Choose Health: Food, Fun, and Fitness (CHFFF)

CHFFF uses experiential learning to teach healthy eating and active play, targeting behaviors research shows to be most important for preventing childhood obesity and chronic disease. Topics include replacing sweetened drinks with low-fat milk and water, eating more vegetables, fruits, and whole grains, eating fewer high-fat and high-sugar foods, and playing actively 60 minutes a day. Choose Health: Food, Fun, and Fitness is aimed at 8-12 year olds and targets those behaviors research shows to be most important for preventing childhood obesity and chronic diseases such as heart disease and cancer.

The curriculum also supports key messages of the Dietary Guidelines for Americans as summarized by USDA in their new MyPlate initiative to help Americans build healthier diets:

- Drink water instead of sugary drinks.
- Switch to fat-free or low-fat (1%) milk.
- Make half your plate fruits and vegetables.
- Make at least half your grains whole grains.
- Enjoy your food, but eat less.
- Avoid oversized portions.

Step Up and Scale Down

Step Up & Scale Down is a 12-lesson program developed to provide nutrition information to people who want to live healthier lifestyles. The program focuses on weekly motivation, support, hands-on learning, and accountability to assist them to achieve their goals.

Balance Living

Balance Living is a series of five lessons focusing on time management, stress management, mindful eating, physical activity, and sleep are the major components addressed in this curriculum because these areas tend to be overlooked when life gets hectic or out of control. The goal of this series is for participants to gain knowledge and skills to live a more balanced life.

2. Brief description of the target audience

AgriLife Extension and Cooperative Extension Program

Diabetes Programs

The target audience is all people with type 2 diabetes and those at risk of developing type 2 diabetes who need training to learn dietary and self-care management skills such as eating more healthfully (limiting carbohydrate intake, reducing fat and sodium and increasing fiber in meal plan), increasing physical activity, taking prescribed medications, checking their blood glucose levels, and regularly visiting their health care providers.

Exercise and Wellness Programs

The Walk Across Texas! website (http://walkacrosstexas.tamu.edu)is open access and participants may register and participate throughout the year. The target audience is both adults and youth (with youth teams being registered by an Adult volunteer). All it takes is eight weeks and people willing to get physically active using a fun, motivating team approach.

Cancer Prevention Programs

Underserved rural women who are at risk for breast and cervical cancer.

3. How was eXtension used?

Health and Wellness FACT Sheets were used in education programming

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	859215	570128	690036	0

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

Patent Applications Submitted

Year:	2018
Actual:	2

Patents listed
* COMPOSITIONS AND METHODS FOR DRUG-SENSITIZATION OR INHIBITION OF A CANCER CELL
* VACCINE VECTORS AND METHODS OF ENHANCING IMMUNE RESPONSES

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	4	78	82

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of group educational sessions conducted.

Year	Actual
2018	108520

Output #2

Output Measure

- Number participating in educational efforts.
  Not reporting on this Output for this Annual Report

Output #3

Output Measure

- # research-related projects

Year	Actual
2018	25

Output #4

Output Measure

- # of classes/workshops addressing nutrition and health

Year	Actual
2018	2967

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of participants who report improved before meals blood glucose levels after attending 4 of the 5 Do Well, Be Well with Diabetes classes; and 5 of 6 ¡Si, Yo Puedo Controlar Mí Diabetes¡.
2	Increased number of miles walked per week at week one compared to week eight.
3	Number of people reporting knowledge gained through participation in cancer prevention educational activities.
4	Number of people reporting a willingness to adopt practices through participation in cancer prevention educational programs.
5	Number of individuals who gain knowledge in Health and Wellness while attending workshops and conferences.

Outcome #1

1. Outcome Measures

Number of participants who report improved before meals blood glucose levels after attending 4 of the 5 Do Well, Be Well with Diabetes classes; and 5 of 6 ¡Si, Yo Puedo Controlar Mí Diabetes¡.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	512

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Diabetes is not curable, but it is manageable. While the skills needed to effectively manage diabetes are well documented, diabetes education is not readily available. An estimated 3.2 million Texans 18 years or older are diagnosed with diabetes. People with diabetes who maintain their blood glucose, blood pressure and cholesterol numbers within recommended ranges can keep their costs, health risks, quality of life and productivity very close to those without the disease.

What has been done
Do, Well, Be Well with Diabetes, Sí, Yo Puedo Controlar Mí Diabetes and Wisdom, Power, Control are programs designed to educate about dietary and self-care management skills such as eating more healthfully (limiting carbohydrate intake, reducing fat and sodium and increasing fiber in meal plan), increasing physical activity, taking prescribed medications, checking their blood glucose levels, and regularly visiting their health care providers.

Results
In 2018, 512 individuals completed a diabetes management education program across multiple Texas counties. In general, participants significantly improved their overall health, behavior and confidence in dietary and self-care management. The improved management of diabetes for these participants resulted in an estimated cost savings of $8.9 million.

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle

Outcome #2

1. Outcome Measures

Increased number of miles walked per week at week one compared to week eight.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	4

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Thirty-three (33%) of Texas adults are obese. Texas ranks 10th (11.9%; Diabetes) and 23rd (32.5%; Hypertension) in obesity-related health issues. Insufficient physical activity is considered a lifestyle risk factor for preventable chronic diseases. Texas ranks 5th as the most physically inactive state and 32.1% of Texas adults report being physically inactive i.e. did not engage in physical activity or exercise during the previous 30 days other than for their regular job. Regular physical activity and controlling weight can significantly reduce the risk and impact of chronic diseases like heart disease, stroke, type 2 diabetes, cancer at multiple sites, hypertension, and osteoporosis.

What has been done
Community-based programs that develop a strong network, like WAT!, help to motivate and maintain individual?s physical activity. Walk Across Texas! (WAT!) is an eight-week program to help people of all ages and abilities support one another to establish the habit of regular physical activity. Each team will log miles to virtually walk 832 miles across Texas. WAT! is recognized as a Best Practice Physical Activity Program by the Texas Department of State Health Services.

Results
Results from Walk Across Texas! support the effectiveness of the program to increase and maintain physical activity of participants. Self-reported mileage from various physical activities increased by +4.3 miles from week one compared to week eight for 2018 participants (n = 8,851). Over the lifetime of adult participants in 2018, it is estimated that 2,242 could avoid or delay the onset of diabetes through increased physical activity. The total potential economic impact for the 2018 adult participants who completed the program (n = 9,723) is approximately $196 million dollars. The economic impact of the Walk Across Texas! program is a measure of the net present value of health care cost savings and lost wages for both male and female participants. These

participants, by engaging in regular physical activity, could delay or avoid developing diabetes. Net present value is the sum of the potential discounted health care costs savings and lost wages over each participant's lifetime as a result of program completion in a given year.

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle

Outcome #3

1. Outcome Measures

Number of people reporting knowledge gained through participation in cancer prevention educational activities.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	81

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Increasing access to breast and cervical screening and diagnostic services is a significant need in rural, frontier, underserved and border Texas counties for uninsured women. While mammography screening has improved nationally, women in rural areas are less likely to be screened. Effective screening for breast cancer yields a 30% reduction in mortality for women 50 years and over. However, minority, underserved and low socioeconomic status women have not experienced the same reduction in mortality.

What has been done
AgriLife Extension implemented a peer-led, research-tested intervention to encourage un-/underinsured women in rural, frontier and border counties in Texas to comply with breast and cervical cancer screening guidance. At the end of the two-hour educational event, featuring a clinician as a speaker, patient navigators and relevant providers/resources from the area make appointments for women on-site to follow-up with appropriate screenings.

Results

In follow-up evaluation after the events 98% planned to tell someone about the importance of screening; 100% reported the program was helpful.

4. Associated Knowledge Areas

KA Code	Knowledge Area
723	Hazards to Human Health and Safety
724	Healthy Lifestyle

Outcome #4

1. Outcome Measures

Number of people reporting a willingness to adopt practices through participation in cancer prevention educational programs.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	81

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Women living in rural areas of Texas are less likely than their urban counterparts to have had a mammogram or Papanicolaou (Pap) test within the past two years. Screening and diagnostic services tend to be ?disconnected? and not easy to locate or access in rural Texas, especially for underserved and older women. As a result, women in these rural areas tend to be diagnosed in later stages of breast or cervical cancer, making treatment more difficult and impairing their future quality of life.

What has been done
AgriLife Extension supports delivery of Friend to Friend, an evidence-based program that focuses on encouraging women in rural, frontier, and border counties to get regular mammograms and Pap tests for early detection of breast and cervical cancer when the disease is most curable.

Results

In 2018, AgriLife Extension agents in 2 counties implemented Friend to Friend events to communicate the importance of early detection to the women of their communities. The project served 81 women. In follow-up evaluation after the events 50% of participants signed a commitment card to get a mammogram and/or Pap Test.

4. Associated Knowledge Areas

KA Code	Knowledge Area
723	Hazards to Human Health and Safety
724	Healthy Lifestyle

Outcome #5

1. Outcome Measures

Number of individuals who gain knowledge in Health and Wellness while attending workshops and conferences.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	1056

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

In the U.S, chronic diseases are the main cause of poor health, disability, and death, and account for most of the health-care expenditures. The burden of these illnesses rests on several preventable risk factors: tobacco use, poor diet and physical inactivity (both strongly associated with obesity), excessive alcohol consumption, uncontrolled high blood pressure, and high cholesterol. Promoting a healthy lifestyle is critical to addressing this public health problem.

The prevalence and reduction of chronic illness and disease is the focus of health and wellness programming. Risk factors associated with high blood pressure, high cholesterol, excess weight, high blood sugar, and physical inactivity can lead to major life limitations and death. Leading causes of death are cancer, heart disease, accidents, chronic lung disease, and stroke. Based on race/ethnicity, health issue(s) can be pervasive and systemic. Despite improvements, disparities in mortality rates still exist among racial/ethnic groups. The mortality rates for cancer, heart disease, strokes, and diabetes are the highest among African Americans and Hispanics.

Other comorbidities include cardiovascular disease, overweight/obesity, high cholesterol, and high blood pressure. All of these health issues are exacerbated by poor nutrition, smoking, and inactivity.

What has been done

FCH Specialists conducted workshops, seminars, and training for community members on a variety of health and wellness topics to promote best practice strategies to improve individual and population health in their communities. Moreover, Specialists trained local County Extension Agents on these current issues/trends to help with the implementation of Extension-based programs.

Grimes, Maverick, Washington, and Wharton Counties

Cooking for a Lifetime is a cancer prevention cooking school program presented by the Family and Consumer Science Unit of Prairie View A&M University?s Cooperative Extension Program in the rural south. The Family and Consumer Science Unit of Prairie View A&M University facilitated a research-based program to increase awareness of the importance of cancer screening and prevalence of various types of cancers.

Topics addressed reducing the risk of cancer; who should get screened for breast, cervical and colorectal cancer; and how to get screened. The presentation focused on recipes and recipe tasting. Important information on daily living practices pertaining to nutrition and physical activity was shared.

Travis County

The target group for health and wellness programming is persons with limited resources and at-risk groups affected by health disparities. A total of 99 workshops were conducted with 1,333 participants. Educational programming consisted of a lecture, workshops, annual health fair, and community radio. Health and wellness educational materials were disseminated through these venues. Media outlets include community radio and monthly posts to the Travis County FCH Facebook site.

Results

In 2018, a total of 1,056 participants from 14 Texas counties attended HealthTalk Express workshops designed to raise awareness of chronic disease prevention. Workshops focused on seven topics, including cancer, high blood pressure, high cholesterol, stress management, physical activity, medication safety, and stroke. Evaluations of the workshops revealed participants significantly improved their knowledge concerning all health topics.

Grimes, Maverick, Washington, and Wharton Counties

While around 70% and 85% of age and gender eligible participants were in compliance with their cervical (PAP) and breast (mammogram) cancer screening recommendations, respectively, nearly 30% of women eligible for cervical and more than 13% for breast cancer screening were not in compliance with recommended screening tests. More than 55% of age-eligible participants were not in compliance with FOBT/FIT screening recommendations, and nearly 30% of age-eligible participants were not in compliance with colonoscopy recommendations. Therefore, this program is reaching men and women in Grimes, Maverick, Washington, and Wharton counties who are never or rarely screened for cancer.

Following program attendance, the majority reported they were ?Definitely going to do it? or ?May do it? regarding receiving their required cancer screenings appropriate to age and sex (Table 4). Of those females who were age eligible (21 ? 64 y) for GA BCCP PAP screening services and

responded to whether or not they were likely to get a PAP after the Cancer Cooking School (n = 73), 82.2% said they were ?Definitely going to do it.? Of those females who were age eligible (40 y and older) for mammogram screening services and responded to whether or not they were likely to get a mammogram after the Cancer Cooking School (n = 95), 89.5% said they were ?Definitely going to do it.? Of those who were age eligible (50 y and older) for FOBT/FIT and colonoscopy screening services and responded to whether or not they were likely to get these tests after the Cancer Cooking School (FOBT/FIT: n = 83, Colonoscopy: n = 93), 92.7% said they ?May? or were ?Definitely going to? get an FOBT/FIT test; and 78.5% said they were ?Definitely going to? get a colonoscopy. This program is motivating men and women in Grimes, Maverick, Washington, and Wharton counties to consider getting cancer screenings. Earlier detection through screening can contribute to reduced health care costs as well as improved survival from these cancers.

Travis County
A post-survey was completed by participants (n=420). The survey addressed changes in behavior, whether a doctor had diagnosed specific health issues, and demographic information. The majority of participants are age 60 and above. There is a correlation between disease, family history, ethnicity, physical inactivity, and smoking. Lifestyle choices influence the prevention and management of chronic disease. Whereas diabetes is a serious health issue, the majority of participants reported blood pressure (75%) and cholesterol (55%) as a diagnosed medical condition, followed by overweight/obesity (60%). The majority of participants (88%) have an immediate family member with the health issues addressed in the survey. This is a targeted group because of risk factors for chronic disease and other comorbidities.

4. Associated Knowledge Areas

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

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

Families within the metropolitan area of Houston, Texas are still recovering from Hurricane Harvey, other areas of Texas experienced flooding, limited resource clientele is continuously dealing with underemployment and unemployment.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Results from Walk Across Texas! support the effectiveness of the program to increase and maintain physical activity of participants. Self-reported mileage from various physical activities increased by +4.3 miles from week one compared to week eight for 2018 participants (n = 8,851). Over the lifetime of adult participants in 2018, it is estimated that 2,242 could avoid or delay the onset of diabetes through increased physical activity. The total potential economic impact for the 2018 adult participants who completed the program (n = 9,723) is approximately $196 million dollars. The economic impact of the Walk Across Texas! program is a measure of the net present value of health care cost savings and lost wages for both male and female participants. These participants, by engaging in regular physical activity, could delay or avoid developing diabetes. Net present value is the sum of the potential discounted health care costs savings and lost wages over each participant's lifetime as a result of program completion in a given year.

Participants completing AgriLife Extension's diabetes self-management programs (N = 512) showed statistically significant increases in their behaviors related to dietary and physical activity as well as self-care (p-value = .000 for all behaviors). Moreover, participants reported statistically significant increases in their confidence levels as related to management of both dietary and self-care practices (p-value = .000). Over 57% of participants reported never attending a diabetes education class. Diabetes education results in an estimated cost savings of $8.9 million.

In 2018, a total of 1,056 participants from 14 Texas counties attended HealthTalk Expressworkshops designed to raise awareness of chronic disease prevention. Workshops focused on seven topics, including cancer, high blood pressure, high cholesterol, stress management, physical activity, medication safety, and stroke. Evaluations of the workshops revealed participants significantly improved their knowledge concerning all health topics.

In 2018, AgriLife Extension agents in 2 counties implemented Friend to Friend events to communicate the importance of early cancer detection to the women of their communities. The project served 81 women. In follow-up evaluation after the events, 50% of participants signed a commitment card to get a mammogram and/or Pap Test.

Cooperative Extension Program:

Participants believe nutrition and physical activity are important for health and well-being (98%). The survey addressed the participants' health issue(s). In response to the item, "has your doctor told you:

- 312 of 420 (74%) have high blood pressure
- 251 of 420 (60%) are overweight/obese
- 232 of 420 (55%) have high cholesterol
- 147 of 420 (35%) have diabetes

Respondents report the following changes:

- 415 of 420 (99%) will increase fruit and vegetable consumption
- 413 of 420 (98%) will pay attention to portion size
- 413 of 420 (98%) are aware of the effects of stress
- 403 of 420 (96%) will increase their physical activity
- 397 of 420 (94%) are more aware of chronic disease prevention through nutrition and physical activity

Completed evaluations were analyzed to assess the intention to engage in recommended physical activity and nutrition behaviors to prevent cancer. Participants were asked how likely they were to do the behavior before the Cancer Cooking School and now how likely they were to do it after attending the Cancer Cooking School. There were significant improvements in the likelihood of engaging in nutrition and physical activity guidelines

following the program. There were significant ($p < 0.001$) improvements in the likelihood of engaging in all nutrition and physical activity guidelines following the program. For example, most participants indicated they were more likely to be physically active, achieve and maintain a healthy weight, choose whole grains, and limit red and avoid processed meat following the program. This program is motivating individuals in Grimes, Maverick, Washington, and Wharton counties to eat healthier and be more physically active to prevent cancer and promote health.

Key Items of Evaluation

Increase knowledge and behavior change of being examined for cancer.
The importance of incorporating a healthy diet and physical activity in their daily lives
Weight Management
Diabetes and obesity management

V(A). Planned Program (Summary)

Program # 10

1. Name of the Planned Program

Childhood Obesity

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
703	Nutrition Education and Behavior	50%	50%	0%	50%
724	Healthy Lifestyle	50%	50%	100%	50%
	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	3.0	8.0	1.0	2.0
Actual Paid	1.0	8.0	1.0	1.0
Actual Volunteer	0.0	1430.0	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**
17010	589392	1173	185235
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
17010	225653	69327	76256
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
130687	0	468319	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

AgriLife Extension
Balancing Food & Play

The curriculum contains three elements: lesson plans, take-home reading assignments, and student journals.
* Twenty lesson plans address physical activity, MyPlate, making healthy choices, and goal setting.
* The lessons incorporate higher-level thinking and learning skills (i.e., opportunities to design games, commercials, menus).
* Eight take-home reading assignments and parent letters encourage family engagement by providing the opportunity for shared family discussions.
* The reading assignments follow a fictional family as they learn about nutrition and physical activity, set goals, and learn to make healthy choices.
* Each student receives a 41-page journal. The journal allows opportunities for reflective learning and goal setting.
* The program evaluation includes child surveys regarding knowledge and behavior.

Extension Online Nutrition Training
Child care providers have access to numerous online trainings focused child nutrition.

Walk Across Texas! (WAT!) Youth Component
The youth component of Walk Across Texas! is designed to help support and establish the habit of regular physical activity in students and young people. Youth teams, with support from school staff and parents, have a goal to virtually walk 832 miles across Texas. Youth teams combine and report their mileage during the eight-week program on the Walk Across Texas! website (http://walkacrosstexas.tamu.edu/). Progress is tracked on the website and can be compared to other youth teams within the school, district, and / or state.

AgriLife Research
Research is conducted in collaboration with State and Federal Women, Infant and Children Program leaders to provide data and programs to improve the dietary habits of children and their parents or caregivers. Research also involves native American populations and the school lunch program.

Cooperative Extension Program and Cooperative Agricultural Research Center
The Cooperative Extension Program provides a series of educational programs designed to equip parents with better meal preparation skills and persons coping with and at risk for chronic illnesses. Education programs are provided through a series of nutrition education workshops and programs to special interest groups, on-site food demonstrations, educational displays, fact sheets, newsletters and social media (FaceBook). Parents and caregivers learn the importance of balancing meals based upon MyPlate guidelines and implementing physical activity.

2. Brief description of the target audience

AgriLife Extension
Balancing Food & Play
Third grade students in Texas Schools

Extension OnLine Nutrition Training
Childcare providers, parents and other interested adults.

WAT Youth Component
Youth in Texas Schools

AgriLife Research

Parents and others who care for children, school lunch program administrators, and native Americans.

Cooperative Extension Program and Cooperative Agricultural Research Center
Minority families and individuals
Senior adults
Single parents
Secondary education and college students
Persons coping with and at risk for chronic illnesses

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	485073	21328	33096	0

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

Patent Applications Submitted

Year:	2018
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	4	3	7

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of group educational methods conducted.

Year	Actual

2018	1377

Output #2

Output Measure

- # of classes/workshops addressing nutrition and health.
  Not reporting on this Output for this Annual Report

Output #3

Output Measure

- # research-related projects

Year	Actual
2018	3

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	The percent of youth that reported engaging daily in 60 minutes or more of physical activity. (National Indicator Outcome 2,1d)
2	Percentage increase the number of children reporting decreased sweetened beverage intake. (National Indicator Outcome 1,2c)
3	The percent of youth that reported increasing their physical activity and/or reducing sedentary. (National Indicator Outcome 2,1c)
4	Number of participants who understand and use My Plate in meal buying and preparation, become aware of diet related diseases, understand the connection between diet and exercise, increase consumption of fruits and vegetables.
5	Number of participants modify recipes to decrease amount of calorie and adopt healthy eating habits.
6	Number of miles logged by youth WAT participants.

Outcome #1

1. Outcome Measures

The percent of youth that reported engaging daily in 60 minutes or more of physical activity. (National Indicator Outcome 2,1d)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	74

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Lifestyle behaviors associated with obesity include spending too much time sedentary and getting too little physical activity. The 2018 State of Obesity Report indicates that in Texas 21% of youth ages 10-17 are overweight or obese and only 23.8% of youth participate in 60 minutes of physical activity every day. As overweight or obese adults, these children will face higher healthcare costs and lower quality of life than their healthful weight peers.

What has been done
The Balancing Food & Play curriculum was designed to improve knowledge and behaviors related to encouraging at least 60 minutes of physical activity each day. Moreover, AgriLife Extension continues to support the implementation of the Walk Across Texas! program with youth audiences throughout Texas.

Results
At the completion of Balancing Food & Play, of which 638 students participated from 13 Texas counties, students were more likely to correctly identify food and physical activity best practice recommendations. Self-reported student behaviors related to physical activity improved during the time that Balancing Food & Play was taught. The percentage of students who reported getting at least 60 minutes of daily physical activity increased from 46 percent to 74 percent. In addition, youth in 54 Texas counties participated in the WAT! program. Over 30,000 youth participated on 786 youth teams. Collectively, these youth teams logged over 1.2 million miles.

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle

Outcome #2

1. Outcome Measures

Percentage increase the number of children reporting decreased sweetened beverage intake. (National Indicator Outcome 1,2c)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	27

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Children are vulnerable to the deleterious consequences of excessive weight and the adoption of poor behaviors. Obesity and overweight often track into adulthood as do poor behavior choices learned or reinforced during childhood. Research indicates that U.S. youth consume an average of 7.3% of their total daily calories from sugar-sweetened beverages. As overweight or obese adults, these children will face higher healthcare costs and lower quality of life than their healthful weight peers. Therefore, educating children on nutrition with the intent to reinforce positive lifestyles and the adoption of healthy behaviors can help prevent or slow the tendency toward unwanted weight gain.

What has been done
The Balancing Food & Play curriculum was designed to improve knowledge and behaviors related to limiting consumption of sugar sweetened beverages. In 2018, 638 students completed the curriculum from 13 Texas counties.

Results
At the completion of Balancing Food & Play, students were more likely to correctly identify food and physical activity best practice recommendations. Self-reported student behaviors related to soda consumption improved during the time that Balancing Food & Play was taught. The percentage of students who reported drinking soda almost never or never increased from 33 percent to 42 percent.

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle

Outcome #3

1. Outcome Measures

The percent of youth that reported increasing their physical activity and/or reducing sedentary. (National Indicator Outcome 2,1c)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	90

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Lifestyle behaviors associated with obesity include spending too much time sedentary and getting too little physical activity. The 2018 State of Obesity Report indicates that in Texas 21% of youth ages 10-17 are overweight or obese and only 23.8% of youth participate in 60 minutes of physical activity every day. As overweight or obese adults, these children will face higher healthcare costs and lower quality of life than their healthful weight peers.

What has been done
The Balancing Food & Play curriculum was designed to improve knowledge and behaviors related to encouraging at least 60 minutes of physical activity each day, and limiting screen time to two hours or less per day.

Results
At the completion of Balancing Food & Play, students were more likely to correctly identify food and physical activity best practice recommendations. Self-reported student behaviors related to physical activity and screen time improved during the time that Balancing Food & Play was taught. The percentage of students who reported getting at least 60 minutes of daily physical activity increased from 46 percent to 74 percent; and limiting screen time to 2 hours or less increased from 75 percent to 90 percent.

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle

Outcome #4

1. **Outcome Measures**

Number of participants who understand and use My Plate in meal buying and preparation, become aware of diet related diseases, understand the connection between diet and exercise, increase consumption of fruits and vegetables.

Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

Number of participants modify recipes to decrease amount of calorie and adopt healthy eating habits.

2. **Associated Institution Types**

- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	2967

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Texas citizens, living in rural or urban areas, are socially disadvantaged or low income and are experiencing problems with diet-related illnesses such as diabetes, hypertension and elevated cholesterol levels. Children who are food insecure are living in areas where access to retail venues in their communities to purchase healthy foods is limited; such as supermarkets, has been associated with a lower quality diet and increased risk of obesity. Having a balanced diet to include fruits, vegetables, and controlling portion sizes are steps to preventing and managing obesity-related diseases including diabetes, hypertension, cancer and heart disease. Unfortunately, nearly two out of three (64.5%) of U.S. adults are overweight or obese. Overweight and obese individuals are at increased risk for the healthcare issues previously mentioned.

What has been done
The Cooperative Extension Program and the Cooperative Agricultural Research Center have worked collaboratively to introduce medicinal vegetables into the diets of limited resource citizens. A demonstration with approximately 350 African American and Hispanic audiences attended a presentation using a variety of greens such as Kale, Collards, and Mustards were presented and showed differences in preparation and presentation. Individuals were showed how they could

make chips that were nutritious and tasty. The team provided information on these products and the agents passed out samples for participants to sample. Instead of taking over the counter appetite suppressants, Bottle Gourd and Bitter Melon (Momordica charantia L) was introduced as a method of juicing, cooking, and eating raw.

Results

Working with the Cooperative Agriculture Research Center (CARC) and gathering information to share with the underserved and underrepresented audiences in Texas has proved to be beneficial for participant?s health improvements. The success of incorporating Bitter Gourd in the Diet has been evident in reducing the A1C Levels of one participant from an 11.0 to a 4.0. This participant continues to see success, and he has lost over 60 pounds. His success has inspired other coworkers to implement these vegetables into their everyday diet. Another individual has also seen a decrease in her A1C Level as well. These successes were accomplished by juicing the Bitter Gourd and incorporating it in their diet daily.

4. Associated Knowledge Areas

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

Outcome #6

1. Outcome Measures

Number of miles logged by youth WAT participants.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	1246260

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

According to the most recent available data, Texas ranks 7th as the state with the highest rates of childhood obesity (10- to 17- year olds). The high rates of childhood obesity are a concern because of its link to negative health outcomes. Incorporating more moderate to vigorous activity in youth has been shown to improve fitness, weight, and school performance.
https://stateofobesity.org/states/tx/
https://activelivingresearch.org/blog/2015/01/infographic-active-kids-learn-better

What has been done

In response to the issue, Texas A&M AgriLife Extension Service has continued to support the implementation of Walk Across Texas! in youth audiences across the State of Texas. Local County Extension Agents have partnered with schools and other youth audiences to implement the WAT! program using a variety of best practice approaches. While each program is different, the overall goal is the same, to establish the habit of physical activity in youth.

Results

In 2018, youth in 54 Texas counties participated in the WAT! program. Over 30,000 youth participated on 786 youth teams. Collectively, these youth teams logged over 1.2 million miles.

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

Any of a number of factors could affect the implementation, and subsequent number of participants, of the three programs such as changes in politics, priorities, and/or policy. For example, the Texas legislature cut funding for the Texas A&M AgriLife Extension Service; this could result in fewer county educators to provide leadership at the local level. Likewise a change in either national, state or administrative priorities or policy could divert resources from child obesity programming.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Balancing Food and Play

During 2018, Texas A&M AgriLife Extension Service agents in 13 counties recruited local third grade classroom teachers to participate in this program. They received permission to implement this school-enrichment program, and 638 students completed the curriculum. To date, over 5,200 teacher manuals and 3,118 student journal masters have been downloaded from the website (http://balance.tamu.edu).

At the completion of Balancing Food & Play, students were more likely to correctly identify food and physical activity best practice recommendations.

Self-reported student behaviors related to physical activity, soda consumption, and screen time - all of which are associated with obesity - improved during the time thatBalancing Food &Playwas taught. The percentage of students who reported:

- getting at least 60 minutes of daily physical activity increased from 46 percent to 74 percent;
- drinking soda almost never or never increased from 33 percent to 42 percent; and
- limiting daily screen time to 2 hours or less increased from 75 percent to 90 percent

Cooperative Extension Program:
Evaluation results indicated that 85% of those individuals were enrolled in one or more Food Assistance Programs showed improvement in one or more food resource management practices (i.e. cook dinner at home, compare food prices, plan meals before shopping, look in refrigerator or cupboard before shopping, or make a list before shopping). 93% (490 of 526) of participants showed improvement in one or more diet quality indicators (i.e. eating fruits, vegetables, red and orange vegetables, dark green vegetables, drinking less regular soda (not diet), drinking less fruit punch, fruit drinks, sweet tea, or sports drinks, and cooking dinner at home). 82% (430 or 525) of participants showed improvement in one or more physical activity behaviors (i.e. exercising for at least 30 minutes, doing workouts to build and strengthen muscles, or making small changes to be more active).

Key Items of Evaluation

In 2018, youth in 54 Texas counties participated in the WAT! program. Over 30,000 youth participated on 786 youth teams. Collectively, these youth teams logged over 1.2 million miles. Meal Planning, making a grocery list, incorporating fruits and vegetables, drinking less sugary drinks.

V(A). Planned Program (Summary)

Program # 11

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
502	New and Improved Food Products	0%	25%	0%	50%
701	Nutrient Composition of Food	0%	10%	0%	20%
703	Nutrition Education and Behavior	50%	50%	50%	10%
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	50%	15%	50%	20%
	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	5.0	4.0	3.0	8.0
Actual Paid	12.2	4.0	0.0	8.0
Actual Volunteer	0.0	573.0	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**
207528	294695	0	1481879
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
207528	112827	0	610048
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
1594377	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

AgriLife Extension

During 2018, 9 new County Extension Agents for Family and Community Health were be trained to become instructors for the Food Protection Management Program, enabling them to offer the Certified Food Manager and the Food Handler programs. Additional training was provided/identified so that existing instructors (n=80) could maintain their instructor qualification status per Agency guidelines. The program was implemented in counties across the state that have a County Extension Agent who is able to teach the program. Program materials for the Certified Food Manager program were available in both English and Spanish. Food Handler programs were offered face-to-face in both English and Spanish and online in English, Spanish, and Mandarin.

The Certified Food Manager (CFM) course was evaluated by assessing the pass rate on the CFM exam. The food handler's course was evaluated by assessing change in knowledge (pre vs. post).

Cooperative Extension Program and Cooperative Agricultural Research Center

This program provides technical and educational information to the underserved and underrepresented families to help them understand the importance of food safety. These education programs educate audiences on the relationship between basic sanitation practices when handling food, reduce waste, conserve nutrition and prevent foodborne illness. Cooperative Extension Program agents and the specialist got trained to become instructors for the Food Protection Management Program as well as being ServSafe certified.
Cooperative Agricultural Research Center (CARC) Carried out summer workshops for: 1) Research Extension Apprentice Program; 2) Ag Discovery Summer Program; and 3) 4-H Program. Supported workshop on providing information for Goat Producers. Supported workshop on Food Safety focused on fruits and vegetables.
CARC continued development of instrumentation in the Food Quality Laboratory to analyze foods for physical and chemical characteristics including 1) Water Activity 2) Color 3) Moisture Content 4) pH 5) Brix;6) Rheology/Viscosity 7) milk protein, fat, and moisture content. Continued development of a food sensory and rheology laboratory. Development of Food Microbiology Laboratory using molecular analytical techniques for extracting, and measuring DNA and RNA to determine microbial load and speciation in food and nonfood products.

2. Brief description of the target audience

AgriLife Extension

Individuals who are employed in the retail food service industry. This includes cooks, managers, and owners who are affiliated with foodservice establishments including restaurants, school food service, bed and breakfasts, prisons, and other establishments that prepare and serve food to individuals.

Cooperative Extension Program and Cooperative Agricultural Research Center

Minority families and individuals
Senior adults
Single parents
Persons coping with and at risk for chronic illnesses
Youth

The primarily targeted audience is the underserved population living in the surrounding counties and the Northwest Houston Corridor. This population is dominated by Hispanics and African - Americans. Also, this area has been designated by the State of Texas as Prairie View A&M University's service area.

3. How was eXtension used?

FACT Sheets were used by CEP from eXtension to provide limited resource clientele additional food safety information.

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	9846	31086	12162	0

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

Patent Applications Submitted

Year:	2018
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	2	8	10

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of group educational sessions conducted.

Year	Actual
2018	1137

Output #2

Output Measure

- Number of research-related projects.

Year	Actual

2018	6

Output #3

Output Measure

- Number of on site demonstrations for adults and youth.

Year	Actual
2018	6

Output #4

Output Measure

- Number of research workshops/presentations.

Year	Actual
2018	10

Output #5

Output Measure

- Number of graduate/undergraduate students involved in research projects.

Year	Actual
2018	5

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Percentage increase in knowledge as a result of completing the food handler's course.
2	FPM Pass/Fail Rate - percentage of participants who pass the DSHS Certified Food Manager exam on the first attempt. (National Indicator Outcome 3,2)
3	Number of new and different value-added caprine products added to the food base and accepted by the target audience.
4	Number of limited resource clientele who adopts safer food handling practices.
5	Number of limited resource clientele who gain knowledge on the handling and availability of value added fruit & vegetable.

Outcome #1

1. Outcome Measures

Percentage increase in knowledge as a result of completing the food handler's course.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	17

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Each year the Centers for Disease Control and Prevention (CDC) estimate that 1 in 6 Americans (48 million) will become sick from a foodborne illness. Foodborne disease is a costly problem and more than half of all foodborne illnesses are attributed to improper handling of food prepared away from home. Because almost half of our food dollars is spent on food prepared outside the home, food safety is a top concern among consumers. Therefore, food safety education is a critical prevention component for reducing the risk for foodborne diseases.

What has been done
The food handler?s program was offered in 88 counties across the state. This 2-hour program is targeted towards front-line food service workers and focuses on reducing cross contamination and time/temperature abuse as well as personal hygiene. At the county level, the food handler?s program is offered in both English and Spanish. In addition, the food handler's program is available on-line (http://foodsafety.tamu.edu/courses/food-handlers-course/) and is available in English, Spanish and Mandarin.

Results
In 2018, 11,187 individuals completed the food handler's program either in a classroom format (n=5,645) or via on-line (n=5,542) education. Program evaluations from those completing the program face-to-face demonstrated a statistically significant increase in food safety knowledge (average score was 75 pre vs. 88 post). We also noted a significant change in knowledge among those participants who completed the course via online (average score pre was 75 vs. post average of 85).

4. Associated Knowledge Areas

KA Code	Knowledge Area

712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #2

1. Outcome Measures

FPM Pass/Fail Rate - percentage of participants who pass the DSHS Certified Food Manager exam on the first attempt. (National Indicator Outcome 3,2)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	77

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Each year the Centers for Disease Control and Prevention (CDC) estimate that 1 in 6 Americans (48 million) will become sick from a foodborne illness. Foodborne disease is a costly problem. More than half of all foodborne illnesses are attributed to improper handling of food prepared away from home. Because almost half of our food dollars is spent on food prepared outside the home, food safety is a top concern among consumers. Therefore, food safety education is a critical prevention component for reducing the risk for foodborne diseases

What has been done
The certified food manager program is offered in a classroom format with hands-on activities that reinforce important concepts such as personal hygiene, handwashing, time/temperature control, food preparation and storage, and pest control. This program prepares individuals to take a national certified food manager exam (offered by the National Restaurant Association and/or Prometric). Passing a national CFM exam is required in order for one to have the CFM credential.

Results
In 2018, 490 individuals across the state completed the certified food manager program. Subject material was delivered by trained Extension Agents using lecture, group discussion, and interactive, hands-on activities.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

712 Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #3

1. Outcome Measures

Number of new and different value-added caprine products added to the food base and accepted by the target audience.

2. Associated Institution Types

- 1890 Research

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)

Interest in goat milk and meat continues to increase in Texas due to the changing demographics of persons ethnic groups that consume goat-based products and by consumers who are looking for foods to improve their overall health status. Our research efforts continue to focus on the health benefits of consuming goat milk; specifically functional lipids present in goat milk such as essential omega-3 fatty acids and other functional lipid-based compounds. These components have health benefits in the diet for the prevention of chronic diseases including cardiovascular disease, inflammatory diseases, and neurological disorders. Moreover, goat milk proteins, caseins, bind strongly to carotenoids make them good candidates for the development of nutraceutical foods and beverages. The carotenoids in human body function as biological antioxidants, shielding cells from the destructive effects of free radicals, especially the highly reactive unpaired oxygen atoms.

What has been done

Following research studies conducted
A. The fatty acid profile of goat milk with supplementation of fish oil in the diet.
B.Effects of caprine casein on the chemical stability of alpha-tocopherol in sunflower oil-in-water emulsions.
C.Synergism between exogenous lactoferrin and dietary Hibiscus sabdariffa extract in the prevention of mastitis in dairy goats
D.Goat Meat Research
E.Effect of Cover Crops and Organic Amendments on the Microbial content of Plants and Soils
F.Physio-Chemical Analysis of Fruits and Vegetables Grown on the Prairie View A&M University Farm

Results

The level of fish oil supplementation used in this study did not significantly impact the polyunsaturated fatty acids content of goat milk, suggesting that higher levels of encapsulated fish oil may be required in the diet of goats to increase the level of polyunsaturated fatty acids in milk.

Sunflower oil-in-water emulsion stabilized with bovine casein or caprine caseins type I and type II, alpha-tocopherol, and resveratrol was prepared. The chemical stability of alpha-tocopherol increased significantly ($P<0.05$) in emulsions with caprine caseins types I and II compared to bovine casein.

The potential synergistic effects of lactoferrin (Lf) and Hibiscus sabdariffa extract (HSE) on biomarkers of inflammation in clinical mastitis in dairy goats was studied. Twenty dairy goats were randomly allocated to 4 treatments with 5 goats/group. A significant reduction ($P<0. 05$) in IL-6level was observed in the C + Lf group and C + HSE + Lf group compared with C group and C + HSE group. The intake of HSE decreased ($P<0. 05$) plasma MCP-1 concentrations. These results revealed that HSE-fed goats treated with exogenous Lf exhibited a synergist effect by inducing the reduction of certain pro-inflammatory cytokines as an indicator of the reduction of mastitis in dairy goats.

Efforts to understand how to enhance the growth of the goat meat industry for providing a specialty meat product to the increasingly diverse communities here in the State of Texas and to increase profitability to the goat meat producers in the State. A study was carried out to evaluate the production of marketing of goat meat in the major urban markets in the State of Texas, and to develop a meat quality laboratory to evaluate the quality of goat meat grown by producers.

Results using new microbial analysis techniques.show that amendments have an impact on the level of DNA extracted from the soil and leaves which is an indication that microbial growth is increased. The next step is to carry out speciation analysis to determine what species of microorganisms are present in the soil and the leaves.

To enhance our understanding of the safety and quality of the fruits and vegetables grown on the Prairie View A&M University Farm, a variety of physiochemical tests are carried out on these commodities to assist in the direction of the research in breeding and cultivation research. These efforts have yielded procedures for analyzing these commodities for color, moisture, pH, soluble solids and chlorophyll content that provide such direction and give direction for future post-harvest storage and product development efforts.

4. Associated Knowledge Areas

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

Outcome #4

1. Outcome Measures

Number of limited resource clientele who adopts safer food handling practices.

2. Associated Institution Types

- 1890 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)
Each year, an estimated 1 in 6 people become ill from the food they eat. Common symptoms of the foodborne disease include nausea, vomiting, diarrhea, abdominal cramping, fever, and headache. While some people may view this as a mere case of food poisoning foodborne illness has serious health and economic consequences. Foodborne illnesses from five pathogens alone (Campylobacter, Salmonella, Listeria monocytogenes, E. coli O157:H7, and E. coli non-O157:H7 STEC) cost more than $6.9 billion in medical expenses, lost productivity, and even death. All of us are at risk for foodborne illness, but older adults, pregnant women, young children, individuals with chronic disease, and those with a compromised immune system are at an increased risk. Because nearly half of our food dollars are spent on foods eaten away from home, it is imperative that employees who work in retail food service handle food safely. Food quality and safety involve purchasing, preparing, and storing food using procedures that prevent the spread of bacteria and reduce the risk of foodborne illness. Every year more than 76 million people get sick from food poisoning. County Health Department provides food handler training for food service employees. Extension provides all clients with proper food handling procedures, teaching the effectiveness of personal hygiene, preparing food properly, and storing food properly allows clients to handle food safely and can prevent contamination which causes foodborne illness.

What has been done
The Health Coordinator and Extension agents became certified and in Food Protection Management courses to educate limited resource clientele and business on proper food safety. Over 30 students became ServSafe Certified due to the Health Coordinator conducting the test. Students now had this certification upon graduation. Education programs were conducted throughout 19 Texas counties with youth and adults. Education programs were conducted in schools, churches, schools, restaurants; daycares, and community outreach organizations.

Results
Within Harris County, Food safety workshops were conducted with limited resource participants at risk for foodborne illnesses. Food safety topics include food safety basics (clean, separate, cook, chill), hand washing, shopping for food safety, reading dates on food labels, food safety and eating out, food safety myths, food safety storage, and care of reusable bags. A total of 527 individuals participated in these workshops. 79% (415 of 527 participants showed improvement in one or more food safety practices (i.e., washing hands before preparing food, washing all items and surfaces after cutting raw meat or seafood, not thawing frozen food at room temperature, or using a meat thermometer).

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

Outcome #5

1. Outcome Measures

Number of limited resource clientele who gain knowledge on the handling and availability of value added fruit & vegetable.

2. Associated Institution Types

- 1890 Extension
- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	1435

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The Dietary Guidelines is a critical tool for professionals to help Americans make healthy choices in their daily lives to help prevent chronic disease and enjoy a healthy diet. It serves as the evidence-based foundation for nutrition education materials that are developed by the Federal Government for the public. Fruits and vegetables provide health benefits and are important for the prevention of illnesses. Fruits and vegetables contain a variety of nutrients including vitamins, minerals, and antioxidants. Eating the recommended amount of fruits and vegetables each day can reduce the risk of chronic diseases. Properly storing fruits and vegetable is important within the shelf life and washing properly for insects and chemicals.

What has been done

The Cooperative Extension Program Specialist has partnered with the Cooperative Agriculture Research Center to introduce fruits and vegetables into the American Diet in a unique way. Education programs have been conducted using Collard Greens, Mustard Greens, and Kale as chips; Sorel, strawberries, cucumbers were all introduced as beverages. Finally, bitter melon was introduced in baked, stir-fried, and as a beverage

Results

As a result of these demonstrations, limited resource farmers can grow these products and sell to different audiences, and the underserved and underrepresented clientele are consuming traditional and nontraditional fruits and vegetables differently in their diet. The clientele has stated that they are not cooking their greens with a lot of pork, but they are baking chips for snacks, cooking their greens healthier with a variety of cooking oils and using different meat to prepare their cooked greens.

4. Associated Knowledge Areas

KA Code	Knowledge Area
502	New and Improved Food Products
701	Nutrient Composition of Food
703	Nutrition Education and Behavior
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Government Regulations
- Competing Public priorities

Brief Explanation

Pass rate for 2018 is higher than previously reported (67%) and is slightly higher than previously reported nationally. Factors influencing the pass rate include food safety knowledge/skills of the participants, food service experience, and level of education. Language barriers of participants are an issue where we only have English-speaking instructors. Literacy issues can also influence the pass rate.

Individuals may not be able to attend a series of classes due to lack of transportation, lack of family support, and personnel changes at sites.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Evaluation of the CFM program is based on customer satisfaction (how well participants liked the program and were satisfied with the instructor) as well as the pass-rate on the CFM exam. Customer satisfaction continues to be high in spite of a lower-than-anticipated pass rate on the CFM exam. For the food handler's program, we distribute a pre and post survey to assess change in food safety knowledge. The pre-survey is given right before the start of the program and the post-survey is administered immediately after the program has been completed.

Behavior change in preparing fruits and vegetables. Increase knowledge of incorporating fruits and vegetables into the diet.

Key Items of Evaluation

Fruit and vegetable consumption.
Family mealtime and food preparation.
Food safety.

V(A). Planned Program (Summary)

Program # 12

1. Name of the Planned Program

Global Food Security and Hunger

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
703	Nutrition Education and Behavior	40%	0%	100%	0%
704	Nutrition and Hunger in the Population	20%	0%	0%	0%
801	Individual and Family Resource Management	40%	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	30.0	1.0	2.0	0.0
Actual Paid	47.7	0.0	6.4	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**
811399	0	200950	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
811399	0	238649	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
6233751	0	459074	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

AgriLife Extension and Cooperative Extension Program

Nutrition education will be conducted using a variety of methods including group, individual, media, and newsletters. Group methods will either be single education events that focus on a very specific concept/behavior (e.g. washing fresh produce to reduce the risk of a foodborne illness) or a series of lessons that focus on broader concepts such as label reading or food resource management. Networking with agencies and organizations to expand outreach and identify new audiences will also occur.

Basic gardening programs will be offered to individuals who are interested in learning how to grow their own vegetables and fruits. In three counties, we have developed 18 community gardens that people can work to improve their access to vegetables and fruits. We anticipate expanding the number of gardens slightly and focusing on backyard gardening to help participants reach this goal.

AgriLife Research

Research will be conducted in Africa, Latin America and the Middle East in cooperation with the Gates Foundation, Howard G. Buffett Foundation, local extension services, local universities, Texas Department of Agriculture, Department of Defense and USAID. Examples of planned activities include the Texas Israeli Exchange, Iraq Trade and Development, and the Kurdistan Initiative.

2. Brief description of the target audience

AgriLife Extension and Cooperative Extension Program

The target audience for the Better Living for Texans program is SNAP recipients and applicants. However, Texas has been granted waivers by USDA/FNS that allow us to extend our program to other limited resource audiences. These audiences include: women receiving WIC benefits, children attending schools in which 50% or more of the children receive free or reduce meals; children and parents in Head Start programs; individuals receiving food at a food bank or food pantry; children who participate in the Summer Food Service Program; and individuals living in census tracks where 50% or more of the population is at 130% of the poverty level or below.

AgriLife Research

Target audiences include the United Nations, governments and non-governmental organizations in Africa, Latin America and the Middle East.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	206262	194037	523110	0

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

Patent Applications Submitted

Year:	2018
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	0	54	54

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of group educational sessions conducted.

Year	Actual
2018	20276

Output #2

Output Measure

- # research-related projects

Year	Actual
2018	27

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Minimum amount of monthly out-of-pocket food expenses reported saved by program participants.
2	# of producers adopting best management practices on sustainable agriculture.
3	# eligible SNAP-ED participants who report an increase in accessibility of fresh fruits and vegetables from community gardens.
4	BLT participants who enroll in Walk Across Texas will increase the number of miles walked by 15% at the end of the 8 week program.
5	The percentage of participants who shop with a list "always" or "sometimes" will increase by 20%.
6	BLT participants will report an increase in vegetable and fruit consumption by at least ½ cup total.
7	The percentage increase of participants who shop with a list all of the time or most of the time.
8	BLT participants will increase the number of days they are physically active for at least 30 minutes.
9	The percentage of participants who report filling ½ of their plate with vegetables and fruits will increase.

Outcome #1

1. Outcome Measures

Minimum amount of monthly out-of-pocket food expenses reported saved by program participants.

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

# of producers adopting best management practices on sustainable agriculture.

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

eligible SNAP-ED participants who report an increase in accessibility of fresh fruits and vegetables from community gardens.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	84

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Low-income individuals and families often have diets that are less nutritious compared to those with higher incomes. The consumption of vegetables and fruits tends to be less than what is currently recommended in both low and higher income households. Although SNAP can help increase one's ability to purchase healthy foods, those healthy foods have to be within reach. Nearly every county in Texas has one or more food deserts, defined as a community where healthy foods are high in cost and limited in availability. Compared to more affluent communities, those that are underserved often face limited access to vegetables and fruits, especially those of the fresh variety.

What has been done

The Growing and Nourishing Healthy Communities program aims to increase the availability of healthy foods, specially fresh produce, through the use of community gardens. This program teaches participants how to grow their own produce. To participate in the program, individuals must (1) qualify for SNAP benefits; (2) have an interest in learning how to grow vegetables; (3) agree to help build and maintain the community gardens; and (4) complete a series of educational classes to increase their gardening skills.

Results

In 2018, 695 participants from 21 counties enrolled in the program, maintained 34 community gardens, and grew more than 10,000 pounds of vegetables with support from Extension educators and Master Gardeners. Locations of the gardens varied but were in areas accessible to the participants. Extension educators taught the gardening class series, which included topics such as how to select the right garden location, planting and watering techniques, controlling insects, and composting. As produce was harvested, participants learned how to prepare it through hands-on food demonstrations. Pre and post-surveys indicate participants had an increase in gardening knowledge, as well as an increase in the availability of vegetables and fruits in the home. The percent of participants who reported serving vegetables at meals often or almost always at rose from 64% (pre) to 84% (post). In addition, the percent of participants serving fruit for dessert often or almost always. Often or almost always also rose from 38% (pre) to 64% (post). In addition, more participants reported having cut-up vegetables in the refrigerator for family members to eat often or almost always after the program ended compared to when it began (38% reported pre; 65% were doing so post).

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population
801	Individual and Family Resource Management

Outcome #4

1. Outcome Measures

BLT participants who enroll in Walk Across Texas will increase the number of miles walked by 15% at the end of the 8 week program.

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

The percentage of participants who shop with a list "always" or "sometimes" will increase by 20%.

Not Reporting on this Outcome Measure

Outcome #6

1. Outcome Measures

BLT participants will report an increase in vegetable and fruit consumption by at least ½ cup total.

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

The percentage increase of participants who shop with a list all of the time or most of the time.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	80

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
An estimated 1 out of 7 Texas households face the challenge of food insecurity. Studies show that individuals who are food insecure have poor diet quality and may be at a higher risk for chronic disease (compared to those who are food secure). Adopting sound food resource management practices (which include shopping with a list) can help low-income households manage/stretch their food (and food dollars), avoid impulse buys, and reduce food waste.

What has been done
BLT participants who completed the Fresh Start to a Healthier You! Series which consists of a minimum of three sessions that integrate the importance of healthy nutrition with an emphasis on increasing fruit and vegetable intake, physical activity, food safety, and food resource management. Food demonstrations, recipes, and hand-on activities engage the participants on improving cooking and kitchen skills. In this program, participants learned about food resource management practices that can help them stretch their food dollars. These practices include planning a meal in advance, comparing prices, and shopping with a grocery list.

Results
More than 13,000 low-income adults in 69 counties across Texas completed A Fresh Start to a Healthier You program series in 2018. Of those who completed the pre, post and follow-up

surveys, most (84%) were female and nearly half (49%) identified themselves as Hispanic. Average age of participants was 53 years with a mean household size of 3. In a sample of 4,770 of those adults who completed the pre, post and follow-up surveys the percentage who reported shopping with a list all of the time or most of the time was 49% when the program began. Immediately after the program ended, 69% reported intent to do so. Approximately one month after the program ended, 80% reported doing so.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population
801	Individual and Family Resource Management

Outcome #8

1. Outcome Measures

BLT participants will increase the number of days they are physically active for at least 30 minutes.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
According to the Centers for Disease Control and Prevention, 30% of adults in Texas engage in no leisure physical activity; only 18% achieve current recommendations for aerobic and muscle strengthening activities. An estimated 30% and 38% of Texas adolescents are active daily and participate in daily physical education, respectively. Because of the documented benefits of regular physical activity, helping sedentary individuals adopt the habit of regular physical activity can be beneficial in improving health and reducing the risk of chronic disease.

What has been done
During the 2018 program year, the Walk N Talk program was implemented in 39 counties throughout Texas. This program enhances AgriLife Extension Service?s Walk Across Texas! (WAT!) program which is recognized as a Best Practice Physical Activity Program by the Texas Department of State Health Services. The eight-week program is designed to promote a

physically active lifestyle and healthy eating by increasing fruit and vegetable consumption. Participants meet once a week for a physical activity session and are encouraged to be physically active on the other days outside of the class. During the weekly physical activity session, participants engage in a discussion led by the educator on a fruit or vegetable, the health benefits, nutritional content, and a recipe of the highlighted fruit or vegetable, which may include a taste sampling of the recipe. Evaluation data was assessed with pre and post surveys.

Results

During 2018 1,256 individuals completed the Walk and Talk program. Participants were mainly female (85%); 43% were Hispanic. Average age of participants was 55 years.
Participants identified positive behavior changes in fruit and vegetable consumption and physical activity. The percent of respondents who consumed fruit two or more times per day increased from 49% (pre) to 65% (post) when the program ended. When eating fruit, more participants ate about one or more cups at the end of the program as compared to when the program began (46 percent of participants pre vs. 61 percent post). Participants also reported improvement in consuming vegetables two or more times per day (55 percent of participants pre vs. 67 percent post). Each time they ate vegetables, more participants ate about one or more cups (49 percent of participants pre vs. 63 percent post). The number of days respondents were physically active for 30 minutes or more increased from four days a week (pre) to over five days a week (post) over the course of the program.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population
801	Individual and Family Resource Management

Outcome #9

1. Outcome Measures

The percentage of participants who report filling ½ of their plate with vegetables and fruits will increase.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	66

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

USDA guidelines (MyPlate) recommend that individuals fill half of their plate with vegetables and fruits. A 2015 study commissioned by the Produce for Better Health Foundation found that per capita fruit and vegetable consumption has declined by 7% over the past 5 years. Most of this is fueled from declining vegetable consumption as well as lower fruit juice intake. Helping individuals increase their vegetable and fruit consumption can help promote health and reduce the risk for chronic disease among all citizens, especially those who are low-income (the target audience for BLT).

What has been done

During 2018, more than 13,000 adults completed the Fresh Start to a Healthier You! program series, which has an emphasis on improving vegetable and fruit consumption.

Results

In a survey of 4,770 adults who completed the series, the percentage who reported filling half of their plates with vegetables and fruit rose from 38% (beginning of the program) to 57% immediately after the program ended. Thirty days later, 66% were following this behavior.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population
801	Individual and Family Resource Management

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

Brief Explanation

Increasing activity continues to be a challenge but there are a number of external factors that impact the extent to which the target audience can be physically activity. These factors include weather as well as a lack of a safe place to be physically active. Time constrains (or perceived lack of time) can also be a factor, especially if individuals are working multiple jobs. With respect to our community garden program, weather, pests and having enough participants tend to the gardens impact the amount of produce harvested. Produce is also eaten by wild animals and may be picked (but not reported) by community members.

For other BLT programs, factors that impact participation include language barriers (although our programs are offered in English and Spanish) and lack of transportation or child care.

Ability to adopt targeted behaviors are not only influenced by knowledge but also environmental, social, and policy-related factors.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Individuals who enrolled in a program series were invited to complete a survey which assessed the extent to which they were following targeted behaviors. At the end of the series, participants were surveyed again to learn their intent to practice the targeted behaviors. Approximately 30 days later, participants for one of the programs, A Fresh Start to a Healthier You!were contacted and surveyed again to learn the extent to which the targeted behaviors were being followed. This allowed us to gauge intent to change behavior as well as the actual adoption of targeted behaviors. For the Growing and Nourishing Healthy Communitiesprogram, we utilize a pre and post survey but also measure the amount of fresh produce harvested. Walk Across Texasparticipants tracked weekly miles walked and also reported vegetable and fruit consumption.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 13

1. Name of the Planned Program

Fostering Strong Families

☑ 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
801	Individual and Family Resource Management	50%	50%	0%	0%
802	Human Development and Family Well-Being	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	20.0	8.5	0.0	0.0
Actual Paid	8.3	8.0	0.0	0.0
Actual Volunteer	0.0	689.0	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**
141187	589395	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
141187	225651	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
1084699	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

AgriLife Extension

Parenting and Dependent Care Programs

AgriLife Extension's Family and Community Health (FCH) unit is committed to providing educational programs to support and strengthen Texas families. In the areas of parenting, child care, and dependent care, Extension offers a wide range of programs and resources to citizens across the state. Programs and resources include train-the-trainer workshops for professionals and volunteers, multi-session parent education workshops, 1-2 hour lectures, and internet resources (e.g., online child care courses, fact sheets, research briefs, trend data, links to websites), and newsletters.

Family Financial Management Programs

AgriLife Extension's Family and Community Health Unit promotes the implementation of educational programs that strengthen the financial well-being of individuals and families. A variety of educational resources and programs are provided through local level programming by county Extension educators. These include multi-session workshop series, classroom presentations, simulation activities, and online resources. Curricula and learning activities include the Wi$eUp Financial Planning series and the Welcome to the Real World Financial Simulation Activity.

Cooperative Extension Program

The Cooperative Extension Program provides a series of educational programs designed to equip parents with better meal preparation skills and persons coping with and at risk for chronic illnesses. Education programs are provided through a series of nutrition educational workshops and programs to special interest groups, on-site food demonstrations, educational displays, fact sheets, newsletters and social media (FaceBook). Parents and caregivers learn the importance of balancing meals based upon MyPlate guidelines and implementing the physical activity.

AgriLife Extension and Cooperative Extension Program

Passenger Safety Programs

County Extension agents and law enforcement officers trained and certified as child passenger safety technicians will conduct child safety seat checkup events in under-served rural areas of Texas. In addition, child safety seat fitting stations have been established at county Extension offices and fire/EMS departments to allow families additional access to certified technicians. When needed, a replacement seat is issued at no charge to parents and caregivers at checkup events and fitting stations.

2. Brief description of the target audience

AgriLife Extension

Parenting and Dependent Care Programs

Target audiences for child care programming include adults and teens providing care for preschool and school-age children in family, center and school-aged settings. Target dependent care audiences include adults and teens providing care for adults and children who are unable to provide some portion of care for themselves due to illness or age-related disabilities. Programs and resources are accessible to target audiences regardless of gender, marital status, family status, race/ethnicity, income level, or educational level. It is estimated that 70% of this audience falls under the category of "low-income."

Family Financial Management Programs

Money Smart: unbanked, less financially-sophisticated consumers.
Wi$eUp:Generations X and Y, with emphasis on women ages 22-35.
Welcome to the Real World Financial Simulation: high school age youth.

Cooperative Extension Program

Minority families and individuals

Senior adults
Single parents
Limited resource families
College students
Individuals who have experienced job loss
Teen parents

AgriLife Extension and Cooperative Extension Program
Passenger Safety Programs
Under-served residents of rural areas in Texas.

3. How was eXtension used?

FACT Sheets were used by CEP from eXtension to provide limited resource clientele additional life skills information.

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	125978	232325	75635	0

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

Patent Applications Submitted

Year:	2018
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	4	0	4

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of group educational methods conducted.

Year	Actual
2018	7273

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Percentage of child care providers who increase their knowledge of child care best practices as a result of participating in child care provider training's.
2	Percentage of dependent care providers who increase their knowledge of dependent care best practices as a result of participating in depend care training's.
3	Percentage of parents who increase their knowledge of parenting practices as a result of attending parenting training's.
4	Percentage of fathers (father-figures) who increase the amount of time spent reading to their children.
5	Number of participants who increase knowledge on financial management.
6	Number of participants who reduced debt and increased savings.
7	Number of limited resource clientele who gained knowledge about improving their financial stability by reducing debt and increasing savings.
8	Number of car seats incorrectly installed on arrival and number installed correctly after instruction and/or new seat.
9	Number of car seats recommended for replacement for any reason.

Outcome #1

1. Outcome Measures

Percentage of child care providers who increase their knowledge of child care best practices as a result of participating in child care provider training's.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	99

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Sixty-seven percent of children under age 5 receive some form of child care on a regular basis from persons other than their parents. Researchers have found that quality matters when it comes to child care. Children who receive high-quality care develop better language, math, and social skills; exhibit fewer behavior problems; and tend to be better prepared for entrance into school. Evidence indicates that professional preparation (i.e., more formal education and content-specific training in child development) is linked to higher quality care environments for children.

What has been done
In 2018, county Extension agents and their community partners conducted 27 child care conferences reaching 2,183 child care providers and directors. In addition, child care providers and directors completed 649,667 online courses (1,193,695 clock hours).

Results
Results from a 2018 evaluation study with over 2,000 child care providers and directors indicate that 99% of participants acquired new information, plan to utilize the information to improve their programs, and consider themselves better equipped to work with children. A recent evaluation study with more than 100,000 online participants who completed a series of health and safety courses found statistically significant knowledge increases on all courses (75% pre-test average vs. 89% post-test average, $p < .05$). Participants indicate that they are highly satisfied with the courses, with 89% rating them as Very good or Excellent, 97% stating that they learned new information from the courses, and 99% reporting that they would recommend the online courses to others.

4. Associated Knowledge Areas

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

Outcome #2

1. Outcome Measures

Percentage of dependent care providers who increase their knowledge of dependent care best practices as a result of participating in depend care training's.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	96

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Caregiving continues to be an emerging social issue for the State of Texas and the United States. Estimates suggest that Texas has more than 5 million caregivers at any given time during the year, providing more than 3.2 billion hours of care, valued at more than $34 billion. AgriLife Extension?s practical, personal education creates solutions for caregivers, both professional and non-professional, to help ease the burden of their caregiver journey.

What has been done
AgriLife Extension continues to sponsor and/or actively participate in eldercare conferences throughout the state. Conferences exist on a county or multi-county basis, often offering continuing education units to attendees. Additionally, AgriLife Extension offers professional development webinars related to caregiving for participants who cannot leave their caregiving duties for extended periods. These webinars are also converted to online courses for further reach via asynchronous learning.

Results
In 2018, AgriLife Extension caregiving programs reached more than 6,584 educational contacts, providing more than 6,000 contact hours. Specifically, AgriLife Extension provided primary leadership and/or speaker support for caregiving conferences that targeted professionals. AgriLife Extension also conducted online professional development webinars related to caregiving, allowing for synchronous and asynchronous learning: 90% of the total contacts and half of the total hours were online only.

4. Associated Knowledge Areas

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

Outcome #3

1. Outcome Measures

Percentage of parents who increase their knowledge of parenting practices as a result of attending parenting training's.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	87

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Parents? contributions to their children's development are unparalleled, especially during their early childhood years. Research indicates that children who grow up with actively involved and nurturing parents reap numerous benefits, including better school performance, increased self-esteem, healthier relationships with peers, and greater access to financial resources. High-quality parent education programs, according to researchers, can help young parents develop the skills they need to effectively raise their children.

One in five Americans has a mental illness or substance use disorder, yet many are reluctant to seek help or simply don't know where to turn for care. Recognizing mental health and substance use challenges can be difficult, which is why it?s so important for everyone to understand the warning signs and risk factors.

What has been done
The Texas A&M AgriLife Extension Service provides Texas parents with a wide variety of research-based information and resources to assist them in their efforts to raise healthy children. In addition to single-session parenting seminars, AgriLife Extension offers parents, grandparents, and other caregivers the opportunity to participate in face-to-face and online parenting programs designed to increase participants' knowledge of key parenting concepts and to improve parenting practices.

Program Specialist for CEP has been Certified to teach and train staff in Mental Health First Aid. Webb County incorporates Healing Trauma and Yoga for about 230 participants for 6 sessions. Participants have stated that they have overcome fears, let go of the past, and feel happier.

Results
Evaluation results from AgriLife Extension's parenting education programs indicate that they had a very positive effect on parenting practices. Significant behavioral changes from pre to post occurred in the following areas: parent-child communication, parental self-confidence, and parental use of positive disciplinary practices. In addition, parents reported a significant improvement in their children?s behavior after participating in the programs. In addition to the face-to-face parenting courses, statistically significant knowledge gains were achieved by parents on all online courses (N = 5,155). Pre-test average = 77% vs. post-test average = 87%.

Healing Trauma- is a six-week series class explaining the importance of overcoming trauma and how to achieve a healthy mental state of mind. 8 six-week presentations were conducted to approximately 230 participants. 90% of those participants stated that they are doing meditation exercises and learned how to overcome traumatic experiences and some participants learned how to build barriers and have improved their lifestyle through food, gardening, and laughing.

4. Associated Knowledge Areas

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

Outcome #4

1. Outcome Measures

Percentage of fathers (father-figures) who increase the amount of time spent reading to their children.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	44

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Reading aloud to children is a simple, yet powerful, activity that has been shown to improve children's literacy development across a variety of domains. In a recent survey of fathers? involvement in their children?s learning conducted by the National Center for Fathering and the

National Parent Teacher Association, researchers discovered that 39% of fathers never read to their children. It is well established that fathers play a critical role in their children?s development. Fathers who find time to read with their children are taking advantage of one of the best opportunities to care for, connect with, and contribute to their children?s future.

What has been done

Fathers Reading Every Day (FRED) is a family literacy program designed by the Texas A&M AgriLife Extension Service to increase parental involvement in children's early literacy development, with a specific focus on fathers. During the FRED program, fathers and father-figures of young children are presented with research-based information to help them begin daily reading activities with their children. FRED programs are held at public libraries, Head Start centers, elementary schools, churches, child care centers, and AgriLife Extension centers.

Results

In 2018, over 1,300 parents and children completed the FRED program. A survey of adults revealed the following as a result of participating in the program : 44% increased the amount of time they spent with their children, 45% became more involved in their children?s education, 50% indicated that the program helped their children learn to read, and 51% stated that participating in the FRED program helped improve their relationship with their child.

4. Associated Knowledge Areas

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

Outcome #5

1. Outcome Measures

Number of participants who increase knowledge on financial management.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	891

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Effective financial planning and management skills contribute to overall family and financial wellness over the lifespan when financial knowledge and decision-making capability are increased. In today's world, financial education is crucial. However, many young people are leaving high school lacking the fundamentals of financial literacy. Numerous studies conducted on American youths? understanding of basic financial concepts consistently reveal that young people don't possess adequate financial knowledge to be financially proficient in adulthood.

Unemployment and children living in poverty is an issue in most areas of the United States and Texas is included. The ability to manage one's money is a valuable life skill. Learning through trial and error can be very stressful and expensive. Losing your job, being laid off, or having your family income decrease is traumatic. It is not just a loss of income, but also of the security and way of life. The effects of less income can be managed by economizing..

What has been done

AgriLife Extension?s financial management programs include both financial education for adults (Wi$e-Up Financial Planning Workshops) and real-world expenditure decision-making opportunities for youth (Welcome to the Real World) through a two-hour hands-on activity that includes career and money management decision-points in which the student is faced with making budgeting and spending choices that are realistic and challenging within the income limits of an assigned job or career.

Prairie View A&M University/Cooperative Extension Program?s Family & Community Health Agent, in cooperation with the task force/advisory committee, garnered assistance from a diverse group including educators, faith-based congregations, and community volunteers to provide Outreach Programs for 122 youth and/or families from limited resource areas of Dallas County.

Results

After completing the Wi$eUp workshops, over 80% planned to organize their financial files; over 62% intended to set realistic financial goals; over 75% planned to analyze ways in which they can cut spending; over 90% planned to examine their use of credit and reduce overall debt; over 58% planned to establish a set-aside account and over 90% planned to identify ways to reduce expenses and increase savings. Results from Welcome to the Real World showed that 64% of youth increased their knowledge of how to keep track of financial transactions, 68% increased their knowledge of how to create and follow a spending plan, and 49% plan to create and follow a spending plan.

Welcome to the Real World provided forty-five young ladies (Haley Elementary, Irving, TX) with a hands-on experience of what it is like to have a job, career, make financial decisions, and to work in a diverse world with others who think and act differently. Prior to and at end of activity, participants indicated their levels of understanding of the following items:

* How to use a Budget Worksheet
* Difference between WANTS and NEEDS
* Importance of Money
* Connection between Education, Career, & amount of Money earned
* Financial decision-making process

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management
802	Human Development and Family Well-Being

Outcome #6

1. Outcome Measures

Number of participants who reduced debt and increased savings.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	834

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Effective financial planning and management skills contribute to overall family and financial wellness over the lifespan when financial knowledge and decision-making capability are increased. Managing credit and debt effectively avoids financial problems and setting financial savings goals enhances future financial security. Student loan debt can cost young people more than just the principal and interest. It can mean postponing major milestones of adulthood. Nearly half of people aged 18-29 have put off major life events like getting married, purchasing a car or home because of student debt.

What has been done
AgriLife Extension's financial management programs include both financial education for adults and youth. As part of the From the Classroom to the Real World program, students learn in the classroom that saving money can help to become financially secure and provide a safety net in case of an emergency. During the Welcome to the Real World simulation students with careers requiring post-secondary education make a student loan payment equal to the amount required to pay off their student loan in 10 years.

Results
After completing the Wi$eUp workshops, over 75% planned to analyze ways in which they can cut spending; over 90% planned to examine their use of credit and reduce overall debt; over 58% planned to establish a set-aside account and over 90% planned to identify ways to reduce

expenses and increase savings. Results from Welcome to the Real World showed that 54% increased their knowledge of the importance of Paying Yourself First (savings) and 41% intend to make deposits into their savings account on a regular basis. Following the simulation 65% of the students had a better understanding of the effects of student loan debt on your future budget.

4. Associated Knowledge Areas

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

Outcome #7

1. Outcome Measures

Number of limited resource clientele who gained knowledge about improving their financial stability by reducing debt and increasing savings.

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	875

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Limited resource families are continuously challenged with developing financial foals and lowering debt in an effort to enhance family stability and confidence during economic hardship.

What has been done
A variety of experiential learning experiences targeted youth, adults, single-family households, and limited resource families. Educational activities included: simulation workshops, seminars, newsletters, web sites, media, and shopping trips.

Results
Individuals have reduced the amount they are paying on their student loans, and students are taking out less for student loans. After completing documents and working with the Federal Loan Forgiveness Program, tow participants are paying (0) dollars on their student loans, and other amounts were decreased by $500 per month or more. Families are discussing their budgets. Families are reducing their good budget by preparing healthy meals at home and eating out less.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #8

1. Outcome Measures

Number of car seats incorrectly installed on arrival and number installed correctly after instruction and/or new seat.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	1829

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Traffic crashes are one of the leading causes of death for children age 14 and under in 2018. The total annual cost of motor vehicle occupant-related death and injury is $214 million billion for children ages 14 and under. Safety belts and child restraints are the single most effective tool in reducing these deaths and injuries. Unfortunately, in 2017 only about half of the children killed in vehicle crashes in Texas were known to be restrained. Minority children are at a greater risk of being unrestrained. Crash data from the National Highway Transportation Safety Administration shows that in 2017, 1,024 children under 14 were killed in motor vehicle crashes.

What has been done
The Passenger Safety Project is funded through federal funds competitively awarded through the Texas Department of Transportation. Passenger Safety conducts the National Highway Traffic Safety Administration's National Child Passenger Safety Technician Training to certify technicians to assist parents with child safety seat education. In 2018, the project trained 60 participants as certified child passenger safety technicians. To date, 1,051 technicians have been trained, including 197 Extension agents and 265 law enforcement officers. Child safety seat checkup events are primarily conducted in under-served rural areas to educate parents on the correct usage of child safety seats.

Results
The proper use of child safety seats reduces the risk of injury and death, leading to reduced medical costs, avoidance of lost future earnings, and improved quality of life. These economic benefits are an estimated $2,159 per child age 0 to 4 and $2,606 per child age 4 to 7 for new

seats distributed, and $622 per child for seat misuse with an assumed 75% continued use. In 2018, 1,878 safety seats were inspected and 1,354 new seats distributed at no cost to families. The economic benefit is estimated at $2.57 million.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management
802	Human Development and Family Well-Being

Outcome #9

1. Outcome Measures

Number of car seats recommended for replacement for any reason.

2. Associated Institution Types

- 1862 Extension
- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	1354

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Safety belts and child restraints are the single most effective tool in reducing these deaths and injuries. Unfortunately, in 2017 only about half of the children killed in vehicle crashes in Texas were known to be restrained. Minority children are at a greater risk of being unrestrained. Crash data from the National Highway Transportation Safety Administration shows that in 2017, 1,024 children under 14 were killed in motor vehicle crashes.

What has been done
The Passenger Safety Project is funded through federal funds competitively awarded through the Texas Department of Transportation. Passenger Safety conducts the National Highway Traffic Safety Administration?s National Child Passenger Safety Technician Training to certify technicians to assist parents with child safety seat education. In 2018, the project trained 60 participants as certified child passenger safety technicians. To date, 1,051 technicians have been trained, including 197 Extension agents and 265 law enforcement officers. Child safety seat checkup events are primarily conducted in under-served rural areas to educate parents on the correct usage of child safety seats.

Results

The proper use of child safety seats reduces the risk of injury and death, leading to reduced medical costs, avoidance of lost future earnings, and improved quality of life. These economic benefits are an estimated $2,159 per child age 0 to 4 and $2,606 per child age 4 to 7 for new seats distributed, and $622 per child for seat misuse with an assumed 75% continued use. In 2018, 1,878 safety seats were inspected and 1,354 new seats distributed at no cost to families. The economic benefit is estimated at $2.57 million.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management
802	Human Development and Family Well-Being

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Appropriations changes
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

As noted in last year's report, reaching audiences through face-to-face trainings is becoming a greater challenge. Due to various factors (e.g., advances in technology, competition for time, economic issues), audiences appear to be more inclined to participate in online educational events. While participants attending face-to-face events seem to be plateauing or declining, the number of online participants is dramatically increasing. This provides Extension with both opportunities and challenges to meet and exceed goals and objectives. For example, attendees at face-to-face child care provider trainings remained relatively constant (from 1,934 to 2,183), while child care providers completing online trainings increased 47% (from 441,709 to 649,667).

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Child Care

Results from a 2018 evaluation study with over 2,000 child care providers and directors who attended face-to-face training conferences indicate that 99% of participants acquired new information, plan to utilize the information to improve their programs, and consider themselves better equipped to work with children.

The number of child care providers completing online professional development training is increasing dramatically. In 2018, child care providers completed 649,667 online courses (1,193,695 clock hours), which is a 47% increase from 2017. A recent evaluation study with more than 100,000 online participants who completed a series of health and safety courses found statistically significant knowledge increases on all courses (75% pre-test average vs. 89% post-test average, $p < .05$). Participants indicate that they are highly satisfied with the courses, with 89% rating them as "Very good" or "Excellent," 97% stating that they learned new information from the courses, and 99% reporting that they would recommend the

online courses to others.

Child Passenger Safety

The proper use of child safety seats reduces the risk of injury and death, leading to reduced medical costs, avoidance of lost future earnings, and improved quality of life. These economic benefits are an estimated $2,159 per child age 0 to 4 and $2,606 per child age 4 to 7 for new seats distributed, and $622 per child for seat misuse with an assumed 75% continued use. In 2018, 1,878 safety seats were inspected and 1,354 new seats distributed at no cost to families. The economic benefit is estimated at $2.57 million.

Parenting and Dependent Care Providers

Evaluation results from AgriLife Extension's parenting education programs indicate that they had a very positive effect on parenting practices. Significant behavioral changes from pre to post occurred in the following areas: parent-child communication, parental self-confidence, and parental use of positive disciplinary practices. In addition, parents reported a significant improvement in their children's behavior after participating in the programs. In addition to the face-to-face parenting courses, statistically significant knowledge gains were achieved by parents on all online courses (N = 5,155). Pre-test average = 77% vs. post-test average = 87%.

Cooperative Extension Program:

Intent to Change Behavior

The participants stated they Probably Will/Definitely Will adopt the following behaviors:

- RESEARCH college/career before entering High School = 72%
- CHOOSE a career before entering High School = 68%. Note: 24% said this was not applicable to them or they had already chosen a career.

CHALLENGE myself to raise & keep grades as high as possible = 88%

- SHARE/tell others about this "REAL WORLD" program = 84%

Based on the participants' levels of understanding, before and after the intervention activity, the increase in knowledge of:

1. How to use a Budget Worksheet was 29%
2. Financial decision-making process 27%
3. Importance of Money was 25%
4. The connection between Education, Career, & amount of Money earned was 25%
5. Difference between WANTS and NEEDS was 20%

Key Items of Evaluation

Child Care

The number of child care providers completing online professional development training is increasing dramatically. In 2018, child care providers completed 649,667 online courses (1,193,695 clock hours), which is a 47% increase from 2017.

Child Passenger Safety

The proper use of child safety seats reduces the risk of injury and death, leading to reduced medical costs, avoidance of lost future earnings, and improved quality of life. These economic benefits are an estimated $2,159 per child age 0 to 4 and $2,606 per child age 4 to 7 for new seats distributed, and $622 per child for seat misuse with an assumed 75% continued use. In 2018, 1,878 safety seats were inspected and 1,354 new seats distributed at no cost to families. The economic benefit is estimated at $2.57 million.

V(A). Planned Program (Summary)

Program # 14

1. Name of the Planned Program

Life Skills for Youth (includes Character Education and Leadership)

☑ 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
806	Youth Development	100%	100%	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	100.0	10.0	0.0	0.0
Actual Paid	139.6	7.0	0.0	0.0
Actual Volunteer	0.0	134.0	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**
2374660	515719	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
2374660	197447	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
18243851	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

AgriLife Extension

This program is based on five learning experiences, of a minimum of 30 minutes each, tied to the work of the project for which they participate. Each project is experientially focused. Examples of activities include

workshops, demonstrations, and hands-on experiences.

Numerous materials and support is provided by the Texas 4-H faculty to agents and specialists. These items are used for implementation of projects and for professional development of staff. Use of volunteers is significant in enhancing and extending efforts to reach and provide youth with positive experiences.

Cooperative Extension Program
4-H Youth development takes place in 35 Texas counties facilitated by extension agents with the Cooperative Extension Program in partnership with community volunteers and agencies. There are outreach activities such as science experiments and water stream trailer demonstrations as well as literature dissemination at local health fairs and other community events. There is curriculum enrichment provided to youth in schools and afterschool programs in science, healthy living, civic engagement, college readiness, and career exploration. There are community clubs that develop and promote life leadership skills and service to others in partnership with caring adults. There are special interest project clubs in areas such as gardening and robotics. Youth maintain record books and practice in order to participate in contests such as food challenge, photography, robotics and livestock shows on the county, district, state, and national levels. Special events like camps, summits, and project-oriented days are also sponsored. Local Extension websites, blogs, and Facebook were used to promote and highlight program successes

2. Brief description of the target audience

AgriLife Extension
All youth of 4-H age are targeted for programs depending on location, issues identified by the local communities, and programs of interest.

Cooperative Extension Program
Limited-resource youth, ages 5-19, and caring adults in urban and rural communities across 35 Texas counties throughout the State will be targeted for this program. Special recruitment efforts will be marketed to parents, adults and other agencies for support and collaboration to meet expected goals.

3. How was eXtension used?

eXtension was not used in this plan.

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	302275	1104657	609138	0

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

Patent Applications Submitted

Year:	2018
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of group educational sessions conducted.

Year	Actual
2018	106085

Output #2

Output Measure

- # of youth that participate in educational activities and programs.
  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	% of youth who increase knowledge of life skills concepts and practices.
2	% of youth who report they have adopted life skills concepts and practices.
3	% of youth who plan to pursue higher education interest or career interest as a result of their project work.
4	% of youth who report abilities (skills) changed as a result of participation in character education programs.
5	% of 4-H club participants increasing knowledge of leadership skills.
6	% of 4-H club participants applying leadership skills.
7	% increase in limited resource youth more likely to pursue enrollment in post-secondary education.
8	% of limited resource youth aware of or interested in pursuing entrepreneurship, green jobs, and/or STEM careers
9	% of limited resource youth improving science skills.
10	% of limited resource youth adopting behaviors that lead to a healthy lifestyle.
11	% of 4-H club participants increasing knowledge in healthy living
12	% of 4-H club participants changing behaviors for healthier living
13	% of limited resource youth applying citizenship (leadership or services) skills

Outcome #1

1. Outcome Measures

% of youth who increase knowledge of life skills concepts and practices.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	28

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Life skill development is the cornerstone of 4-H. In today?s world, it is critically important that youth have the opportunity to learn critical life skills so that they can be better citizens in the county, state, country, and world. The ones we specifically aim to address through 4-H are responsibility, decision making, respectfulness, team work, respectfulness, and many others.

What has been done
Outcomes are measured at the county, district, regional, and state level. A snapshot of state results is below. These data were derived from over 4,000 youth participating in Texas 4-H Roundup. Through a qualitative assessment, the five most important life skills youth gained from participating were identified and are noted below:
* Self-esteem/confidence
* Teamwork
* Responsibility
* Communication
* Public Speaking and Sportsmanship (tied)
* Decision Making

Results
Below are results from retrospective on-site survey completed by more than 600 4-H members on knowledge and understanding as a result of participating in a 4-H Leadership Lab.
28.3% increased understanding of strengths and things to work on to be a better leader.
23.3% increased understanding of strategies to work with others.
22.7% increased understanding of teamwork.
21.7% increased understanding of responsibilities of being a leader.
21.3% increased understanding of the role of communication in a team setting.

21.3% increased understanding of the importance of goal setting.
20.7% increased knowledge of what makes a good public speaker.
19.7% increased understanding of the importance of cooperation with others when working on a team.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #2

1. Outcome Measures

% of youth who report they have adopted life skills concepts and practices.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	90

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Life skill development is the cornerstone of 4-H. In today's world, it is critically important that youth have the opportunity to learn critical life skills so that they can be better citizens in the county, state, country, and world. The ones we specifically aim to address through 4-H are responsibility, decision making, respectfulness, team work, respectfulness, and many others.

What has been done
4-H programs during the year, aim to teach life skills. Some strategies include 4-H club work, project work, district events, regional programs, summer camps, and statewide impact programs and camps.

Results
Below are results from retrospective on-site survey completed by more than 600 4-H members on changes made as a result of participating in a 4-H Leadership Lab.
90% - more confident working in a team
89.7% - more confident in recognizing leadership qualities
87.3% - more confident in serving in a leadership role

86.5% - more confident in abilities as a leader
81.7% - more confident speaking with others
81.1% - more confident in making decisions
70.7% - more confident with public speaking

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #3

1. Outcome Measures

% of youth who plan to pursue higher education interest or career interest as a result of their project work.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	100

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Career development and workforce development have been a significant priority for the Texas 4-H Youth Development Program. Over the last few years, this has become more of a priority for the program. As youth pursue their personal interests through a variety of 4-H projects, they are also able to explore higher education and career opportunities.

What has been done
Significant effort has been placed on higher education and career exploration through programs like the Texas 4-H Youth Livestock and Equine Ambassador Programs. In 2018, 20 youth ambassadors embarked on an international experience to Argentina where they spent the next 10 days immersed in Argentine culture and expanding their knowledge of international agricultural systems and practices.

Results
Students are continually evaluated as they progress through the ambassador program. In the international and domestic experience, the program the evaluation is intensified. Students are specifically examined on their perceptions of career development, foreign agricultural practices,

understanding cultural differences, higher education, levels of poverty and leadership. Further, each experience requires a ten-page reflection essay to gather qualitative data and divided into themes. The ability to carefully and systematically evaluate the student?s perceptions allow program architects to alter the design of future experiences.

As a result of participating in this activity, youth indicated their agreement with the following statements related to career goals and higher education (based on a 4-point Likert scale):
* Have a clearer understanding of what my career goals are: 3.4
* Met people who will help me in my career: 3.53
* Believe I am more aware of career opportunities in international agriculture: 3.8
* Believe that 4-H will generate more advances for agriculture as they enter the workforce: 3.93
* Explain my involvement in this international experience to show my leadership qualities: 3.87
* Use the skills I gained in this program even if I do not choose a career in international agriculture: 3.73
* Gained perspective on international agricultural job opportunities: 3.8
* Have a more competitive resume: 3.87
* More aware of different degree plan options within my desired university: 3.13
* More prepared for the rigor and challenges of my college career: 3.8
* More interested in an agricultural major: 3.8
* Have an edge over other potential college students because I have already experienced international learning opportunities: 3.87
* Have a greater understanding of international agricultural topics in my college courses: 3.73
* Can offer a more diverse point of view on international topics: 3.87
* Have a more open mindset ot international topics, ideas and teachings: 3.93
* May be more compelled to interact with international students when I am a university student: 3.8
* May be more prepared to network with international peers and professors: 3.8
* May be more willing to participate in study abroad opportunities through my university: 3.93

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #4

1. Outcome Measures

% of youth who report abilities (skills) changed as a result of participation in character education programs.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	100

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
How others are treated, character education, ethical decisions, and anti-bullying are all significant programs in Texas 4-H Youth Development. Currently, this topic is one of the three most important educational content areas the Texas 4-H Program addresses.

What has been done
Focused on quality assurance and character education, Quality Counts is designed to teach young people the importance of displaying good character in carrying out livestock projects, and in every aspect of their lives. Quality Counts helps youth exhibitors learn the importance of using proper livestock management practices so that food quality and safety are preserved.

Results
In 2018, the Quality County Program was refreshed into a new program. To date, more than 40,000 youth have completed the online training and taken the test with a passing score. Results indicate an increase in knowledge of character and ethics when handling 4-H livestock projects, such as handling medication, transportation and ensuring safety, prevention of biosecurity issues and proper food handling practices.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #5

1. Outcome Measures

% of 4-H club participants increasing knowledge of leadership skills.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual

2018 72

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Leadership development happens best locally. Youth leadership programs that are conducted and evaluated locally provide the most meaningful outcomes because this development is happening on-going throughout the year vs one shot camps and statewide programs.

What has been done
To best ascertain leadership development, leadership evaluations are conducted through various programs and experiences. For 2018, leadership was measured through the Texas 4-H Leaders 4 Life program. Throughout the year youth utilize available resources to develop their skills in the areas of public speaking, service learning, and parliamentary procedure by participating in the Leaders 4 Life program.

Results
Through Leaders 4 Life evaluation, youth revealed the following knowledge increases:
75% - five methods of decision-making
72.5% - Different communication strategies
71.1% - 16 motions that are most commonly used on parliamentary procedure
67.5% - how to build an agenda for business meetings
65% - different leadership styles
59% - visioning
59% - precedence and basic rules of motions
55% - strategies to facilitate groups
53.8% - purpose and principles of parliamentary procedure
52.5% - how to determine majority vote and 2/3 vote
50% - roles and duties of officers
48.8% - teamwork
47.5% - importance of goal setting and how to accomplish goals

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #6

1. Outcome Measures

% of 4-H club participants applying leadership skills.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	100

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Leadership development happens best locally. Youth leadership programs that are conducted and evaluated locally provide the most meaningful outcomes because this development is happening ?on-going? throughout the year vs one shot camps and statewide programs.

What has been done
To best ascertain leadership development, leadership evaluations are conducted through various programs and experiences. For 2016, leadership was measured through the Texas 4-H Leaders 4 Life program. Throughout the year youth utilize available resources to develop their skills in the areas of public speaking, service learning, and parliamentary procedure by participating in the Leaders 4 Life program.

Results
Through the Leaders 4 Life Evaluation, youth revealed the following anticipated behavior changes.
* 94.7% know how to be an effective communicator and good listener.
* 94.7% can use creativity too brainstorm and come up with the best solution to a problem.
* 93.9% believe that what they learned has given them the ability to make better leadership decisions.
* 92.1% have developed or improved their teamwork skills.
* 89.5% have set personal goals to help them fulfill their personal vision.
* 86.8% can define leadership and leadership qualities.
* 86.5% know their leadership styles.
* 83.8% can effectively participate in a business meeting using correct parliamentary procedure.
* 83.8% have a personal vision.
* 78.9% have or plan to implement a community service project.
* 78.4% is able to identify and utilize resources to get a task accomplished.
* 71.1% are more confident in serving in a leadership role.
* 64.9% are a better manager of conflict and knows how to apply different management styles to conflict.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #7

1. Outcome Measures

% increase in limited resource youth more likely to pursue enrollment in post-secondary education.

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	132

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
According to Employment Opportunities for College Graduates in Food, Agriculture, Natural Resources, and the Environment (USDA, 2015), there will be an increase in job opportunities for food, agriculture, renewable natural resources, and environment graduates in STEM areas. However, of the anticipated 57,900 annual average job openings, only 61% of available positions are filled by new graduates in the areas of food, agriculture, natural resources, and the environment (USDA, 2015).

What has been done
To address the issue of preparing young people for college and particularly majoring in food and agriculture, several programs were conducted at Prairie View A&M University. College Prep 101 Workshop Series provided information on ways high school students can begin to get ready prepare for college to 83 youth participants and parents from several counties throughout the state. There were 49 participants in grades 8 through 10 from across Texas involved in a residential college preparatory program to learn about STEM careers related to space exploration in the 2018 Youth Lab program funded by the USDA. The San Antonio Livestock Exposition (S.A.L.E.) awarded five (5) scholarships for program participants.

Results
As a result of the College Prep 101 Workshop Series, 97% of participants surveyed agreed they (or their child) were more likely to apply and attend a college or university. One participant stated they learned "going to college is worth it and not a waste of time.? As a result of the Youth Lab summer program, there was an increase in the percentage of youth participants with an awareness of STEM college majors. Furthermore, participants being aware of STEM college majors and career pathways increased from 90% to 97%. Since the conclusion of the program, BlackEngineer.com has highlighted Youth Lab. Youth who are more likely to enroll in higher education result in increased wage earners that contribute to the economic stability of their

communities. There were five 4-H participants that were awarded $75,000 in scholarship money. Those five students are now enrolled as undergraduates at Prairie View A&M University.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #8

1. Outcome Measures

% of limited resource youth aware of or interested in pursuing entrepreneurship, green jobs, and/or STEM careers

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	4292

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The National 4-H Science mission mandate is designed to address the following: unsolved worldwide social problems, a shortage of scientists and people understanding science in the United States of America, underrepresentation of women and minorities in science careers, a need for a more diverse pool of trained scientists to frame and solve problems and educate others. The general population in the USA lacks a basic understanding of scientific methods and content
(science literacy)(4-H Science Logic Model, 2010). Employment trends in the 21st century are in Science, Technology, Engineering, and Math (STEM) careers and green jobs as indicated by the Workforce Investment Act. Even 27% of agriculture employment opportunities will be in STEM by 2020, according to the United States Department of Agriculture (2015).

What has been done

There were 4292 youth from Cameron, Cass, Tarrant, Travis, and Waller Counties who participated in robotics, National Youth Science Day Code Your World, photography, and water education STEM programs aimed at increasing awareness of and/or interest in STEM careers. A delegation of 11 youth attended Tomorrows Agricultural Annual Professional Symposium High School Program. A Career Spotlight event introducing 50 youth and young adults to internships

and potential employers such as Elanco, Monsanto, and Texas Parks and Wildlife Department was held on campus. In addition, there were college preparation residential and day camps hosted at the university.

Results
A sample of participants was surveyed. Results indicate that 85% (n=298) stated that they strongly agree/agree with being interested or aware in entrepreneurship, green jobs, and/or STEM careers. For Youth Leadership Lab, specifically, there was an increase in the percentage of youth participants exposed to careers in space science and STEM careers. Based on an estimated 45 respondents youth participants made aware of space science careers increased from 49% to 95%. Also, the youth participants who were made aware of careers in STEM increased from 88% to 92%. Additionally, these programs contribute to the development of human capital by providing career awareness, which creates a long-term economic impact on historically underrepresented and underserved youth.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #9

1. Outcome Measures

% of limited resource youth improving science skills.

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	4071

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Employment trends in the 21st century are in Science, Technology, Engineering, and Math (STEM) careers and green jobs as indicated by the Workforce Investment Act. Unfortunately, findings from the first report of the STEM Workforce Data Project confirm that there have persistently not been enough people to fill these positions in the United States, called the skill gap

or broken worker pipeline. So even though unemployment is extremely high, these positions remain vacant.

What has been done
There was 4071 youth reached with hands-on STEM activities in five counties (Cameron, Cass, Tarrant, Travis, and Waller). Activities or programs included robotics, National Youth Science Day Code Your World, photography, Egg to Chick poultry science, gardening, and water education aimed to improve their science skills

Results
A sample of participants was surveyed. Findings indicate that 85% (n=267) evaluated, strongly agreed and/or agreed that their science skills improved.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #10

1. Outcome Measures

% of limited resource youth adopting behaviors that lead to a healthy lifestyle.

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	3354

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
According to Feeding America, data from 2011 indicate that Texas (at 18.5%) is among the top three food insecure states in the nation. Twenty-two percent of Texas children under age eighteen are food insecure the highest rate of any state in the country. Texas is also ranked seventh in the nation with a child obesity rate of 20.4 percent. According to the 2011 Youth Risk Behavior Survey, conducted by the Centers for Disease Control and Prevention, Texas youth continue to engage in behaviors that do not contribute to a healthy lifestyle.

What has been done

TThe Heroes 4-Health program included 106 teen ambassadors who received training, helped facilitate six lesson as well as community outreach. This program reached 3,354 youth from ten counties. The curriculum used is Choose Health: Food, Fun, and Fitness. This is supplemented by Junior Master Gardener, Yoga 4 Kids and Learn! Grow! Eat & Go! Curriculum. Youth participated in Food Challenge and Walk Across Texas. Community events such as garden and health fairs were also key program components with outreach efforts resulting in an additional 1,037 contacts.

Results

There were Healthy Living Common Measure surveys administered as part of the Youth Voice: Youth Choice Healthy Living programs. Results indicate that 99% (n=106) of teen ambassadors and 87% (n=3,350) of participants in grades 3-12 learned of healthy food choices. Ninety percent of teen ambassadors and 82% percent of participants (n=3,350) pay attention to how much water they drink each day and 72% pay attention to how much fruit they consume each day. Ninety-one percent of teen ambassadors and 86% of participants have given their families ideas for healthy meals and snacks. Eighty-seven percent of teen ambassadors compared to 69% of participants eat breakfast every day or most days.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #11

1. Outcome Measures

% of 4-H club participants increasing knowledge in healthy living

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 percentage of the food budget spent on away-from-home food has increased steadily since the 1960s, which, consequently, consists of larger portions, higher calories and costs. This trend, coupled with the childhood obesity epidemic, reveals a need to teach youth nutrition and how to prepare healthy, nutritious meals and snacks. Through the 4-H food and nutrition project, youth focus on nutrition, food purchasing, food preparation, cooking skills, food safety, and related career opportunities.

What has been done

The 4-H Food & Nutrition Project has historically been one of the most popular projects offered by the Texas 4-H Youth Development Program. Through learning experiences, youth gain knowledge and skills related to nutrition, menu planning, food preparation, healthy substitutions, and food safety. Leadership experiences, such as the Healthy Texas Youth Ambassador Program also equips youth leaders with knowledge and skills to expand the reach of Extension and serve as positive examples and educators on healthy living.

Results

Grow into Health was implemented in Texas counties. The program utilized Extension Assistants to educate youth in an 8-week, school-based intervention held during their regular scheduled physical activity class period. During the four years of implementation, 7,053 students completed the course lessons which included:

* My Plate taught the importance of eating a balanced diet.
* H20 is the Way to Go educated students on benefits of water and hydration.
* Fruits & Veggies Matter encouraged eating a variety of produce in a rainbow of colors.
* Heart Health helped students understand the importance of aerobic and non-aerobic exercise.
* Label Lingo Taught students to identify and understand parts of the nutrition facts label and how to incorporate into healthy eating.
* SMART Fitness taught students about physical activity, but more importantly about goal setting.

Annually, pre and post assessments were administered. A sampling has been analyzed with the following results found:

?Overall, a reduction in the amount of time spent on screen time away from school.
?Outdoor activity for more than 30 minutes increased by 27 percent.
?An increase in the consumption of green and red/orange vegetables, as well as fruits, has also been seen.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #12

1. Outcome Measures

% of 4-H club participants changing behaviors for healthier living

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	90

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The percentage of the food budget spent on away-from-home food has increased steadily since the 1960s, which, consequently, consists of larger portions, higher calories and costs. This trend, coupled with the childhood obesity epidemic, reveals a need to teach youth nutrition and how to prepare healthy, nutritious meals and snacks. Through the 4-H food and nutrition project, youth focus on nutrition, food purchasing, food preparation, cooking skills, food safety, and related career opportunities.

What has been done
The 4-H Food & Nutrition Project has historically been one of the most popular projects offered by the Texas 4-H Youth Development Program. Through learning experiences, youth gain knowledge and skills related to nutrition, menu planning, food preparation, healthy substitutions, and food safety.

Leadership experiences, such as the Healthy Texas Youth Ambassador Program also equips youth leaders with knowledge and skills to expand the reach of Extension and serve as positive examples and educators on healthy living.

Results
Direct survey results from the Building Healthy Youth to Build a Healthy Texas summits indicated that over 90 percent of the youth responding (n=83) would utilize the training materials provided to provide education to others. More specifically, youth found training in youth health trends, nutrition, and increasing physical activity most beneficial. Youth indicated via short answer questions that learning facts and statistics gave them an insight to the health issues facing today?s youth.

Training provided to Healthy Texas Youth Ambassadors has fueled the motivation of these youth to improve the health of others. Since June, Healthy Texas Youth Ambassadors have logged over 2900 hours into the online reporting system; additionally, those reporting indicated they have reached over 17,000 Texas via educational programs, social media platforms, health fairs, or one-on-one contacts. Continued monitoring and evaluation of the program will occur.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #13

1. Outcome Measures

% of limited resource youth applying citizenship (leadership or services) skills

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	1428

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Since its inception, 4-H has emphasized the importance of young people being engaged, well-informed citizens. The core areas of citizenship are civic engagement, service, civic education, and leadership. The opportunity to value and practice service has been identified as one of the eight essential elements of positive youth development. Giving back to others in meaningful ways helps to learn about themselves as well as gain exposure to the larger community.

What has been done

There were 1428 youth who applied leadership skills, provided service to their communities, and improved in decision-making after receiving educational series. The Youth Voice: Youth Choice healthy living programs mobilized directly 106 underserved youth ambassadors to provide leadership and take action around nutritional deficiencies, healthy food choices, and physical activity in ten counties. There were 20 national and 60 state delegates to leadership conferences including National 4-H Conference, National 4-H Congress, and National Youth Summit on Healthy Living, State Healthy Living Summit and Tomorrow?s Agriculture Professional Symposium High School program). Youth participated in photography, robotics, goat judging, plant, talent, water Quizbowl, record book and food contests on the county, district, and state level. Travis, Cass, and Grimes county 4-H?ers also served their communities. For example, 4-H youth put on giveaway events (Thanksgiving turkeys, 500 backpacks/coloring books, donated food from a drive). They also shared their time and talents with nursing home residents (hosting Valentine?s and Christmas events as well as donating blankets they made).

Results

Peer teaching, hands-on activities, and contests allow youth to demonstrate how their project has improved their confidence, motivation, decision-making, communication, and problem-solving skills. For peer educators, 97% (n=106) agree they have had a chance to be a leader and 96% agree they had a chance to teach what they learned. For youth participating in an educational series, 100% (n=31) of youth in Cass County and 92% (n= 36) in Tarrant County improved their leadership skills. More than 15 participants received Best in Show or Grand Champion awards. One example is David and Ryan, brothers who have participated in goat programs through the International Goat Research Center and 4-H. They?ve both had success showing their animals at various competitions across the state. Ryan?s goat was Grand Champion in the senior alpine division at the West Texas Fair and State Fair of Texas in addition to winning Best Udder and Best in Breed. David?s goat won Grand Champion in the junior alpine division at the State Fair of Texas. Their experience with the goat program has had an everlasting effect on the family. ?The scholarship has completely changed our lives. Now we have a full dairy herd and a license with the state to sell our milk,? said Byers. She added, since her sons are among the few students in Hamilton County to raise dairy goats, they have influenced other farmers to do the same. The family?s dedication to raising animals has allowed them to assist other farmers and host workshops focused on showmanship and animal care, in Hamilton County.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Appropriations changes
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

See outcome summaries

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 15

1. Name of the Planned Program

Adult Leadership and Volunteer 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
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	40%	0%	0%	0%
806	Youth Development	60%	100%	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	20.0	11.0	0.0	0.0
Actual Paid	15.7	6.0	0.0	0.0
Actual Volunteer	0.0	428.0	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**
267064	442045	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
267064	169240	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
2051780	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

AgriLife Extension
The following activities will be used to implement this program:

*Provide training for Extension professionals on the ISOTURE volunteer management model and key concepts related to volunteer administration.

*Provide training and guidance to Extension specialists in the role and support of program development related to volunteerism.

*Provide orientation and training directly to volunteers in preparation for their service resulting in a positive experience.

Cooperative Extension Program
There has been training provided by and to 4-H staff, adult leaders, and youth ambassadors. They have traveled to national and state conferences to develop in alignment with the 2017 Practical Research, Knowledge and Competencies for 4-H Agents and the Volunteer Research, Knowledge, and Competencies. They also benefitted from a number of local and virtual trainings. Trainings for adult and youth volunteer leaders took place in counties across Texas and on campus. These include 4-H, project, curriculum enrichment, and grant trainings.

2. Brief description of the target audience

AgriLife Extension
The following groups are included in the target audience for this program:

* Youth and adult volunteers who have a need or interest in a Texas Extension program.
* Extension educators
* Youth and adults who have an interest in community development and partnerships.

Cooperative Extension Program The target audience includes partnering with underserved youth, families, and community organizations to recruit and train volunteers. One recent challenge posed by NIFA's former Director of Youth & 4-H has been to combine professional and volunteer development. Additional audiences that will be targeted include Extension faculty, young professionals, students, and the unemployed who may be limited-resourced or commit to serve those who are.

3. How was eXtension used?

One 4-H agent attended the eXtension National Impact Collaborative with a group of colleagues.

V(E). Planned Program (Outputs)

1. Standard output measures

2018	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	188726	924382	392098	0

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

Patent Applications Submitted

Year:	2018
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2018	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # group educational sessions conducted.

Year	Actual
2018	98724

Output #2

Output Measure

- # of volunteers and staff that participate in professional /volunteer leadership development and service-learning.

Year	Actual
2018	215

Output #3

Output Measure

- # of community service and service-learning hours provided by volunteers and participants.

Year	Actual
2018	23

Output #4

Output Measure

- # service or volunteer hours.

Year	Actual
2018	1853

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	% of participants who report an increased knowledge of leadership development practices.
2	% of participants who plan to or adopt leadership development practices.
3	% positive attitude toward serving others as volunteers.

Outcome #1

1. Outcome Measures

% of participants who report an increased knowledge of leadership development practices.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Leadership has been a long-standing issue for both youth and adults. It is important for young people to develop and gain leadership life skills in order to grow into successful, contributing members of society in adulthood. When developing volunteers, we are also developing leaders, who in turn then help develop youth into leaders.

What has been done
In 2018, more than 10,000 Master volunteers and more than 20,000 4-H Volunteers assisted in implementing educational programs on behalf of the Texas A&M AgriLife Extension Service and extended the reach of Extension?s programs to local communities.

Results
Participants of leadership and volunteer development programs indicated an increase in knowledge as it relates to teamwork, personal strengths, responsibilities of being a leader, importance of cooperation with others, goal setting, the role of communication, and strategies to work with others.

4. Associated Knowledge Areas

KA Code	Knowledge Area
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
806	Youth Development

Outcome #2

1. Outcome Measures

% of participants who plan to or adopt leadership development practices.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	45

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
There is a strong need to develop and maintain sustainable communities using appropriate community and economic development tools and programs. One educational response is to develop adults and youth in counties to be leaders of tomorrow. It is the responsibility of AgriLife Extension and the 4-H Youth Development Program to provide volunteers with high-quality, educational opportunities and resources so they are best equipped to lead programs. These adult volunteer experiences are provided face-to-face and through online training and development.

What has been done
Leadership development programs have been implemented in a variety of ways for youth and adults. Adult leadership development programs were held for community members and Extension volunteers focused on various subject matters to learn about leadership, gain skills needed to serve in community leadership positions and acquire knowledge of community and economic development.

Results
Participants of the various volunteer and leadership development programs offered by Extension reveal that they plan to adopt practices when serving in a leadership role and feel more confident serving in a leadership role. Specific evaluation results also revealed:
* 28% increase in ability to provide a safe environment for youth.
* 45% increase in ability to serve in a volunteer/coach role.
* 45% ability to provide youth development practices in youth programming.

4. Associated Knowledge Areas

KA Code	Knowledge Area
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
806	Youth Development

Outcome #3

1. Outcome Measures

% positive attitude toward serving others as volunteers.

2. Associated Institution Types

- 1890 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2018	400

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The opportunity to value and practice service has been identified as one of the eight essential elements of positive youth development. It is also a critical component for successful volunteer recruitment and retention. Giving back to others in meaningful ways helps youth and adult leaders learn about themselves as well as gain exposure to the larger community.

What has been done
There has been training provided by and to 4-H staff, adult leaders, and youth ambassadors. The 4-H staff developed professionally through National Extension Association of 4-H Agents, Texas Association of Extension 4-H Agents, Texas Extension Specialist Association, State 4-H Program Leaders Meeting, Southern Region Program Leadership Network, Southern Region and 1890 Urban Extension Conference, eXtension National Impact Collaborative, and the 1890 Leadership Academy. They also benefitted from a number of local and virtual trainings.

There were thirty trainings offered for over 294 adult and 106 youth volunteer leaders in 10 counties and on campus. These include advisory committee and civil rights training, orientation to 4-H/Extension, 4-H database enrollment, club (manager/officer/chartering), record book, financial management trainings. Project trainings include archery certification, career awareness, clothing & textiles, entrepreneurship, goat judging, photography, robotics, and sausage making. Specific program trainings included Duds to Dazzle, Growing U, Heroes 4-Health, Path to Plate, and Youth Leadership. Additionally, teens had opportunities to develop at the National 4-H

Conference, National 4-H Congress, National Youth Summit on Healthy Living, as well as a number of state and local training opportunities.

Results

A small sample of volunteers involved in the robotics project in Cameron and El Paso Counties had positive attitudes toward serving others. Of those surveyed, 100% (n=7) were completely or mostly satisfied as an extension volunteer in their first year. They indicated they were involved in challenging work had the opportunity to apply knowledge and skills, and have been empowered to fulfill their volunteer responsibilities. One volunteer reported, ?It has enriched my purposed to serve our youth as well as our community.? They then requested additional training in all projects offered by 4-H ?to help staff lessen their workloads.? A teacher who volunteers remarked, ?I get to see my students excited about robotics and engineering.? A third volunteer reported, ?It has reinforced my ability to empower minority students to work on meaningful projects.? Another said that although they began helping so that their son could experience this ?awesome? program, they now hope ?to give this experience to children who otherwise wouldn?t have the opportunity.? There were 4-H Scholarship recipients who volunteered at Prairie View A&M University. They assisted with events such as college days for youth and Future Farmers of America career/leadership development events. They also volunteered at the rodeo in San Antonio in efforts that raise scholarship money for other youth.

4. Associated Knowledge Areas

KA Code	Knowledge Area
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
806	Youth Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

See outcome summaries

Key Items of Evaluation

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.