2019 Annual Report of Accomplishments and Results

Texas
Texas A&M AgriLife Extension Service (Texas A&M University)
Texas A&M AgriLife Research (Texas A&M University)
Prairie View A&M University Cooperative Extension Program
Prairie View A&M University Cooperative Agricultural Research Center

I. Report Overview

The NIFA reviewer will refer to the executive summary submitted in your Plan of Work. Use this space to provide updates to your state or institutions as needed.

1. Executive Summary (Optional)

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

The College was in transition during 2019 as a result of new leadership, including the appointment of a new Dean and Director of Land Grant Programs in summer 2018, which is the fifth dean or interim dean of this College over 10 years. Later that year, a new Fiscal Director was appointed, also a long unfilled vacancy.

The hallmark of the Cooperative Extension Program illuminates how county outreach educators bring evidence-based science and modern technologies to meet the social, economic, physical, and emotional needs of the underserved and underrepresented families. Farmers, consumers, youth, and families. Stakeholder groups and other local decision-makers' input is critical in identifying relevant issues while meeting local, state, and federal priorities.

To address childhood obesity, extension agents from 14 Texas counties participated in the Heroes 4-Health grant program. Extension agents trained 89 youth health ambassadors, which resulted in reaching 3194 youth. Survey results of 83% of the youth surveyed indicated that they learned the importance of selecting healthy food choices. To connect youth interests and talents to school success, 120 youth were involved in a Common Measures grant funded by the National 4-H Council. Results from Igniting Sparks indicated that 88% of youth considered 4-H as a place where they get to figure things out for themselves. The leadership development data cited that 65% set goals for themselves. The Family & Community Health agents conducted over 350 education workshops to over 3,500 clienteles using Diabetes Education Awareness and Prevention (DEAP), Balance Living, and A Taste of African American Heritage curriculums.

Additionally, Choose Health Food Fun and Fitness, Step Up, and Scale Down and Eat Smart Being Active sessions enrolled 8,239 adults and children. Evaluation data revealed that 91% showed improvement in eating more fruits and vegetables and consuming less sweetened beverages. Food Safety interactive series enrolled 2,340 participants. Over 2,450 parents attended sessions relative to Active Parenting, Teen Parenting, and Financial Management. Eighty-nine percent of parents cited that they communicate more effectively with their Welcome to the Real World provided 528 youth with experiential learning experiences in budgeting regarding careers, career, housing, transportation, grocery and food purchases, insurance while working in a diverse workforce. Survey data showed that 83% made the connection to education, career choices, and monthly salary. Mental Health First Aid workshops taught 750 skills for dealing with stress and resources available in their communities.

Rural and urban farmers and producers attended 38 in-depth educational programs that focused on Livestock Production Management, Sustainable Agriculture, and Small Farm Outreach Programs implemented by the Agriculture & Natural Resources staff. The 2501 Project offered six information events throughout six counties, and 48 landowners applied for Micro Loans valued at more than 1 million dollars. More than 700 feral hogs have been captured with 20 traps built by farmers, ranchers, and homeowners. Survey data implied that 93% adopted new practices, 96% increased their skill level in feral swine prevention, and 100% would participate in more feral swine educational programs. The Community & Economic Development staff provided 174 workshops and 2,485 hours consulting entrepreneurs with business planning, loan packaging and review, business marketing, and small business resource availability. These outreach efforts resulted in 68 new businesses established, 85 non-profit businesses assisted $20,119,273 in loans approved and $1,015,800 in grants approved. Youth entrepreneurship programs and activities reached 677 youth with information to begin or expand their business plans. The Business in Development (BID) nine-week series was implemented in Harris, El Paso, Jefferson, Willacy, and Zavala counties and data cited: 145 participants completed the series, 27 New HUBs were certified, 11 of 23 contracts were approved totaling $2, 479,734. A partnership with the General Land Office of Texas assisted 35 homeowners affected by disasters. Staff throughout the state helped 70 individuals receive $213,277 in 504 funding to rehab homes for families and seniors. The CED team collaborated with the PVAMU College of Business and Family & Community Health unit to assist underserved individuals with income tax returns preparation. This resulted in 148 returns prepared for individuals whose annual salary is $56,000 or less, and a total of $152,304 was returned to the individuals.

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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 Food, Natural Resources, 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 System, Food System, Plant System, Natural Resources and Environmental Systems, and Social and Allied Program.

The Animal System research 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; 2) Nutrition; 3) Functional Genomics; and 4) Reproductive Biology.

The Food System 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 foodborne 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 addresses the issues of food security and insecurity.

The Plant System group works on many projects that are an important and vital portion to the regional economy. The unit is dedicated to developing a body of knowledge using a multidisciplinary approach to examine the efficacy of producing high-value, low-volume medicinal, and nutritional products. Current projects are focused on three (3) areas; 1) Medicinal plants; 2) Develop locally grown food crops that have high economic potential; and 3) HEMP.
The Natural Resources and Environmental System (NRES), this unit focuses its research on 1) Soil CO2 exchange/carbon sequestration; 2) Climate change mitigation; and 3) Watershed modeling and forecasting.

The Social Systems and Allied Program group focuses its research efforts on examining factors impacting the quality of life. An understanding of these factors is vital in setting policies and programs that promote socioeconomic well-being. These factors are multi-dimensional and include some key indicators. Research scientists in the group have therefore established research projects that related explicitly to eight (8) 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; and 8) County revenue.

II. Merit and Scientific Peer Review Processes

The NIFA reviewer will refer to your Plan of Work. Use this space to provide updates as needed or activities that you would like to bring to NIFA's attention.

Process	Updates
1. The Merit Review Process	**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** 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 to 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.
2. The Scientific Peer Review Process	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 quality checked by our on-campus Office of Sponsored Programs.

III. Stakeholder Input

The NIFA reviewer will refer to your Plan of Work. Use this space to provide updates as needed or activities that you would like to bring to NIFA's attention.

Stakeholder Input Aspects	Updates
1. Actions taken to seek stakeholder input that encouraged their participation with a 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. Approximately every five years, AgriLife Extension holds open forums to identify issues. These forums are held in each of the 254 counties. Issues identified are entered into a state-wide database and used to guide programming. The last state-wide needs assessment was conducted in the Spring of 1999. Data from these forums and other processes are 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. 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. Methods to identify individuals and groups and 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 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.
3. Methods for collecting stakeholder input and 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.
4. A Statement of how the input will be considered and brief explanation of what you learned from your stakeholders.	**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. 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. The last state-wide needs assessment was conducted in the Spring of 1999. Data from these forums and other processes are used to guide programming. 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.

	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.

IV. Planned Program Table of Contents

V. Planned Program Activities and Accomplishments

Please provide information for activities that represent the best work of your institution(s). See Section V of the Guidance for information on what to include in the qualitative outcomes or impact statements. Add additional rows to convey additional accomplishments. You may expand each row as needed.

No.	Title or Activity Description	Outcome/Impact Statement	Planned Program Name/No.
1.	**2019 Evaluation Summary of South Texas Cotton & Grain Risk Management & Marketing Workshops**	**Relevance:** With low crop prices and increasing production costs, crop producers could be in for marginal returns in 2020. Determining costs of production and break-even prices and developing marketing strategies will be key to profitability. **Response:** Texas A&M AgriLife Extension specialists planned, developed, and presented workshops to address management practices and options to help crop producers make better informed decisions for the 2020 crop year to have a positive impact on bottom-line profits. **Results:** Three programs were conducted October-November of 2019—October 9 in Sinton (Bee, Nueces, San Patricio, and Refugio counties); October 17 in Wharton (Fort Bend, Jackson, Matagorda, and Wharton counties); and November 6 in Victoria (Calhoun, De Witt, Jackson, and Wharton counties). Budgeting decision tools, cotton and grain outlook, and marketing tools and strategies were presented at the programs. Of the 44 producers attending, 93.02% had a favorable level of satisfaction with the program. Approximately 50% reported plans to increase the use of practices presented. Respondents had a 45.6% average gain in overall knowledge. On average, producers valued the information at $12.08 per acre. The average producer in the meetings manages 1,709 acres, resulting in an average value of $20,645/operation.	Program 1 - Economics and Management for Sustainable Agriculture
2.	**Training Socially Disadvantaged Farmers**	**Relevance:** The Rio Grande Valley (RGV) is a predominately Hispanic region located in the southernmost part of Texas bordering Mexico and it comprises the counties of Hidalgo, Cameron, Starr and Willacy. The region leads the nation in terms of the percentage of population living in poverty and number of persons without educational degrees at all levels. Small-scale farmers and ranchers living in deprived communities are traditionally characterized by their limited resources and lack of technical skills. Hence, these small-scale producers have lower possibilities to succeed in a competitive market compared to their more knowledgeable and larger counterparts.	Program 1 - Economics and Management for Sustainable Agriculture

		Response: in 2016, the RGV Small Acreage Program was created to empower underserved agricultural producers of the RGV. The main goal of the program is to increase the sustainability and retention of small-scale farming operations in the RGV by training underserved and underrepresented farmers and ranchers in sustainable and profitable production and marketing practices. **Results:** To-date, 25 educational workshops and field days have been conducted and over 950 farmers and ranchers have attended the training sessions. Evaluation results indicate that there was a 77% increase in knowledge, 87% of participants plan to adopt what was learned, and 67% of respondents anticipate a positive economic benefit as a direct result of the training sessions. Each educational workshop is expected to generate an economic impact of $1,803 per participant, which could be equivalent to an overall impact of $1,478,360 if those expectations are achieved. Additionally, around 97% of participants are mostly or completely satisfied with the program.	
3.	**FARM Assistance**	**Relevance:** The 2019 calendar year marks another successful year of FARM Assistance client participation and analyses with 61 analyses completed. **Response:** Participation includes traditional commercial production agriculture, but also extends to include the program's contribution in significant education efforts funded by the Texas Water Development board, as well as an ongoing partnership with USDA-FSA in Texas to conduct FSA borrower training. **Results:** The outcome of client participation is measured through participant evaluations. Client assessments (over the last 3 years) of the FARM Assistance program indicate a very positive impact on management ability. As a result of participating in the FARM Assistance program, 89% claim a better understanding of the financial aspects of their operation and 96% 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 87% indicated that they would be more likely to use a formal financial analysis (like FARM Assistance) to help make decisions in the future. 98% of respondents indicated they would recommend FARM Assistance to another producer. Finally, in responding to anticipated economic value, respondents estimated an average $24,289 annual benefit to	Program 1 - Economics and Management for Sustainable Agriculture

		their operation as a result of their FARM Assistance participation. Additionally, data and specialists experience with individuals across the state helps contribute to other extension programs, applied research output, and Extension publications. The FARM Assistance Focus Series publications (http://farmassistance.tamu.edu/publications/) include topics such as case studies of High Plains agriculture, and economic incentives for adopting no-till practices or the use of soil moisture sensors to manage irrigation.	
4.	**Master Marketer**	**Relevance:** Agricultural producers continue to look for better ways to manage the many risks they face given the increasing volatility of input and output prices, tighter profit margins, and changes in farm program supports. **Response:** The Extension Agricultural Economics Unit continues to provide in-depth risk management education through its Master Marketer program. While the extensive program provides over 64 hours of classroom training, it is important for extension educators to understand whether the program is providing the desired educational benefit and is resulting in effective learning and adoption of risk management practices. **Results:** A 2.5-year post evaluation of the Master Marketer Program is conducted following each Master Marketer Course. 2019 would have been the appropriate time to conduct the post evaluation of the 2017 Master Marketer Course that was to be held in Castroville, TX. However due to the limited resources and services available because of Hurricane Harvey. The 30th Master Marketer program (approximately 70 hours of classroom training over a six-week period) was conducted in Lubbock, Texas during January-March 2019. Pre-test and post-test scores of subject matter knowledge level indicated a 56.79% improvement in participant's scores from the beginning of the Master Marketer program (average pre-test score 31.15%) to the end of the Master Marketer program (average post-test score 48.85%). In an exit evaluation, participants suggested that they were much more confident in how and when to use various risk management/marketing tools. If this increase in knowledge levels and confidence translates to improved marketing performance similar to preceding Master Marketer graduates, then an increase in annual income of approximately $35,000 per year, on average, can be expected for each of the 45 graduates of the 2019 Spring's program. If so, these returns would work	Program 1 - Economics and Management for Sustainable Agriculture

		out to over $1.5 million per year for the graduates of the 2019 Master Marketer program in Lubbock.	
5.	**Texas A&M Grass-fed Beef Conference**	**Relevance:** There is a growing demand for local produced agricultural products and local produced grass finished beef. There are significant limitations to producing high quality beef in Texas environmental conditions and available for ages. Many small producers want to produce product to sell but few have both the production and marketing skills to attract adequate buyers for their products. Many wanting to produce local grass-fed products are unfamiliar with the cuts of meats and by-products of beef production they will have to sell nor how to price the products produced. Understanding the laws and regulations associated with production, harvesting and marketing directly to consumers is another area where cattle producers have little to no knowledge. Locating and working with plants to harvest and process cattle into cuts that are easy to market is another area many do not have any experience with. Cost of production and product value is no something most cow calf producers ever consider until they are trying to make a profit by selling cattle in the beef. **Response:** The Texas A&M Grass-fed Beef Conference was initiated six years ago to help address questions related to production of locally raised beef and the skills needed to successfully market their products. In 2019 this two day program included discussion of topics related to labor and time constraints, forage production, stocking rate adjustment necessary to support finishing programs, breed types and characteristics that are best suited to forage finishing programs, carcass harvesting and fabrication, preventative herd health strategies, nutritional profiles of beef from different production scenarios, packaging and marketing beef locally. Speakers include Texas A&M AgriLife personnel from Animal Science, Meats, Soil and Crop Science, practicing veterinarians, forage production consultants and Grass-fed Producer Panel to discuss marketing strategies for locally produced beef. **Results:** Surveys of participants indicated 100% gained knowledge that would assist them in the production and marketing of their beef products. Related to value of different portions of the program 93% indicated the discussion on forage and stocking rate would benefit them financially, 100% gained knowledge and expected to benefit financially from the discussion on carcass fabrication and	Program 2 - Livestock Production

		packaging of beef products, 83% indicated they gained value from the discussion of preventative health practices and 100% indicated they gained valuable information from the panel of Grass-fed producers discussing how they marketed their products directly to consumers. When asked how much they would benefit financially most indicated a value over $100 per head of cattle marketed which is about five times higher than we see in most beef cattle production meeting evaluations. Just based on the cattle numbers represented by those in attendance the economic value of this conference was estimated to be $115,000	
6.	**Texas A&M Beef Cattle Short Course**	**Relevance:** Texas is home to the largest beef cattle population in the U.S., leading the nation in beef cows and cattle on feed and second in number of stocker cattle grazing on forage crops or range grasses. The industry is made up of a very diverse set of land and livestock owners coming from many varied backgrounds and with many different goals in their beef cattle enterprises. Production environments vary greatly across the state going from annual rainfall of 8" in the far Western part of the state to around 80" annual rainfall in Southeast Texas. It also goes from areas that never have a frost date to growing seasons from May to September only. Developing a premier educational program that address production constraints and differences in educational needs of the audience is always a challenge. Topics covered range across all areas related to beef production and puts focus on a systems approach to beef cattle production and environmental stewardship. **Response:** The TAM Beef Cattle Short Course has been taught in various formats for about 40 years. Currently it is coordinated by Texas A&M AgriLife Extension and held on the campus of Texas A&M University each August, is recognized by producers, industry leaders, and educators as the largest and most comprehensive Extension beef cattle program in the nation. The 2019 Texas A&M Beef Cattle Short Course attracted 2,300 participants from 24 states and 6 countries. 24 different "Cattleman's College" sessions and a general session were held during the three-day event. The program had presentations by 71 speakers from Texas A&M AgriLife Extension, Texas A&M AgriLife Research, the College of Agriculture and Life Sciences, other universities and from industry organizations. Several media outlets (newspapers, trade magazines, radio, TV) covered the	Program 2 - Livestock Production

		event including the "From the Ground Up" program on KBTX and AgriLife Communications. The industry trade show had 174 exhibitors. **Results:** Participants attending the different educational sessions responded with expected adoption rates ranging from 75% to 97% for the beef cattle management areas covered, with most in the 85-95% range. Surveys of participants indicated that 90% anticipated benefiting economically as a result of attending the Short Course. Based on data collected the projected economic impact of the Beef Cattle Short Course was conservatively estimated by Ag Economists to be in excess of $2,000,000 annually. Exit surveys indicated 99% of participants were satisfied with the experience they had at the Texas A&M Beef Cattle Short Course. The last question asked to participants on a scale of 0 – 10 "how likely were they to recommend this particular activity to others" and this data is utilized to generate a "Net Promoter Score". The "Net Promoter Score" for the 2018 TAM BCSC was 78%. Literature indicates that the most efficient company or program usually rates 50% to 80%.	
7.	**Environmental Cross Contamination in Livestock Show Animals**	**Relevance:** Youth livestock project shows in Texas currently have a zero-tolerance drug policy; therefore, any number of drugs detected in an animal's urine is grounds for disqualification and forfeiture of prize money and accompanying scholarship awards. Many monetarily significant scholarships are provided by the livestock shows, and in some cases, exhibitors were stripped of their winnings if minute amounts of drug were found in testing of the animal's urine. Current technology allows the detection of drugs in urine at a level of 0.05 ng/ml. The significance of minuscule amounts of drugs in the urine needs revisiting, and a rational tolerance level needs to be determined. There is little information correlating the urine drug level with tissue levels. Even though exhibitors have never treated their animals with pharmaceutical products of anytime during their ownership animals are testing positive for extremely low levels of some product. This usually results in litigation and in-depth review of the family and exhibitor's behavior and handling of the youth project. Most often there is no evidence to support the assertion that anyone associated with the project has feed or injected the suspect compound into the animal and the disqualification is overturned. **Response:** Extension was instrumental in securing philosophical support and financial support from the five major livestock shows in Texas to investigate the	Program 2 - Livestock Production

		associations of drug levels found in urine to levels found in plasma, and tissue. Extension was also asked to evaluate the impact of environmental drug contamination on youth livestock projects. The major livestock shows wanted to evaluate the possibility of urine from treated animals contaminating the livestock show environment, causing untreated animals to test positive for drugs. Research shows that horses treated with an approved nonsteroidal inflammatory drug will contaminate their environment, resulting in nontreated pen-mates testing positive for the drug. We tested that hypothesis using swine. **Results:** Two pens and four pigs were used to test the proof of concept with the compound flunixin. Preliminary results of this study demonstrated untreated pigs housed with treated pigs could test positive for drugs. The flunixin experiment was repeated using 10 pens and 20 pigs. Each pen contained a treated and untreated pig. Ten days after treatment, all treated and untreated pig's urine tested positive for flunixin. The findings of this research have implications for livestock shows as well as for the commercial livestock industry. Environmental contamination needs to be considered when comingling treated and untreated animals. Extensions' research indicates there needs to be more emphasis on biosecurity (animal housed near animals that were treated could test positive). Results of this research is used in Extension programming to emphasize the importance of administering drugs for the proper indication, by the proper route, and dose. Our research indicates that testing urine is not a reliable indicator of tissue or plasma residues and testing of plasma is being considered by some major shows.	
8.	**Livestock Management (1890)**	**Relevance**: Some limited resource producers lack agriculture resources on pasture and hay management and animal production and management resources. **Response**: To provide an in-depth educational program through Livestock Production Management, Cooperative Extension Program conducted several workshops. These workshops included subject matter planned programs and result demonstration projects on Small Ruminant Production and Management, Pasture Management, Annual Goat Artificial Insemination (AI) Workshop, Beef Cattle Production Workshop, Forage Management Workshop, Winter Pasture, Prescribed Grazing & Stocking Rates, and Forage Inventory.	Program 2 - Livestock Production

		Results: The production survey evaluation results indicated that 91% of participants learned from the program, and 81% gained knowledge of cost-share programs. Forage Management evaluation results indicate that 94% of producers will adopt practices learned in livestock production. 93% will adopt forage production practices. 85% have learned new information that they hadn't heard before. 88% have indicated that by changes in their practices, they have seen a slight increase financially in their operation. Small Ruminant Management program showed that 100% of producers gained knowledge about Goat management, common Goat Disease and Pathogen, and understanding a different kind of goat breeds	
9.	**Physiological Mechanisms Affecting Reproductive Performance in Livestock (1890)**	**Relevance**: Research programs designed to improve the efficiency of animal production include developing genetic selection criteria that result in more cost-effective milk and meat production. The GrowSafe feed intake and behavior monitoring system was validated for use with goats. This Research will improve the efficiency of animal production by developing genetic selection criteria that result in more cost-effective milk and meat production. The impact of a model to study the genetic basis for growth and feed efficiency is to increase production efficiency and profits for goat producers. **Response**: Additional Research seeks to lower maintenance costs by developing techniques that increase reproductive efficiency. Studies have identified a unique microbiome in the upper female reproductive tract, which was once thought to be sterile. Studies are currently investigating whether the microbiome changes throughout the estrous cycle and differs during equivalent days of pregnancy. Another goal is to improve the efficiency of artificial insemination, which is a powerful producer can use to increase genetic merit in their herds. The efficacy of transcervical (TC) and intracervical (IC) semen deposition was evaluated for pregnancy per artificial insemination (P/AI) in a fixed-time artificial insemination (FTAI) program in the goat. Three breeds (Alpine, n=50, Boer, n=17, and Spanish n=20) were synchronized by a Co-synch program and then inseminated by TCAI (n=52) or a commercial ICAI (RamGo, TecnoGen) technique (n=35). Pregnancy status was determined on day 30-35 via transrectal ultrasound. **Results**: No difference in P/AI was noted between the TC or IC technique (45.7 and 30.8 %, respectively). Additionally, no interactive effect on P/AI was found between the insemination method and breed. The timing of FTAI did present a	Program 2 - Livestock Production

		significant difference in the P/AI among the breeds. Spanish does demonstrate a lower P/AI than the Boer and Alpine does (10 vs 41.2 and 46 %, respectively). In summary, ICAI requires less technical proficiency and is a practical technique for FTAI in the goat. The P/AI results further demonstrate a need for continued evaluation of the optimal timing of insemination between breeds. These projects will enhance the roles that livestock play in food security and poverty alleviation in Texas. The outcomes are an increase in sustainable livestock and farm productivity and lower maintenance costs by developing techniques that increase reproductive efficiency.	
10.	**Livestock, Plant and other Genetics**	**Research Impacts** An extensive analysis of genetic variation in the blue crab, a species that supports major fisheries from Canada to Argentina was conducted. The study found strong evidence for panmixia among stocks ranging from Atlantic coastal states and throughout the Gulf of Mexico, but significant differentiation was discovered between stocks in northern and southern hemispheres. Although recently published, this study already has influenced management by US federal and state agencies.	Program 2 - Livestock Production
11.	**Crop and Forage Production**	Extension continues to work to provide environmentally and economically sound cropping system decisions for Texas growers. Besides our work on reduced tillage systems, we conduct variety trials for multiple crops across many different growing environments in Texas to help growers make the best choices regarding varieties for their ecoregion. We also work to identify solutions to herbicide resistance in weeds and am now developing a variety testing program for hemp once it is legal in Texas. Our nutrient management specialist reported a total potential economic impact of $51 million in reduced costs to landscape maintenance professionals adopting our recommended best management practices. Our corn hybrid test indicated a potential economic impact associated with our programming efforts was estimated at $88 million, while our sorghum hybrid trials indicated an additional potential economic benefit of $11.5 million. One of our weed scientists indicated a total economic impact of >$3 million as a result of three programs conducted across 22 counties in South Texas. The SCSC Extension Unit cotton program has had an estimated economic impact over the past 10 years of >$400 million. During Calendar year 2019, the Unit had direct contact with nearly 45,000 individuals for a total of 96,000 contact hours.	Program 3 - Crop and Forage Production

12.	**Supporting Crop Production through Education**	**Relevance:** Rising input costs and various production-related challenges, including droughts, disease, invasive species and other pests have placed serious stress on farmers across the state. Changing global markets and the management of agricultural production and price risk have farmers seeking ways to maximize production efficiency to maintain competitiveness. In addition, issues regarding the balance between Texas' water supply and demand have brought about the need for more efficient use of this vital resource**.** **Response:** The Texas A&M AgriLife Extension Service delivers wide-ranging educational programs focused on research-based crop production and management practices, evaluation of technologies, improved decision making, water-use efficiency, and job training. • 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. • AgriLife Extension is at the forefront in responding to emerging issues such as drought, floods, wildfires, and insect and disease outbreaks. • Through 5,600 educational events, planning meetings, and workshops in 2017, AgriLife Extension achieved more than 1.3 million educational and other contacts. • AgriLife Extension often collaborates with industry groups and with other government entities to deliver educational programs. **Results:** Selected programs are highlighted below. Impacts were measured by the increase in net returns associated with adoption of certain management practices taught in 2017. • The economic benefit resulting from the increase in net returns for boll weevil eradication was estimated at $328 million, with cumulative benefits amounting to $3.9 billion (since 1996). • Outreach related to crops, floriculture, nursery production, and marketing led to an estimated increase in annual net returns of $105.1 million, and assisted cotton growers with variety selection valued at $22.9 million.	Program 3 - Crop and Forage Production

		• Programs focusing on managing crop and livestock financial risk resulted in estimated gains of $39 million. • The impacts above support an additional 3,236 jobs in agribusiness and retail-related sectors. • 75,000 Texas farmers used the web-based decision aid for the 2014 Farm Bill, developed by the Agricultural & Food Policy Center (AFPC), with an estimated impact of improved decision making valued at $1.3 billion annually. • Job training through continuing education related to pesticide safety and cotton ginning supports 65,514 Texas jobs, with an annual wage base of $957.6 million.	
13.	**New Crops**	**Research Impacts** • New plant varieties were released and licensed, including, two wheat varieties peaches, roses, potatoes, peppers, and several unique color forms and winter-hardy hibiscus. The research and graduate programs in this area contributed to knowledge of the inheritance of insect and disease resistance of several pathogens that affect vegetable crop production in Texas. • Research continues on several large multi-investigator, multi-state SCRI projects including safer, healthier melons, nitrogen-use efficient spinach, breeding for resistance to rose rosette disease, description and management of crape myrtle bark scale, and pecan genomics. In collaboration with New Mexico State and USDA-ARS pecan program, progress was also made on QTL mapping and molecular marker identification of pecans for pecan scab resistance and other phenotypic characters.	Program 3 - Crop and Forage Production
14.	**Small Farm Outreach Programs (1890)**	**Relevance**: The Small Farm Outreach Program (SFOP) reaches out and provide learning opportunities for small scale ranchers and farmers, limited resource, socially disadvantaged and veteran farmers to educate them on managing their agriculture operation and how to improve farm management skills and production management. **Response**: Workshops targeted limited resource producers and beginning farmers and ranchers to provide them with the necessary training and knowledge	Program 3 - Crop and Forage Production

		to obtain agriculture funding to start or maintain their operation. These workshops focused on providing producers with education on USDA NRCS and FSA funding opportunities. There were Agrability, USDA Financial Assistance, Women In Agriculture workshop, several 2501 Program informational events held in several counties across Texas. **Results**: There were 48 landowners to apply for over a million dollars in Micro Loans. One result showed that a total of 30 consultants met with youth ag producers. This resulted in 17 of those producers applying for the $5,000.00 youth loan for active 4-H and FFA members. A total of 70 consultants met with limited resource producers and beginning agriculture producers. A total of 26 program participants have applied for Micro Loans; 6 producers have applied for the Macro Loan for a total amount of $600,000; 9 participants applied for $12,000 in funding provided by SARE, and 11 participants applied for cross fencing funding and High Tunnel Funding through the NRCS. The evaluation results show that 91% of participants expressed knowledge gained from the program, and a total of 33% of applicants expressed they would change behavior as a result of the information presented on effective marketing strategies.	
15.	**Sustainable Agriculture Program (1890)**	**Relevance**: Specialty crop production and cover crop production are among the top priorities for some limited resource producers in Texas. The production problems among growers are due to differences in soil type, pest control, and nutrient deficiencies. **Response**: The Sustainable Agriculture Program has educated landowners through workshops on benefits of Cover Crop, Agriculture and Beekeeping, Improving Soil Health, and Controlling Feral Hog. Workshops were conducted to educate limited resource producers on how to properly take a soil test, site selection, weed, pest prevention, and adequate watering cycles to improve overall soil health, and maximize production. In addition, we have conducted several workshops on controlling Feral Hogs. With the rise of feral swine infestation competing for territory due to rural and urban development in Texas, CEP workshops educated landowners on how to trap, prevent, and eliminate feral swine issues. There were over 20 corrals, box, boar, and jaeger traps built.	Program 3 - Crop and Forage Production

		Results: Evaluation results indicate that 94% of participants in this project will adopt practices learned through our training and will adopt practices to teach other members they will mentor. 90% have learned new information on these crops that they hadn't heard before. 95% of participants will continue to follow and attend extension programs. The program helped captured more than 1000 feral hogs since 2016. Trapping demonstration evaluation results showed that 88% of the participants will change their current environment to prevent feral swine damage, 96% increased their knowledge gained, 87% of participants increased their skill level in feral swine prevention, 96% of participants increased interest in subject matter, 96% percent of participants gained a new opinion about feral swine trapping, 93% of participants adopted new practices presented, 100% would make better-informed decisions, 100% would participate in more feral Swine programs, and 100% of the participants indicated that their economic conditions would change.	
16.	**Protecting and Conserving Texas' Vital Water Resources**	**Relevance:** Population growth, increasing water demand, contamination issues, and drought have placed the state's water supply under tremendous stress. Water demand in Texas is projected to increase by 17% from 2020 to 2070. Protecting water resources and utilizing conservation practices will be essential to sustaining the state's water demand-supply balance. Response: The Texas A&M AgriLife Extension Service delivers a wide range of programs focused on research-based water conservation and water quality practices, watershed protection, onsite wastewater treatment systems, private water well screening, and soil nutrient management. • These programs teach participants about efficient water use, sustainable practices, watershed management, and environmental stewardship. • AgriLife Extension's conservation programs focus on reducing household water use and improving irrigation efficiencies in lawns, landscapes, and agricultural production systems. • Urban water issues are being addressed through the Texas Water Star program, which includes popular water-use efficiency efforts such as Earth-Kind® landscaping and strategies for in-home water savings. • Through 5,350 educational events, planning meetings, and workshops in 2017, AgriLife Extension achieved more than 1.3 million educational and other contacts to increase public awareness and adoption of practices that	Program 4 - Water & Natural Resource Management

		are vital to improving and sustaining the state's water demand-supply balance. Results: The benefits of these programs are measured in terms of water saved, water-cost savings, number of jobs and annual wages for trainees in the landscape-irrigation profession, and externally funded grant dollars received and spent locally to implement watershed protection and educational programs. • Water conservation programs have resulted in a potential savings of 2.1 billion gallons annually (enough to supply 13,300 households), valued at $7.6 million (using municipal water rates). • Water quality restoration efforts in the Attoyac Bayou, Copano Bay, Cibolo Creek, Mission River, Aransas River, Matagorda Basin, Lavaca River, Tres Palacios Creek, Arenosa Creek, Carancahua Bay, Little River, San Gabriel River, Big Elm Creek, Navasota River, Arroyo-Colorado River, Brownsville Resaca, Mill Creek, and the Geronimo and Alligator Creek watersheds follow the Plum Creek Watershed model. In 2011, the Plum Creek watershed was removed from the EPA's list of impaired water bodies. • To leverage state resources, $9.8 million in externally funded grants has been obtained to support critical water quality protection activities and educational programs and to identify sources of watershed contamination. • Programs that provide certification in landscape irrigation, onsite wastewater systems management, and water quality directly support over 1,440 jobs, with $43.8 million in annual wages. • The ultimate societal benefit to Texas is the protection and more efficient use of scarce water resources.	
17.	**Protecting State Watersheds**	Relevance: High-nutrient, bacterial, and salinity levels —along with low dissolved-oxygen levels — in some Texas watersheds have raised concerns among residents and state officials about public health, water quality, water-use limitations, aquatic habitats, and reduced or lost recreational opportunities. Potential sources of this pollution include natural sources, feral hogs, wastewater treatment systems, livestock and pet waste, and fertilizer and chemical runoff from croplands, pastures, lawns, landscapes, parks, and industrial sites.	Program 4 - Water & Natural Resource Management

		Response: The Texas A&M AgriLife Extension Service has collaborated with many local, state, and federal agencies and organizations to inform and educate residents about water quality concerns in several Texas watersheds. • AgriLife Extension currently coordinates planning and education efforts in the following watersheds: Attoyac Bayou, Copano Bay, Cibolo Creek, Mission River, Aransas River, Matagorda Basin, Lavaca River, Tres Palacios Creek, Arenosa Creek, Carancahua Bay, Little River, San Gabriel River, Big Elm Creek, Navasota River, Arroyo-Colorado River, Brownsville Resaca, Mill Creek, and Geronimo and Alligator Creeks. • The process of improving water quality and protecting a watershed's natural resources typically involves forming a local stakeholder partnership group, identifying the causes of watershed pollution, and developing a comprehensive management plan. Education and the adoption of best management practices are critical to implementing these efforts. • To support the need for stakeholder involvement, the Texas Watershed Steward Program was initiated to provide science-based, watershed education to help citizens identify and take action to address local water quality impairments. • Through more than 95 educational events, watershed planning meetings, and workshops in 2017, AgriLife Extension and collaborating agencies engaged more than 3,100 landowners and other stakeholders in an effort to improve public awareness and participation vital to developing and implementing watershed protection plans. Results: The following highlights demonstrate recent accomplishments made toward restoring water quality through selected watershed protection and education programs: • While efforts to protect watersheds and restore water quality are in various stages, significant progress is being made. In 2011, the Plum Creek Watershed became the first watershed to be removed from EPA's list of impaired water bodies. Water quality has also been restored in the Buck Creek Watershed.	

		• To leverage state resources, $9.8 million in externally funded grants over five years has been obtained to support critical water quality protection activities, identify sources of watershed contamination, and support educational programs. • The ultimate societal benefit to Texas is improved water quality, reduced water treatment costs, and protecting public health and the environment.	
18.	**Water Research Efforts**	**Research Impacts** • The Dashboard for Irrigation Efficiency Management (DIEM) was developed and released to growers in the Texas Panhandle to allow them to schedule field-specific irrigation for an entire growing season that optimizes yield and water-use efficiency based on rainfall and irrigation availability. This tool combined with the deployment of soil moisture sensors and deficit irrigation production strategies have demonstrated a 28% reduction in water use for irrigated cotton in the region, with less than a 10% reduction in cotton yield. Using this approach for all cotton production could reduce water use by up to 60,000 acre-ft annually across the South Plains. • Research on the use of soil moisture sensors to aid in scheduling the irrigation of pecan fields near El Paso shown that the number of irrigation events can be reduced by 25% (from 12 to 9 per year). Adoption of this technology and irrigation management approach could yield over 6,000 acre-ft of freshwater savings annually, if adopted across the entire irrigation district in this very arid region of Texas. • A capstone research project led by the Bush School of Public Policy assessed the current water security issues facing municipalities across Texas, and developed approaches to help solve these issues. A Phases Framework was developed that can be adopted by municipalities to address their water security issues as they evolve, with these Phases being (1) water demand management; (2) deployment of advanced technology to increase water supplies; and (3) development of desalination and direct water reuse. Use of the Phases Framework by Texas municipalities will	Program 4 - Water & Natural Resource Management

		allow them to plan more effectively for their community water needs as their populations and water availability.	
19.	**Performance of Micro-irrigated Collard Greens under Different Organic Amendment Types and Rates (1890)**	**Relevance**: Organic amendments are known for their benefits to improve soil physical, chemical, hydrological, and biological properties, which in turn increase crop yield. However, with increases in the use of organic amendments in conventional and organic production systems, understanding how organic amendments affect the soil-water-plant-atmosphere continuum has become imperative. **Response**: A field experiment was carried out to evaluate the effect of organic amendment types (Chicken manure, Cow manure, and Milorganite) and application rates (0, 168, 336, 672 kg total N ha^{-1}) on i) soil physical properties, ii) CO_2 emission, iii) nutrient uptake by the crop and movement within and below the rootzone. Periodically carbon dioxide emissions were monitored in the field, and soil water solutions were collected and analyzed in the laboratory to quantify the dynamics of macro and micronutrients within and below the rootzone. Also, crop root distribution, spatial variability of soil pH, and soil moisture were analyzed. **Results**: Preliminary results of this organic amendment experiment were shared by NRES team members with participants of the 2019 Ag Day On the Hill. Seventy-five percent of the participants who attended this demonstration session reported an increase in their level of understanding of the water and nutrients management and their effort on increasing crop production. Also, 100% of the participants increased their knowledge in collard greens response to organic amendment types and rates, field methods for monitoring soil health, and smart agriculture (use of drones, Ground Penetrating Radar, automated precision farming using FarmBot, and other sensors in agriculture. Sixty-seven percent of the participants reported that they would adopt practices such as the use of soil organic amendment and soil health assessment to increase crop production. Results were also demonstrated to participants of the Research and Extension	Program 4 - Water & Natural Resource Management

		Experiences for Undergraduates (REEU) program, and K-12 students visit from different schools. Some of the preliminary findings of the project were disseminated to the general public and scientific community through presentations at several conferences. Oral and poster presentations were given at ARD Research Symposium, 14th Annual Research Symposium, 15th Annual Pathways Research Symposium, and other workshops/ symposiums.	
20.	**Development of Different Tools to Improve Irrigation Water Management of Crops and Urban Landscapes (1890)**	**Relevance**: Agricultural and urban landscape irrigation, including golf courses, uses a substantial portion of freshwater in Texas. The main goal of this project is to improve irrigation water management of crops through the development, testing, validation, and dissemination of the mobile-web-app irrigation related tools which use near-real-time and historical weather data (rainfall and Evapotranspiration), site-specific soil hydrologic data, and crop-specific crop coefficients under urban and agricultural production environmental conditions across Texas and US. **Response**: We improved the web-based irrigation scheduling tool (IrrigWise) and the android app for site-specific soil parameters and weather forecast (WeatherAndSoil). IrrigWise uses several databases, including USDA-NRCS' Soil Survey Geographic Database, rainfall, and evapotranspiration data from multiple weather networks across Texas, and forecasted weather data for the following five days from the National Weather Service. IrrigWise-PRISM extended the use of daily gridded climate data, PRISM (Parameter elevation Regression on Independent Slopes Model). The wide use of the tool by the farming and urban communities could help improve irrigation management of crops and urban landscape in the US. IWET is a web-based tool that calculates irrigation water requirements for crop and urban landscape based on long term historical climate data. All these tools are available on the website: http://irrigwise.pvamu.edu/introduction/index.php. These tools were introduced to farmers and ranchers, agricultural professionals, researchers, agency representatives and students in the Southern Region Water Conference, AgNR Training Workshop, 14th Annual Research Symposium, Research Week Creative	Program 4 - Water & Natural Resource Management

		Activities Display, ARD Research Symposium, ASA-CSSA-SSSA International Annual Meeting, and AGU Fall Meeting. Three graduate students were trained in using irrigation related tools and developing web applications. The students were able to present posters in research symposiums. **Results**: The tool with extended capability in incorporating PRISM data allows IrrigWise-PRISM to establish irrigation scheduling programs across the US for any crop grown in a specific location and during a growing season. The tool allows the user to modify crop and soil-related default parameters to fit specific needs. The tool tracks the daily status of the different soil water budget components, including irrigation amount and near real-time weather data. The tool provides the user information on when and for how long to irrigate. The tool also predicts the change in soil water content of the selected field during the next five days based on forecasted weather data and crop water uptakes. We also improved Irrigation Water Estimator for Texas (IWET).	
21.	**Evaluation of Different Radar/Satellite Data and the Potential of Different Watershed-Scale Models (1890)**	**Relevance**: The Multi Sensor Precipitation Estimation (MPE) radar rainfall product was processed and used in watershed modeling to evaluate flash floods and the effect of land-use change in the Texas Hill Country. **Response**: We analyzed the performance of the Multi-Radar Multi-Sensor precipitation products over the Lower Colorado River. We also quantified the impacts of land-use and climate on Carbon fluxes using satellite data across Texas. The MPE and Multi-Radar Multi-Sensors (MRMS) rainfall products were also processed to simulate the impact of extreme events on semi urbanized watershed as Cypress Creek flood in Harris County. We also conducted a study to understand the hydrological extremes and relationship between terrestrial water storage and surface soil moisture using satellite products across Texas under a changing climate. Irrigation Management System (IManSys) model was used to analyze the potential impact of climate change on irrigation requirements of four major crops (cotton, corn, sorghum, and winter wheat) in the Brazos Headwaters Basin and Northern High Plains of Texas. The same model was used to study	Program 4 - Water & Natural Resource Management

		optimum turfgrass irrigation requirements and corresponding water-energy-CO_2 nexus across Harris County, Texas. **Results**: Some of the research findings were published in peer-reviewed journals, book chapters, and conference proceedings. Some of the preliminary results of the project were disseminated to the general public and scientific community through presentations at many conferences.	
22.	**Soil Health Management on the 90-acre Property (1890)**	**Relevance**: Soil health determines the ability of the land to supply nutrients and produce higher quality grasses in pasture systems and yield more nutritious grains, fruits, nuts, tubers, and vegetables in row and flat cropping systems. Additionally, soil health impacts the surrounding ecosystem by supplying less potentially harmful nutrients, e.g., nitrate and phosphate, as part of erosion and leaching processes in less well managed agricultural systems. Farmers, ranchers, landowners, and outdoor enthusiasts who embrace the value of healthy soils and the ecological services that they provide by cleaning water, cleaning air, and producing healthy plants and animals, are willing to support environmental initiatives that promote sustained maintenance of our precious natural resources. **Response**: The Soil Health Project on the Prairie View A&M University 90-Acres property is being transformed as part of a collaborative project with USDA NRCS in order to provide research, demonstration and outreach activities that highlight the progression of land from the raw, unmanaged prairie setting into different levels of management based on defined goals that incorporate geographic position, environmental setting, agricultural use, and soil health status. A hillslope was prepared for a cover crop experiment with 10 treatments that were planted with clovers, peas, grasses, vetch, and mixed plantings in order to identify which varieties performed best on Upper Texas Gulf Coast Prairie soils in Fall and Winter conditions that proved to be warmer and drier than normal conditions in most years. Each of the plants were evaluated by the AGRO 2733 Principles of Crop Production class in raised beds at the PVAMU Greenhouse Complex and the grasses (Barley, Oats, and Triticale) performed best followed by Austrian Winter Peas and Common Vetch with the Clovers (Balsana and Berseem) germinating very slowly followed by wind and frost burn. The cover crop plantings will be	Program 4 - Water & Natural Resource Management

		examined as part of a field tour during the spring season with students, farmers, and ranchers being invited to see how these plants perform in this geographic zone. **Results**: The field trial indicated that the plants followed the same pattern, but none of the plants grew at the same level of vigor that is believed to be due to fertility and pressure from insects, cows, and deer in the open plot setting that was not fenced. 90% of participants in the soil health and cover crops tour indicated that they increased their knowledge of best management practices related to soil and water management as related to maintaining and building soil quality using cover crops and low-till practices in pasture-based cropping systems. 70% of participants in the soil health and cover crops tour indicated that they would adopt best management practices related to cover crops planting in order to maintain and build soil quality using low or no-till cropping practices. 70% of participants in the soil health and cover crops tour indicated that they plan to or have adopted best management practices related to cover crops planting in order to maintain and build soil quality using low or no-till cropping practices in order to enhance the soil and water management practices on their land.	
23.	**Performance of Legume and Grain Cover Crops under Southeast Texas Condition (1890)**	**Relevance**: 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. However, information on the most suited cover crop for southeast Texas is lacking. **Response**: This study is evaluating the performance of four different cover crops (Winter Rye, Winter Wheat, Crimson Clover, Hairy Vetch), four combinations (Winter Rye-Crimson Clover, Winter Rye-Hairy Vetch, Winter Wheat-Crimson Clover, Winter Wheat-Hairy Vetch), and a Control treatment (no cover crop). The project is collecting and analyzing (i) soil physical, chemical, and hydrologic properties, (ii) soil organic content at the beginning and end of the experiment, (iii) soil water dynamics within and below root zones of different cover crops, (iv) weed pressure, (v) soil CO_2 emission before and after the rain under dry and wet	Program 4 - Water & Natural Resource Management

		soil conditions (vi) biomass and nutrient concentration of cover crops, and (v) root morphology and soil profile descriptions. **Results**: NRES Team members will demonstrate the preliminary results of the experiment in 2020 Ag Field Day.	
24.	**An Integrated Approach to Study and Disseminate the Impact of Climate Change on Agriculture and Water Quality (1890)**	**Relevance**: Climate change and variability have significant impacts on natural resources, environment, and agriculture. **Response**: The main goal of this project is to use an integrated approach that combines field experiments, historical data analysis, and numerical modeling to develop, test, demonstrate, and disseminate optimum water and nitrogen management practices to the stakeholders that would optimize crop yield and minimize contamination to the environment (soil and water) under changing climate and climate variability. We have identified and developed research testbed on Prairie View A&M University (PVAMU) research farm. We developed twenty-seven plots around the existing eddy covariance flux tower so that we can monitor actual carbon emission and/or uptake from plants as well as soil health and water quality parameters. **Research Results**: • Projected daily climate data (precipitation, maximum and minimum temperature) until 2099. • Impact of climate change on surface water and water quality by 2099. • Plant hardiness zone maps.	Program 4 - Water & Natural Resource Management
25.	**Range Management**	**Relevance:** At 92.6 million acres, native rangeland continues to be the prevailing general category of land use in Texas. By the end of 2007, the USDA Census of Agriculture accounted for over 247,000 farming and ranching operations in the state. This number represents an 8% increase since the 1997 census. In other words, Texas gained about 1,900 new working farms and ranches annually. By 2007, smaller operations – those less than 100 acres in size – accounted for over 50% the state's total farming & ranching operations. These smaller operations	Program 5 - Range Management

		increased by 22% since 1997. Many of these smaller operations are owned by novice landowners unfamiliar with proper range management practices. **Response:** ***County Extension and non-Extension Educational Events*** During 2019, AgriLife Extension Range Specialists conducted 190 presentations at 180 county Extension educational events involving 10,341 participants and an additional 113 presentations at non-Extension events with 7,638 participants. ***Texas A&M Beef Cattle Short Course Sessions*** Range Specialists conducted Range Management: Balancing Rangeland Opportunities and Challenges and Brush Busters sessions with 126 and 142 participants, respectively. ***South Texas Ag Symposium*** Conducted from a face-to-face location with 21 counties linked in from remote locations. ***Texas Range Facebook*** 93 educational posts, 3274 followers, and 234,806 views. ***Online Courses*** Generation Next: Our Time to Ranch • In 2014, the Generation Next program was launched to address the growing need to provide an educational program aimed at first-time ranch landowners, and people inheriting agricultural businesses, enterprises that can be started on ranch land range from traditional cattle, sheep and goat operations, to the many forms of nature tourism. • In 2015, the program implemented an online format to make it accessible to more people across the state. The program consists of one session being taught each week for 12 weeks. • Topics during the first half of the course include starting an agricultural business, business taxes, understanding insurance needs, financial management, evaluating land resources, and setting goals for success with measurable objectives. • During the second half of the course, participants learn about basic ranch laws, grazing and wildlife management leases, land management strategies, conservation hot topics, alterative business enterprises, and creating a generational business transition plan. • A primary goal during the course is for participants to develop and complete a formal, written business plan for their business. To facilitate this, smaller weekly activities are used to build toward the completion of a final business plan.	

		• In 2019, there were 90 participants that manage, or will soon be managing, a combined 180,000 acres of land. Prescribed Burning online course is under development. Range Management online course is under revision. ***Applied Research*** This is an important effort with 68 projects established in 55 counties and 138 on-going projects evaluated in 128 counties. **Results:** ***Texas A&M Beef Cattle Short Course Range Management: Balancing Rangeland Opportunities and Challenges Session*** A retrospective-post evaluation indicated a 55% (range of 36 to 110%) average increase in understanding of 8 teaching points evaluated. Participants represented 47 different Texas counties, Alabama, and Oklahoma and reported owning an average of 1495 acres, an estimated 188,370 acres for all attending. Intent to adopt (will or likely will) practices averaged 71% including 1) adjusting calving and/or weaning seasons to better match animal nutrient requirements to forage quality forage during the year, 2) using cow size and milk production selection criteria to match nutrient requirements to plants on the ranch, 3) using broadcast herbicide applications to manage unwanted brush, 4) using chemical, mechanical, fire, or grazing applications to improve wildlife habitat, 5) developing a drought management plan, and 6) using Pasture, Rangeland, Forage (PRF) Index Insurance. One hundred percent of respondents indicated the training gave them the ability to analyze land situations and make better land management decisions. ***Texas A&M Beef Cattle Short Course: Brush Busters Session*** A retrospective-post evaluation indicated a 67% (range 40-94%) average increase in understanding of 11 topics discussed including equipment and specific species control treatments. Participants represented 68 different Texas counties owning an average of 2048 acres, an estimated 290,816 acres for all attending. One-hundred percent plan to do some form of brush control in the near- future. All participants indicated that the information received would help them make better management decisions. ***Generation Next: Our Time to Ranch Online Course*** The economic benefits of Generation Next were measured in terms of the potential increase in net income resulting from their participation in the program.	

		• 64 percent of participants completed their business plans by the end of the course and indicated that they would not have completed a business plan without this course. • Participants estimated an economic benefit of $10,400 per ranch ($5.00/acre), or $934,000 for all participants in the Generation Next program. ***County Educational Event Economic Benefit*** During 2019, economic benefit estimates were available for 14 educational events at which Range Specialist made presentations. Participants reported managing 1.3 million acres and an estimated economic benefit of $29.2 million.	
26.	**Land Use and Sustainability**	**Research Impacts** • A price simulation and economic model (price, profit and revenue) for U.S. aerial applicators was developed in in partnership with National Agricultural Aviation Association (NAAA), USDA-ARS, and the Office of Technology Transfer. Preliminary economic analysis of the benefit of the aerial application industry to the U.S. economy was conducted using a simulation model for major crops. Cost of not having aerial application industry is about $1.2 billion and $23 billion to the Texas and U.S. economy, respectively. • Advancements were made in applying econometric tools to Improve Risk Management. Researchers applied advanced econometric models to crop yield data in the US, incorporating possible scenarios of climatic disturbances. They demonstrated that the proposed methods effectively identify profitable insurance policies and provide practical assessment frameworks that inform stakeholders in risk management. The research was published in the American Journal of Agricultural Economics. • Solutions were identified to prevent sand dune erosion in several nations, and a national-scale accounting of carbon sequestered by wetland plants was developed and led a diverse array of stakeholders in restoring several thousand acres of Texas coastal wetlands. In a separate effort, a technical comment was published in Science that significantly revised quantitative estimates for the potential for tree planting to sequester carbon dioxide from the atmosphere and mitigate global warming. • The first web-based, analytical tool developed by NRI included the Texas Early Notification Tool (TENT; https://tent.nri.tamu.edu) as part of a	Program 5 - Range Management

		military land use project funded by the Governor's office and the Department of Defense's (DoD) Office of Economic Adjustment. The web-based tool enables wind energy developers and commanders of Texas military installations to assess potential wind project locations in light of military mission compatibility. TENT includes the ability to conduct custom queries/analyses (e.g., radar line of site) that typically require sophisticated geospatial tools and technical expertise. TENT was so well received that the original sponsors have funded an additional $500K for its continued expansion to other compatible use issues (e.g., land fragmentation, endangered species, water resources, etc.) for this year. This suite of web-based tools collectively branded TxMAP. TENT is also being used as a national example for other states. We are currently pending approval for expanding our work to other areas, such as Oklahoma.	
27.	**Climate Change**	**Research Impacts** • Alternative Natural Feed Additives to Reduce Greenhouse Gas Whole-animal respirometry system has been used for the enumeration of gaseous emissions of growing cattle treated with condensed tannins (CT), a natural feed additive, to improve nutrient efficiency, reduce enteric gas production, and possibly mitigate unmanaged excreta emissions. From the respirometry trials, 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 CT provision. Total CO2¬e produced decreased linearly with increased QT rate due to an average reduction of 5 and 10% for CO2 and CH4, respectively. • Heat Stress and Alternative Feed Additives for Antibiotics. 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. Feeding live yeast to finishing steers reduced methane production by 5.7%, improved dry matter digestibility by 2.3%, improved digestible	Program 6 - Climate Change

		energy by 3.1%, and improved metabolizable energy by 4.4% without affecting intake. This represents an 8–12% loss of carbon and available energy in the diet. 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. 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. • Increasing Water Efficiency. AgriLife Research has identified large discrepancies in water footprint estimates of beef cattle production that range from 94 to 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. Cattle production also, directly and indirectly, alters water use for the production of forage and grain feed inputs and servicing of cattle (manure management). 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). The risk of drought conditions increases the uncertainty of water costs and associated changes in grain crop, pasture or forage, and cattle inventory/prices. To understand and mitigate beef cattle water challenges, a Beef Water Footprint decision 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 possible 274 thousand to a 2.6-billion-dollar decrease 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. • Net protein contribution, a measure of the effectiveness of a livestock feeding system's ability to upcycle human-edible protein from one form, generally cereal grains, to high-quality animal protein was modeled for beef production in the United States. In the U.S. for every pound of	

		human-edible protein fed to cattle we get nearly a pound of human-edible protein back; more impressively, the beef protein is approximately three times as effective at meeting human protein requirements than the grain fed. Additionally, feedlots that increased their use of grain byproducts (e.g., distillers' grains) from 2006 to 2017 net protein contribution increased by 48%. Our data highlights the positive contribution of beef production to feeding a growing population.	
28.	**Bioenergy**	Biofuels are a renewable energy source that can reduce our dependence on fossil fuels, mitigate greenhouse gas emissions, and create new markets/uses for existing and new crops. However, despite our many excellent options for biofuel feedstocks available in the U.S., critical limiting factors like available water resources must be addressed first to create sustainable bioenergy production. **Research Impacts** The Algae for Fuel program at the Pecos Station developed and evaluated flocculation processes for harvesting algae to reduce the cost of algal lipid production by 30%. The SWAT hydrologic model developed at the Temple Center assesses impact of growing crops for biofuels.	Program 7 - Sustainable Energy
29.	**Growing Our Economy**	**Relevance:** The Southern Region Extension Program Leaders Network (SRPLN) identified the lack of community and economic professional development opportunities as an important need in the Southern Region at an annual gathering in 2017 and documented that need through a follow-up survey to define specific CED education needs. **Response:** A team of Extension program leaders from the SRPLN) developed a **Community Resource Development 101** training to share CED resources and information, and to build skills and networks to enhance community and economic development capacity for Extension professionals in states with limited CED training opportunities. The training was held at the Dallas Agrilife Center November 11-12, 2019 and was followed by a facilitation training sponsored by the Southern Rural Develop Center November 12-15, 2019. **Results:** Eighteen Extension community development participants gathered in Plano, Texas on the first week of November 2019 at the Texas A&M Ag. Life	Program 8 - Community Resource and Economic Development

		Center. In the CRD 101 workshop, participants explored community systems, power dynamics, local governance, economic structure and methods for find community data. While only 1½ days in length, the workshop included presentations, small group work, panel discussions with elected officials, and a community immersion/assessment experience in McKinney, Texas. The workshop evaluation indicated program success. All of the participants agreed with the statements: Due to participation in this workshop *"I have a deeper understanding of community development practice",* and "*I understand how to assess the power dynamics and context for working in a community".* In addition, when asked about the most beneficial aspects of the community development workshop, participant comments included: • Understanding power dynamics, community assessment, capstone project • Learning of the different data methods and where to find them • Theories and data to support our work • Understanding systems and the impacts of community development • McKinney Assessment helped with hands on experience with learned knowledge • Better understanding of learned information • Learning how to engage and approach elected officials. • Overview of Community development, good presenters and panel leaders • Understanding complexity of communities	
30.	**CDC Working on Wellness Environments-Texas Boarder**	**Relevance:** Several Texas Border counties have high rates of obesity, diabetes, and other chronic conditions related to nutrition and physical activity. These counties also have low economic outcomes. **Response:** AgriLife CRED faculty, through a CDC Working On Wellness-Environments grant have worked with agents and community members in Hudspeth, Maverick, Starr, and Webb counties to present opportunities to improve nutrition and physical activity Policy, Systems, and Environments (PSE) through workshops and strategic doing. **Results:** Counties have begun preparing fundable action plans to address local nutrition and physical activity PSE needs, including food business and public	Program 8 - Community Resource and Economic Development

		enterprise development. Several of these action plans will be implemented by the communities with specialist and staff support in FY20.	
31.	**Evaluating the Accuracy of Economic Impact Estimates**	**Relevance:** Increased the need for accountability and financial analysis in making economic development decisions has increased interest in economic impact analysis. However, these analyses are rarely validated. **Response:** AgriLife CRED faculty compared results from a 2013 meat plant closure impact study to actual economic outcomes over a 2- to 4-year period. **Results:** Employment impacts were reasonable but income impacts were overestimated. The article recognizes limitations and offers best practices in impact studies (https://jrap.scholasticahq.com/article/10204-evaluating-the-accuracy-of-regional-economic-impact-estimates-considering-a-2013-beef-plant-closure-in-texas).	Program 8 - Community Resource and Economic Development
32.	**Economic Impact of Proposed Improved Access to the Cross-Bar Management Area**	**Relevance:** Tightened budgets and political pressures on local governments have increased the need for accountability and financial analysis in making economic development decisions. **Response:** AgriLife CRED faculty conducted a workshop on considerations for planning an economic impact study as well as draft example impacts for the proposed Cross Bar Management Area's public access. **Results:** Using Palo Duro Canyon visitation and spending as the baseline, the CBMA could be expected to generate $3.37M in labor income and almost 108 jobs to Potter and Randall counties.	Program 8 - Community Resource and Economic Development
33.	**TACA: Strategic Planning for Future Opportunities**	**Relevance:** New opportunities and new leadership often require associations to adopt or revise strategic plans to meet emerging needs. **Response:** AgriLife CRED faculty facilitated a strategic planning workshop for the Texas Tax Assessors and Collectors Association Board. **Results:** The TACA board created a strategic plan to guide future efforts to improve educational opportunities, professionalism, and interaction with other governmental affiliates.	Program 8 - Community Resource and Economic Development

34.	**Small Business Training and Technical Assistance (1890)**	**Relevance**: 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, non-profit training, one-on-one consultations, state contract training, business planning, and tax preparation, housing, and emergency management/response. **Response**: The Community and Economic Development Unit (CED) of the Cooperative Extension Program provides Research and curriculum-based training and consulting in the areas of small business, housing, financial literacy, and non-profit organization. The CED team provided 174 workshops and 2,485 in consulting hours to entrepreneurs assisting them with business advisement, business planning assistance, loan packaging and review, and small business resources. **Results**: It resulted in 68 new businesses established, 85 non-profit businesses assisted, $20,119,273 in small business funding approved, and $1,015,800 in approved grants. Equally important is the training of youth in entrepreneurship and small business ownership. Staff trained and/or exposed 677 youth in small business.	Program 8 - Community Resource and Economic Development
35.	**Businesses Development Program (1890)**	**Relevance**: In 2019 staff in Harris, El Paso, Jefferson, Willacy, and Zavala counties conducted the Businesses in Development (BID) program, a 9-week state contracting training course. **Response**: 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 effect to assist them in starting a business, maintaining their business, developing business plans, and applying for small business loans. **Results**: This resulted in: • Participants trained: 145 • New HUBs Certified: 27 • Contracts approved: 11 of 23	Program 8 - Community Resource and Economic Development

		• Submitted: $3,435,899 • Approved: $2,479,734	
36.	**Chronic Disease, Health and Wellness**	**Relevance** Physical Activity – In Texas, approximately 35% of adults are obese and nearly 26% report being physically inactive. Texas ranks 11th (12.5% - Diabetes) and 23rd (32.5% - Hypertension) in obesity-related health issues. Regular physical activity and controlling weight can significantly reduce the risk and impact of chronic diseases like heart disease, stroke, type 2 diabetes, cancer, hypertension, and osteoporosis. Type 2 Diabetes – An estimated 2.8 million Texans have type 2 diabetes. Diabetes education programs can help these individuals understand how to manage their disease through healthy eating patterns, being physically active, and following proper self-care management. Clients who participate in an evidence or research-based diabetes education program have shown to delay and prevent further complications associated with type 2 diabetes. **Response** Physical Activity – To help Texans of various ages and abilities establish the habit of regular physical activity, AgriLife Extension regularly implements *Walk Across Texas! (WAT!)*, an eight-week community program delivered through a web-based platform. *WAT!* challenges teams to track and log mileage to virtually walk across the state of Texas (832 miles). Through a team-based approach, participants are involved in friendly competition to promote engagement during the program. Type 2 Diabetes – AgriLife Extension offers multiple type 2 diabetes self-management programs to Texans, including *Do Well, Be Well with* Diabetes (a five-class series covering basic nutrition and self-care management topics), and ¡*Sí, Yo Puedo Controlar Mí Diabetes!* and *Wisdom, Power, Control* (culturally relevant programs targeting traditionally underserved minority populations). The programs help people with prediabetes, type 2 diabetes, or caregivers learn the skills needed to manage the disease successfully.	Program 9 - Chronic Disease, Health, and Wellness

		Results Physical Activity – In 2019, 58,041 Texas adults and youth participated in the WAT! program, logging nearly 6.4 million miles walked. Adult participants saw a 12.2% increase in meeting physical activity guidelines at the conclusion of the program and 92% reported that they or their family benefited from participating. A recent study published in *BMC Public Health* confirmed the effectiveness of the Walk Across Texas! program. Overall, the study found that self-reported physical activity significantly improved from week 1 to week 8, increasing an average of nearly 5 miles per week, which translates to an additional 11,000 steps/week. Similar results were found for all activities levels, and improvements did not vary between genders, ages or race/ethnicities. The results demonstrate the efficacy of the program to increase physical activity in a supportive team environment. The lifetime economic benefit for *WAT!* adult participants is estimated to be over $48 million. Type 2 Diabetes – In 2019, over 600 Texans participated in AgriLife Extension diabetes self-management programs. An evaluation study with 317 participants who completed the *Do Well Be Well* program 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 related to management of both dietary and self-care practices (p-value = .000). Economic impact based on estimated cost savings is equivalent to $8.15 million.	
37.	**Disease Prevention**	Although the roots of Texas A&M AgriLife are firmly planted in production agriculture and natural resources, we also look to apply the power of fundamental life sciences to other real-world issues. Discoveries in biochemistry and genetics are accelerating our impact on sustainable food and fiber production. And advances in drug development and nutrition make for a healthier Texas. **Research Impacts** Beaumont center scientists identified antioxidants that reduce the effects of reactive oxidative species by preventing damage to rice cell membranes. Experiments have shown a 5.7% increase in yield, which if applied to the entire Texas population would have a value of $9.26 million per year. Corpus Christi research on fungus has led to the discovery of the best resistant genes for hybrid	Program 9 - Chronic Disease, Health, and Wellness

		grain sorghum grown in the region. Finally, Stephenville center researchers have developed new methods of screening water and soil samples to mitigate bacterial contamination of watersheds.	
38.	**Disease prevention and Vector-borne disease research**	Significant advancements in basic and applied knowledge has been accomplished during the past year under a broad array of areas within the disease prevention and vector-borne disease research priority for AgriLife Research. **Research Impacts** • Unique gene drive applications in mosquito-virus systems that are self-limiting or non-perpetuating has resulted in an invited forthcoming manuscript in *Philosophical Transactions of the Royal Society B* (Biological Sciences) entitled *Making gene drive biodegradable*. • AgriLife Researchers, in collaboration with colleagues from the five CDC Centers of Excellence and CDC Ft Collins, conducted a national study to determine the state of tick surveillance and control for the U.S. from local, state, regional and national levels. Results of the study will be published in forthcoming issue of the Journal of Medical Entomology. • Joint entomology research with USDA, ARS and APHIS links global climate systems with 60-year history of cattle fever tick infestations providing an early warning system basis for the US Cattle Fever Tick Eradication Program (potential PNAS submission 2020). • Multiple cattle fever tick projects are making advancements in understanding of tick ecology, wildlife and cattle control and prevention advancements, economic impacts and surveillance. • The first year of a poultry 4-year NIFA award to test whether the endocannabinoid signaling system that relies upon bioactive N-acylethanolamines (NAE) of varying fatty acid substituents can be used to manage appetite in broiler breeder pullets in lieu of feed restriction, showed that a combination of alteration in dietary fatty acid composition and treatment with a probiotic genetically modified to enhance intestinal NAE production effectively reduces voluntary feed • intake by 16-31% with differences due to broiler strain apparent. These are highly significant and encouraging outcomes that provide a new way	Program 9 - Chronic Disease, Health, and Wellness

		forward for the poultry industry to improve health and welfare of parent stock birds. • Necrotic enteritis (NE) is estimated to cost the global poultry industry in excess of $2 billion annually. Research focusing on dietary nutrients and non-antibiotic feed additives during • natural NE occurrence has shown that dietary Ca in the form of limestone source, particle size, and solubility all influence the intestinal environment and severity of natural NE occurrence. The • results can be utilized to more effectively formulate for dietary Ca and other minerals and manage intestinal integrity during risk periods of intestinal challenge in NAE programs. • A search for genes that confer resistance to the FOV4 cotton pathogen that threatens the upland cotton varieties began its third field season in El Paso. A multi-state and multi-institutional effort to identify resistant genes and move them into improved upland cotton varieties.	
39.	**Living Life (1890)**	**Relevance**: According to the American Diabetes Association, roughly 30 million people, children, and adults have diabetes in the United States. 95% of people with diabetes have type 2 diabetes, a condition that interferes with the body's ability to produce insulin and regulate blood sugar. Diabetes is more common among African Americans and Hispanics than among Whites. In one Texas county, there are approximately 274,000 African Americans and Hispanics living with diabetes. Diabetes can cause heart disease, kidney failure, blindness and the cost to the US health care system and employers is over $245 billion every year (National Center for Chronic Disease Prevention and Health Promotion, 2018). **Response**: The Family & Community Health agents conducted over 350 education workshops to over 3,500 clienteles using Diabetes Education Awareness and Prevention (DEAP), Balance Living, A Taste of African American Heritage curriculums teaching clientele methods of healthier lifestyles by choosing healthier foods and incorporating a minimum of 30 minutes of daily exercise.	Program 9 - Chronic Disease, Health, and Wellness

		Results: 97% (3,395 of 3,500) participants indicated that they understand the health implication of diabetes and they are able to understand the warning signs of diabetes and they can implement positive behavioral changes with their food choices.	
40.	**Working on Health and Wellness (1890)**	**Relevance**: 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. Even when friends and family of someone who may be developing a mental illness recognize that something is amiss, they may not know how to intervene or direct the person to proper treatment. All too often, those in need of mental health services do not get them until it is too late. Mental Health First Aid encourages early detection and intervention by teaching participants about the signs and symptoms of specific illnesses like anxiety, depression, schizophrenia, bipolar disorder, eating disorders and addictions. **Response**: The Program Specialist for CEP has been Certified to teach and train staff in Mental Health First Aid. Within 3 CEP counties, agents are teaching *Healing Trauma* curriculum. *Healing Trauma* is an evidence-based, gender-responsive, six-session (90-minute sessions) curriculum for women, especially designed for settings in which a short-term intervention is needed. Examples where agents are teaching this curriculum include a domestic violence shelter, a homeless shelter, and individuals who are experiencing traumatic life events. **Results**: Over 750 individuals participated in Mental Health First Aide workshops and 84% (630 of 750) stated they learned skills for dealing with stress, they know how to retrieve resources within their community, and they have learned skills necessary for relaxation and mediation. Additionally, one of the agents has used YOGA as a method for exposing these individuals to exercise and relaxation.	Program 9 - Chronic Disease, Health, and Wellness
41.	**Childhood Obesity**	**Relevance:** The obesity rate among children is concerning, as it foretells a lifelong struggle with weight-related poor health — and its associated increased need for medical care. • Texas has the 7th highest obesity rate for youth ages 10-17[1]. • 18.6% of Texas high school students are obese[1].	Program 10 - Childhood Obesity

		• Texas ranks 5th as the state with the highest high school student obesity rates[1]. • Texas ranks 17th as the most physically inactive state[1]. • Texas ranks 11th (12.5%; Diabetes) and 23rd (32.5%; Hypertension) in obesity-related health issues[1]. • 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[2]. • Childhood obesity results in extra health care costs. A child with obesity has $12,900 more in medical costs than a child with normal weight[3]. *[1]Trust for America's Health and Robert Wood Johnson Foundation (2019). The State of Obesity: Obesity Rates and Trends. https://stateofobesity.org/ (accessed December 2019).* *[2]U.S. Department of Health and Human Services. Physical Activity Guidelines for Americans, 2nd Edition. Washington, DC: U.S. Department of Health and Human Services: 2018. https://health.gov/paguidelines/second-edition/pdf/Physical_Activity_Guidelines_2nd_edition.pdf (accessed December 2019).* [3]Finkelstein E A, et al. Lifetime Direct Medical Costs of Childhood Obesity. Pediatrics 133, no. 5 (2014): 854-62. (accessed December 2019) **Response:** Best practice behaviors associated with healthful weight have been identified and include an eating pattern consistent with *MyPlate*, increasing physical activity, and decreasing sedentary behaviors. For children to adopt best practice behaviors, education, skills building, family engagement, and community support are required. Two Texas A&M AgriLife Extension programs supporting best practice behaviors include: The **Balancing Food & Play** program; a 3rd grade school curriculum enrichment program designed to improve knowledge and behaviors related to the following four educational constructs:	

		• Snacking on fruits and vegetables, • Drinking milk with meals and water with snacks, • Encouraging 60 minutes of physical activity each day, and • Limiting screen time to two hours or less per day. The curriculum contains three elements: 20 lesson plans, four take-home family reading assignments, and a 60-page journal for each student. The **Walk Across Texas! Youth** program (**WAT! Youth**); an eight-week community program delivered through a web-based platform to help youth of various ages and abilities establish the habit of regular physical activity. WAT! Youth challenges teams to track and log mileage to virtually walk across the state of Texas (832 miles). Through a team-based approach, participants are engaged in friendly competition to promote engagement during the program. **Results:** Outcome measures for both Texas A&M AgriLife Extension youth programs include: **Balancing Food & Play** Program participants: 575 Third grade youth Statistically significant differences from pre to post were noted in consumption of regular soda, time spent on screen time, and time spent physically active. • The percentage of students who reported "Almost Never or Never" drinking regular (non- diet) soda increased from 38% to 45%. • The percentage of students who reported limiting screen time (2 hours or less) increased from 69% to 89%. • The percentage of students who reported having 60 minutes or more of physical activity increased from 46% to 77%. • **WAT! Youth** Program participants: 45,970 youth	

		Counties implemented: 61 Miles logged: 4,302,581	
42.	**Working off Weight (1890)**	**Relevance**: Poor health, obesity, poor nutrition and limited physical activity are significant health concerns that disproportionally affects minority and low-income populations. 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. **Response**: 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 Family & Community Health Unit conducted education workshops using Choose Health Food Fun and Fitness, Step Up and Scale Down, Balance Living, Eat Smart Being Active curriculums involving 8,239 underserved and underrepresented clienteles in a series of education workshops. **Results**: Evaluations results indicated that 91% of participants showed improvement in one or more diet quality indicators (eating more fruit and vegetables, red and orange vegetables, dark green vegetables, drinking less sugary drinks), increased physical activity by 79%, and 43% of participants improved in one or more food security areas (not eating less that they wanted so that there was more food for the family).	Program 10 - Childhood Obesity
43.	**Food Safety**	**Relevance:** 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	Program 11 -Food Safety

		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. **Response:** AgriLife Extension implemented two programs that are designed for food service employees, the food handler's program and the certified food manager program. 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 and Spanish. 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:** Food Handler: In 2019, 7,387 individuals completed the food handler's program either in a classroom format or via on-line. 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 70 vs. post average of 86). Certified Food Manager: In 2019, 383 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.	
44.	**Staying Safe (1890)**	**Relevance:** Although the American food supply is the safest in the world, the Centers for Disease Control (CDC) estimates that foodborne illnesses affect millions of Americans each year: 48 million reported cases of foodborne illnesses	Program 11 -Food Safety

		or 1 in 6 Americans will become sick, 128,000 people are hospitalized and, 3,000 deaths occur because of foodborne illnesses. **Response**: The Family and Community staff have conducted education workshops demonstrating food safety methods to over 2,430 participants on washing hands before preparing food, washing all items and surfaces after cutting raw meat or seafood, and not thawing frozen food at room temperature, and cross-contamination. **Results**: 84% (2,041 of 2430) participants showed improvement in food safety practices.	
45.	**Post-harvest Handling and Processing of Commodities for Limited-Resource Farmers (1890)**	**Relevance**: The Food Systems group here at Prairie View A&M University has been involved in a mission of researching the areas of post-harvest quality, safety, nutrition, and value-added processing of commodities produced from the Animal Sciences and Plant Sciences groups in the Cooperative Agriculture Research Center **Response**: Their efforts include the following: 1. Goats Milk: Research is being carried out to better understand and elucidate the nutritional benefit of goat milk proteins to encapsulate functional components, like fucoxanthin, keeping it more active in the intestinal tract before being degraded by digestive enzymes; and thereby making consuming goat milk with this component present more healthy. 2. Sweet Potatoes: The Food Systems Group is collaborating with the sweet potato breeder in the Plant Sciences group to identify value-added uses for purple sweet potatoes varieties being bred to grow here in the State of Texas. The benefit of these sweet potatoes is that they are more nutritionally advantageous due to the higher levels of antioxidants present. The challenge from a post-harvest standpoint is to find value-added uses for these potatoes and thereby find markets for these potatoes for the low resource farmers who would grow them. The Food Systems Group has been investigating using the flour has a fortifying agent in combination with "white flour" to make baked products such as muffins, cookies, bread, and noodles more nutritious. Moreover, we also are investigating the potential functional benefits of the starch extracted from the potatoes	Program 11 -Food Safety

		3. Strawberries: There has been a concerted effort to identify and establish different varieties of strawberries to grow in this region as a means to identify another value-added crop to increase the profitability of low resource farmers in the area. The Food Systems Group has been working with the breeder to evaluate the quality of these berries by measuring physical parameters such as sugar content, color content, texture, and acidity. This work will continue and include consumer sensory panels in the future. 4. Food Safety: One of our interests in the area of producing and selling fresh produce is the safety of these fruits and vegetables for consumers, particularly as many farmers are seeking to grow these crops organically using manure as a nitrogen source. The Food Systems Group is working collaboratively with both the Plant Sciences Group and the Natural Resources Group in CARC to evaluate the microbiome of the soil, and plants produced using manure to determine if pathogens could be present. The Food Systems Group is employing not only traditional microbiology analytical techniques but newer molecular microbial analyses measuring DNA and RNA to identify not only the number of organisms but the species as well. **Result**s: Excellent progress is being made and we look to present and publish this work as well as begin evaluating the safety of community gardens where produce can be consumed at homes and/or sold in farmers markets. The group has a USDA Capacity Building Grant to confirm this attribute of goat's milk in dairy products such as cheese and yogurt. Four presentations were presented on this work in national and international conferences, and one paper was published in January 2020. One paper on this work (starch extracted from potatoes) has been submitted for publication, and there have been numerous presentations presented on this work at regional and national conferences.	
46.	**Global Food Security, Hunger, and Nutrition Education**	**Relevance:** In Texas, nearly 15% of households live at or below the federal poverty level. More than 3.5 million Texans receive SNAP benefits. Low-income individuals are less likely to consume diets that meet current guidelines and are more likely to suffer from food insecurity and diet-related chronic diseases compared to those with moderate or higher incomes. The burden of chronic disease is great from both a financial and societal perspective.	Program 12 - Global Food Security, Hunger, and Nutrition Education

		Response: The Better Living for Texans (BLT) program provided food and nutrition education to individuals and families who are receiving or who are eligible for benefits from the Supplemental Nutrition Assistance Program (SNAP). Programs focused on increasing vegetable and fruit intake, increasing physical activity, increasing home gardening skills to improve access to fresh produce, food safety, and food resource management. **Results:** During the 2019 program year, BLT educators located across the state reached more than 423,000 individual adults and youth through direct and indirect educational outreach. The total number of individuals who graduated from a program series was 22,721; an additional 189,762 individuals participated in a single education event. Program impacts include: • Adult participants completing the Fresh Start to a Healthier You! series reported on pre and post-surveys increasing their fruit and vegetable intakes by more than 15 percent; • Adult participants completing the Growing and Nourishing Healthy Communities series reported increasing availability of vegetables in their household by 20%; more than 30 percent reported the ability to grow vegetables. Participants reported harvesting more than 8,149.3 pounds of vegetables, fruit, and herbs with an additional estimated of 6,876.3 pounds harvested, thus increasing accessibility and availability to fresh produce. • Youth participants enrolled in the Balancing Food and Play program reported drinking one or more less sugar-sweetened beverages as a result of what they learned; and Participants enrolled in the Walk Across Texas physical activity program reported an increase in the number of miles walked each week by 1	
47.	**Food and Nutrition**	We are keenly aware that hunger, specifically lack of nutrition, is one of the most important global issues of our time. We believe that we can help alleviate human suffering associated with hunger and poverty through agricultural science, and in a way that builds a better world for future generations. **Research Impacts** New peanut varieties and better use of herbicides have produced an increased yield of almost 50% per acre, as compared to 20 years ago, and the added gain	Program 12 - Global Food Security, Hunger, and Nutrition Education

		can be $100-150 per acre. New peach and nectarine lines developed by AgriLife researchers advance commercial harvest by 2-3 weeks and potentially add 10% in production capacity. This could have a potential value of up to $50 million in the U.S. The AgriLife Research wheat-breeding team has been recognized for developing wheat varieties, which are estimated to add more than $200 million annually to the US economy. Finally, new rice cultivars, if adopted at 15% rate over the next five years, the 5% yield advantage will increase statewide rice production revenue by $1.22 million per year.	
48.	**Fostering Strong Families**	**Relevance;** Child Care – Every week in Texas, more than 1.3 million children are cared for in paid child care settings, including nearly 560,000 children under the age of 5 and over 726,000 between the ages of 5 and 14. Children who receive high-quality care at a young age 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 on the part of staff is linked to higher-quality care environments. Child Passenger Safety - Most parents think they are using child safety seats correctly; however, studies indicate that an estimated 3 out of 4 seats are used incorrectly. Lack of access to affordable child safety seats contributes to a lower usage rate among low income families. Caring for Older Adults - More than 12 percent of the population in Texas is older than 65, and that number is expected to surpass 20% by 2050. The older population is growing faster than the population of the state. Formal and informal caregiving are and will continue to be important for older Texans to remain active, vibrant parts of their communities — especially in the state's rural areas. **Response:** Child Care – AgriLife Extension's offers over 150 online professional development courses to childcare providers in Texas and beyond. The program utilizes interactive technologies to deliver the latest research and best practices in early childhood health and safety, nutrition, and child development. Child Passenger Safety – In 2019, 55 child passenger safety technicians were trained. To date, 1,106 technicians have been trained, including 201 Extension Agents.	Program 13 - Fostering Strong Families

		Caring for Older Adults – AgriLife Extension offers workshops to caregivers of persons with chronic health conditions, persons with special needs and service members or veterans. Caregivers learn better self-care behaviors, emotional management techniques, and how to access community resources. **Results:** Child Care – In 2019, childcare providers and directors completed 549,816 online training courses (1,056,169 contact hours). Results from a follow-up study involving nearly 800 participants reveal that caregivers are using the information learned in the courses to improve the quality of care they provide to children. Over 95% of respondents indicated that they learned something new, use the things learned often in their work, and provide better quality care as a result of completing the trainings. Child Passenger Safety – In 2019, 2,077 inspections were conducted, and 1,445 new seats distributed. 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. Economic benefits are estimated at $2,159 per child (ages 0 to 4) and $2,606 per child (ages 4 to 7) for new seats distributed, and $622 per child for seat misuse corrected. Economic impact for the 2,077 inspections is estimated at $2.8 million. Caring for Older Adults – In 2019, AgriLife Extension caregiving programs reached more than 4,589 educational contacts (> 5,000 contact hours). AgriLife Extension provided primary leadership and/or speaker support for four caregiving conferences across the state, targeting professional and non-professional caregivers.	
49.	**Working Together as a Family (1890)**	**Relevance**: Texas ranked as one of the six states having the highest rates of children living with low income working parents. Within Texas, there are over 2 million children living within households with incomes less than 200 percent of the federal poverty level, as defined by the U.S. Office of Management and Budget. Child abuse and neglect occur across all social, economic, and ethnic groups. However, a much larger percentage of children identified as neglected or abused come from lower socioeconomic families (Ammerman & Hersen, 1990). This may be due to the larger number of low-income families in the social service system, which may put them at a higher risk of being scrutinized. The basic purpose of parenting has not changed throughout	Program 13 - Fostering Strong Families

		history. We can state it like this: The purpose of parenting is to protect and prepare our children to survive and thrive in the kind of society in which they live. **Response**: Partnerships and collaborations were established with the counties to deliver research-based information to parents, teenagers, and family care, givers. Participants received handouts to help facilitate successful parenting programs that proved to be effective for parents. Upon completing the series of lessons in teen pregnancy, Active Parenting, Teen Parenting, and Financial Management. Over 2,450 parents participated in a minimum of one and up to six classes of the Active Parenting/Parenting Matters education series. **Results**: 89% of parents stated that they are now using skills learned in parenting workshops to more effectively communicate with their children, properly discipline their children, and promote power, courage and self-esteem within their family. Welcome to the Real World" provided 528 youth with a hands-on experience of what it is like to prepare for and choose a job and/or career, make financial decisions, and to work in a diverse world with others who think and act differently. With a diverse audience, 86% stated that they now know how to use a budget, 85% know the difference between wants and needs, 88% realize the importance of money, 83% made the connection between education, career, and the amount of money earned.	
50.	**Life Skill for Youth**	**Relevance:** 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 they can be better citizens in the community, county, state, country, and world. The skills we specifically aim to address through 4-H are responsibility, decision making, respectfulness, teamwork, leadership, along with many others. **Response:** 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. Through the variety of experiences, youth learn project specific information, leadership, citizenship, and life skills. Texas 4-H Youth Development includes over 52,600 youth and 9,020 screened volunteers in over 1,700 clubs in Texas. **Results:** Outcomes are measured at the county, district, regional, and state levels. A snapshot of specific state and district results follow. These data were derived	Program 14 - Life Skill for Youth

		from over 2,500 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: • Confidence/Self-esteem • Teamwork • Responsibility • Communication • Public Speaking and Sportsmanship (tied) In addition to the life skills mentioned above, Texas 4-H members had many different opportunities to learn and enhance skills that will benefit them throughout their lives. In the various learning experiences that include camps, workshops and practice sessions, 4-H members were exposed to new ideas and materials that led to self-reflection and personal development. Of the members participating in the Leaders 4 Life activities: 100% developed or improved teamwork skills 100% stated that they could make better leadership decisions because of their participation 83% better understood the importance of goal setting and how to accomplish those goals Of the members participating in the Crossroads event: 100% indicated receiving help with identifying personal skills, interests, and abilities 98% said 4-H provided the opportunity to explore future career options Leadership education is provided all year but specifically during summer experiences. 95% of the participants reported being more comfortable working in teams 84% reported they were more confident speaking with others after their experience	
51.	**CEP 4-H (1890)**	**Relevance**: To address childhood obesity, extension agents from 14 Texas counties participated in the Heroes 4-Health grant program. A total of 3194 youth was educated and surveyed on healthy living practices. County Agents trained 89 youth health ambassadors. This impact was the result of collaborations with	Program 14 - Life Skill for Youth

		partnerships from 77 agencies, faith-based organizations, and community groups. We estimate that approximately 4785 family members interacted with the program and engaged in healthy living practices. **Response**: To connect youth interest and talents to school success, there was 120 youth that participated in a Common Measures grants funded through the National 4-H Council. There were 63 youth that participated in leadership development, and 57 youth participated in Igniting Sparks, a research-based approach to find adult support for developing their interests and ultimately create a vision of who they want to be in the future. All youth completed the post-test survey. **Results**: At least 83% of the youth surveyed reported that as a result of the program, they learned why it is essential to eat a healthy diet. Results from Igniting Sparks indicated that 88% of youth considered 4-H as a place where they get to figure things out for themselves; 85% felt 4-H is a place where it ok to make mistakes; and 87% felt 4-H is a place where they are encouraged to plan for their future. Results from the leadership development program indicated that 76% of youth indicated that they think about their choices before making a decision; 65% set goals for themselves, and 78% keep trying until they reach their goals.	
52.	**Volunteer Management**	Relevance: Volunteers provide Extension with an opportunity to expand all levels of educational delivery. Response: Extension in Texas has a comprehensive volunteer management effort impacting all levels and program areas within the agency. Results: In 2019, 93,621 volunteers provided 5,477,611 hours of service. This provided an impact of $139,295,650 in support to Texans.	Program 15 - Adult Leadership and Volunteer Development