

Texas Cooperative Extension
and
Texas Agricultural Experiment Station

**Joint Annual Report of
Accomplishments and Results:
FY 2006**

**Texas A&M University System
Agriculture Program**

**For Federal Reporting Year
2006**

¹ Completed and signed 30 March 2007

**Texas Cooperative Extension (TCE)
and
Texas Agricultural Experiment Station (TAES)**

FY 2006 Joint Annual Report of Accomplishments and Results

A. PLANNED PROGRAMS

Goal 1: An agricultural system that is highly competitive in the global economy

Overview

Texas Cooperative Extension and Texas Agricultural Experiment Station programs under Goal 1 focus on increasing the competitiveness and profitability of the agricultural industry in the state, nation, and world. Three programs representing a broad sector of the agricultural community are represented by this goal. These programs include risk management, field crops and forage production, and, livestock quality and profitability.

Risk Management. Risk is inherent at all levels of the food and fiber system. For the Texas food and fiber system to become more competitive, profitable, and sustainable (in light of changing agricultural and trade policies and highly volatile commodity and input prices), farmers, ranchers, and organizations—plus the communities that are dependent upon agriculture—must be better able to weigh the risks and projected impacts of alternative decisions on profitability and competitiveness. Managing the increased price and income risk is key to the future economic success of production agriculture and agribusiness firms in Texas. As economic stress intensifies, risk management—knowing the probabilities associated with what to do and what not to do—becomes even more important to the long term goal of a profitable and sustainable agriculture.

In response to the described need, TCE-TAES coordinated the development and delivery of multifaceted programs in policy analysis, risk assessment, risk management, and in-depth management/marketing education. In the past, policy, management, and marketing changes were evaluated based on average results. But, in Texas, averages do not tell the story—the risk of upside and downside swings also must be evaluated for long-term survivability. Educational and applied research programs are focused on (1) intensive education in group settings; (2) use of master volunteers and county Extension personnel to expand extension and research communication; and (3) one-to-one assistance in financial and risk management.

Field Crop and Forage Production. Environmental stresses, crop pests and global market forces make profitable and sustainable production of crops and forages a continuing challenge. It is through understanding and adoption of technologies that improve productivity, profitability and global competitiveness of crop and forage production systems that Texas farmers and ranchers will enhance their competitive position to other producers around the world. The target audience includes farmers and ranchers who produce field crops and forage in Texas. Applied research and outreach education programs through Texas Cooperative Extension had significant impacts on the production and economic success of growers in Texas in 2006. Through local, regional and statewide programs, Texas producers are the recipients of timely, sound and objective research-based information to enhance their production success.

Livestock Quality and Profitability. Texas ranks first in the nation in total livestock value and has the broadest spectrum of producers and variation in production environments. High production costs and variable sale receipts for all livestock species necessitates adoption of best management practices to efficiently produce livestock and their resulting end-products that

are cost-competitive with consumer alternatives while meeting the food quality and safety standards expected by our society. Educational programs are needed to increase producer awareness of consumer concerns and implementation of advancements in research proven production practices and developments in technologies to meet those needs while increasing net returns from livestock operations. Research and education programs focus on livestock genetics, nutrition, reproduction, cost effective best management practices and how producers can increase profitable production efficiency while still producing high quality, safe, wholesome end products. Specific livestock recommended management practices in selection, nutrition, reproductive physiology, health, and meat science are emphasized. Other factors that influence product acceptability in the market such as marketing methods and food safety issues are stressed.

Sources of TCE-TAES Funding and FTEs

TCE Funding: Smith Lever and State Matching

		\$ X 1000
		Actual
		<u>FY 2006</u>
Program 1 – Risk Management		1,249
	FTEs	20.96
Program 2 – Field Crops & Forage Production		2,739
	FTEs	111.23
Program 3 – Livestock Quality & Profitability		3,489
	FTEs	143.38
Total Allocated Resources Goal 1		8,415
	FTEs	357.34

TAES: Hatch, and state, federal and private contracts and grants

Source of Funding and FTEs

Federal Funds (\$ x 1000):	3,707
State Funds (\$ x 1000):	12,996
FTEs:	116.64
Number of Projects:	326
Number of Publications:	1,212

State TCE-TAES Plan of Work Program 1: Risk Management

Key Theme: Risk Management, Agricultural Competitiveness, and Agricultural Profitability

A. Description of Activity

Risk is inherent at all levels of the food and fiber system. For the Texas food and fiber system to become more competitive, profitable, and sustainable (in light of changing agricultural and trade policies and highly volatile commodity and input prices), farmers, ranchers, and organizations—plus the communities that are dependent upon agriculture—must be better able to weigh the risks and projected impacts of alternative decisions on profitability and competitiveness. Managing the increased price and income risk is key to the future economic success of production agriculture and agribusiness firms in Texas. As economic stress intensifies, risk management—knowing the probabilities associated with what to do and what not to do—becomes even more important to the long term goal of a profitable and sustainable agriculture.

In response to the described need, TCE-TAES coordinated the development and delivery of multifaceted programs in policy analysis, risk assessment, risk management, and in-depth management/marketing education. In the past, policy, management, and marketing changes were evaluated based on average results. But, in Texas, averages do not tell the story—the risk of upside and downside swings also must be evaluated for long-term survivability. Educational and applied research programs are focused on (1) intensive education in group settings; (2) use of master volunteers and county Extension personnel to expand extension and research communication; and (3) one-to-one assistance in financial and risk management.

As one example, along with numerous one-day events on various risk management topics, 41 producers attended a 64-hour *Master Marketer* workshop program in FY06. Attendance included producers from 3 different states. These individuals greatly enhanced their risk management knowledge and skills. Many of the Master Marketer graduates go on to become marketing club leaders in their respective counties thereby teaching others about risk management tools. A new, in-depth training program for new and emerging producers was launched in FY03—referred to as Tomorrow's Top Ag Producer Program, TTAP. Over 100 contact hours with each participant occurred through the 15-month curriculum ending in January of 2004. The second TTAP program began in November 2005, and the classroom portion of the program ended in January 2007. One-to-one producer assistance using district-based risk management specialists was facilitated through the TCE-TAES jointly developed *FARM Assistance* decision support system. Individual agricultural operations statewide, using information specific to their business, can now effectively assess the risk of proposed changes and the projected impact of those changes on their net worth 10 years down the road. Producers completing a FARM Assistance analysis agree to have their information entered into a confidential database for use by research economists as well as for the development of educational programs to serve additional producers, some from underserved populations or geographic regions.

The *Agricultural and Food Policy Center (AFPC)*. The farm program is an integral part of the risk management decisions producers must make. AFPC conducted analyses for Congressional leadership and communicated results to state and national commodity groups relative to the economic health of representative farms under various policy scenarios. The

AFPC also analyzed alternative approaches to support ethanol production, and to project growth of the biofuels industry.

The *Center for North American Studies (CNAS)* (a joint TAES-TCE activity) evaluates trade policy scenarios and their economic impacts on various sectors of the agricultural economy. CNAS has taken the lead with other in-state groups relative to trade with Cuba and analyzing potential economic benefits to the U.S. farm sector. The WTO decision related to cotton is still receiving CNAS attention in FY06. Both CNAS and AFPC are studying the impacts of changing planting restrictions on the fruit and vegetable industries. CNAS has taken the lead in estimating the economic impacts of invasive species on the Texas potato and citrus industries, studying *Zebra chip* and *citrus greening*.

Economics of Water Investments/Irrigation Technology: In the Texas Rio Grande Valley, Texas Agricultural Experiment Station (TAES) and Texas Cooperative Extension (TCE) economists are collaborating with (a) irrigation managers and their consulting engineers, (b) agricultural producers, (c) municipal water suppliers, and (d) USDA Agricultural Research Services (ARS) scientists to evaluate the economics of capital investments in water-delivery infrastructure, alternative water supplies, conservation via irrigation technology, and the financial implications of water-delivery rate changes. In order to achieve the objectives, several tools have been developed/utilized, including: (1) An economic and financial model RGIDECON (Rio Grande Irrigation District Economics) is being used to calculate the economic and financial costs of projected water and energy savings for several capital rehabilitation projects. (2) VIDRA (Valley Irrigation District Rate Analyzer) is being used to assist several irrigation districts in understanding the likely financial outcomes of changes in water-delivery rates to agricultural, municipal, and industrial users. (3) Enterprise budgets for the many crops grown in the Valley are being updated. (4) An economic model, DESAL ECONOMICS, is used to calculate the life-cycle costs to produce and deliver reverse-osmosis water. (5) CITY H2O Economics, is being developed to evaluate costs for conventional municipal surface-water treatment. (6) An analysis of the expected benefits of the El Morillo Drain, a drain that diverts high-saline water from entering the Rio Grande, has been completed. (7) The Agricultural Economic Benefits model has been updated and used to estimate the benefits of flood control and major drainage infrastructure for the U.S. Corps of Engineers. (8) Collaboration has begun with the USDA-ARS to perform economic analyses associated with a potential management program for controlling Giant Reed (*Arundo donax*), an invasive weed that consumes excessive amounts of water.

Financial recordkeeping tools and management information systems have improved risk management decisions for beef cattle producers through the *Standardized Performance Analysis (SPA)* program. This one-to-one joint TCE-TAES program has led to computerized decision aids using coordinated Excel spreadsheets. The SPA database also is used for applied research and the development of improved education programs for beef producers. *The Tomorrow's Top Ag Producer Program* is another example of intensive education with one-to-one follow-up to increase the adoption of information technology.

The emphasis in risk management by TCE-TAES is targeted toward owners and operators of commercial size farms and ranches. Some of these commercial operations are geographically disadvantaged in that they are located in isolated areas. Marketing clubs and the delivery of education based on the FARM Assistance database are reaching underserved populations, such as along the border with Mexico. Through additional funding support from the Southern Region Risk Management Education Center (managed for the Southern Region by

TCE), risk management programs have been adapted for small scale agriculture audiences through the network of 1890 institutions in the South.

TCE-TAES are collaborating with other CSREES partners, including Kansas State, Oklahoma State, Mississippi State, Montana State, University of Minnesota, Iowa State, University of Missouri, Cornell, Virginia Tech, New Mexico State, Louisiana State, and the Prairie View A&M Cooperative Extension Program. External collaborators include the Texas Farm Bureau, the Texas Corn Producers Board, the Texas Wheat Producers Board, and the Texas Cotton State Support Committee.

B. Impact of Programs

Master Marketer Educational System (MMES): MMES consists of a number of coordinated educational efforts including: Master Marketer training, Advanced Topics Series, Tomorrow's Top Agricultural Producers Program (for young or new producers), leveling workshops, and marketing club activities. These group training efforts are supported by the *Risk Management Curriculum Guide*; *Marketing Club Leaders Guide*; a website for education and market updates; newsletters; and market outlook & agricultural policy update teleconferences.

One result of the in-depth Master Marketer Workshops is producers highly trained on the subject of risk management. In surveys of participants conducted 2.5 years after they completed the 1996-2004 Master Marketer workshops, 681 producers estimated, on average, that their *annual* incomes had improved by \$33,640 as a result of adopting effective marketing and risk management practices. If the 128 producers who have participated in the four in-depth workshops since mid-2004 received similar results, then the aggregate *annual* impact of this part of the program in Texas would exceed \$27 million in added combined income to the 809 producers!

The training appeared to have a major impact on the participants' risk management practices. For example, 38 percent of 681 producer-graduates from the 1996-2004 workshops said they had marketing plans prior to ending Master Marketer. Two and a half years later, 87 percent said they had developed marketing plans. Prior to the workshops, 44 percent said they used breakeven costs in marketing decisions. Two and a half years later, 79 percent indicated they incorporated breakeven price information into their enterprise marketing plans. Similar improvements were reported for other knowledge and skill variables. Producers indicated a 71 percent increase in improved confidence towards utilizing various marketing tools for risk management from participating in Master Marketer.

Master Marketer graduates agree to share what they have learned with others in their respective counties through small marketing club study groups. This volunteer aspect greatly multiplies the educational impact of the program. More than 90 marketing clubs have been started or revitalized by Master Marketer volunteers—helping to extend risk management education to producers across the state. Members of current clubs were surveyed in 2003. Of the 407 producers who responded to the survey, marketing club members indicated they increased their gross revenue by an average of \$12,399 per year as a result of their participation in a marketing club.

Tomorrow's Top Agricultural Producer (TTAP): Tomorrow's Top Agricultural Producer Program was launched in FY03 to reach the risk vulnerable audience of new producers. The second TTAP class began in November 2005, and the classroom portion of the training ended in January 2007. With the risk and financial commitment necessary to enter farming or ranching in

today's economic environment, new producers need all the financial and risk management assistance they can get. The entire curriculum covers four weeks over a 15-month period. Over 100 contact hours occurred with participants in this intensive program that focused on the necessary elements of developing a formal business plan for their operation—a way to provide the business tools that all producers need to effectively manage and market their production. Volunteer mentors are utilized in Phase II of the intensive program where each program participant was assigned three mentors. A formal evaluation of the 1st program was conducted in FY05 after the mentor program has been completed. Survey results indicate that graduates of the program achieved a 50% increase in business management skills, an increase in net farm income of 3.1%, and a reduction in their debt/asset ratio of 5.5%. The program was so successful in terms of improved knowledge and skills that the decision was made to conduct the program again, beginning in the fall of 2005. The second class will be evaluated in FY 07 after the mentoring program has been completed.

FARM Assistance: Financial and Risk Management (FARM) Assistance is a unique combination of Extension risk management specialists working one-to-one with producers—backed up by a sophisticated computerized decision support system planned, developed, and regularly modified by a team of TAES and TCE scientists. The FARM Assistance software allows risk assessment of differing strategic alternatives for the farm or ranch. As farming operations are becoming more diverse and complex, individual analyses of risk and financial factors, using research-based tools, are needed. More than 1,800 alternative risk management scenarios have been analyzed for individual producers since 1999—representing over 2 million acres of crop and pasture land.

One measure of the FARM Assistance program's impact is the projected net worth consequences of each risk assessment subscriber's starting situation versus the best-case or worst-case scenario. This measure indicates the potential gain or loss in net worth a producer could potentially see, at the end of the 10-year planning horizon, from a decision to continue current practices versus another alternative under consideration. From all the producers in the database, on average, a \$22,700 per year difference in net worth was calculated for this measure. Thus, risk assessment, using the TCE-TAES developed FARM Assistance decision support system can pay big dividends. In fact, seventy-three percent of the FARM Assistance subscribers responding to a survey indicated that their participation in the program allowed them to make a change that likely will have a positive financial impact on their operation. Eighteen percent said the analysis helped them avoid making a decision that likely would have had a negative risk impact. The FARM Assistance program has been recognized for use in FSA borrower training programs. When producers complete the planning requirements associated with their FARM Assistance analysis, this satisfies the borrower training requirements for FSA borrowers.

In addition to the advantages that individual producers receive for participating in this significant effort, many other producers and associated agribusiness firms are benefiting from the database that is being developed from accumulating the individual analyses. Producers want to compare the critical success factors in their operation to those of similar operations nearby. This secondary impact of the program is being used to further target educational programs and applied research efforts. Underserved audiences will be able to glean risk management ideas from database summaries. Joint TAES-TCE contributed papers have been presented on best risk management practices, success rates under alternative debt scenarios, and policy and tax impacts on types of operations.

Agricultural and Food Policy Center (AFPC): The Agricultural and Food Policy Center (AFPC) is a joint program of TAES and TCE. The decisions of producers regarding farm bill options are an integral part of risk management. Analyses of the safety net impacts of the 2002 farm bill and the various alternative policy proposals on representative crop farms were analyzed for the House Ag Committee. AFPC developed baseline analyses and presented them to the House and Senate Ag Committees, USDA policy analysts, and commodity groups. The Center also continued to study the economics of ethanol and other biofuel production in Texas as a diversification alternative for grain producers.

Economic models of representative farms and individual commodity sectors have been developed and used to conduct comparative statistic analyses of policy changes. Results focus on the change in the profitability of farms and ranches in Texas and the U.S. due to changing various policies. Basic research for this project involved development and documentation of a simulation language that runs in Excel. The policy facilitated our development and application of Monte Carlo simulation models for policy analysis, and this system has been adopted by researchers in USDA-AMS, Purdue, and U. of Arkansas as well as FAPRI, Columbia, Mo.

Center for North American Studies (CNAS): The Center for North American Studies also combines basic and applied research with outreach delivery through extension outlets. Although the Center has many varied activities, its focus for the past few years has been on the analysis of (1) NAFTA, WTO, FTAA, CAFTA and other trade policy impacts on U.S., Texas, and southern agriculture; (2) Mexican livestock, meat, and feed industries and fresh fruit and vegetable trade impacts via the North American Free Trade Agreement (NAFTA) on structure of industries resulting from trade liberalization; and (3) the economic impacts of renewed agricultural exports to Cuba. CNAS analysis of Texas trade and trade agreements illustrates the importance of exports to stimulate business activity, incomes and employment. Texas agricultural exports of \$3.2 billion support an additional \$6.3 billion in business sales, \$2.5 billion in income and 84,647 jobs. Analysis suggests losses of migrant labor due to lack of immigration reform would adversely affect Texas agriculture. It was estimated that business sales losses in Texas produce and landscape industries would reach \$363 million, income losses of \$544 million, and job losses of 9,260. Analysis of the economic impacts of invasive species indicates the Texas citrus and vegetable industries are significant contributors to the economy. If *zebra chip* and *citrus greening* infest Texas, losses in business activity would exceed \$169 million, while income losses would reach \$104 million and job losses could reach 2,050.

Economics of Water Investments/Irrigation Technology: In the Texas Rio Grande Valley, Texas Agricultural Experiment Station (TAES) and Texas Cooperative Extension (TCE) economists are collaborating with irrigation managers and their consulting engineers to determine the economic and financial costs of projected water and energy savings with the RIDGECON model. These associated costs are being provided for the capital rehabilitation projects being proposed to the Bureau of Reclamation, the Border Environment Cooperation Commission, and North American Development Bank. To date, 21 federally-authorized project components, with total estimated construction costs of \$63.8 million, have been analyzed. Using amortization procedures, these projects are estimated to save a combined 57,762 acre-feet of water (18.8 billion gallons) each year, with individual project components' cost of saving water ranging from \$16 to \$427 per acre-foot. An analysis of the expected benefits of the El Morillo Drain has been completed. This study provided a preliminary analysis of the apparent major benefits of the Drain accruing in South Texas, conservatively estimating that the annual direct benefits to residents of South Texas ranges between \$20.1 and \$31.6 million. Adding the

potential costs to agriculture from crop losses of about \$20.5 to more than \$76.9 million results in a total annual impact between \$40.6 and more than \$108.5 million.

Standardized Performance Analysis (SPA) and Beef PEP Program: Standardized Performance Analysis is a specialized applied research and extension outreach program, primarily for beef cattle producers. The Excel spreadsheet based management information system was developed and updated to analyze beef cattle financial and production performance. The Southwest Cow-Calf SPA database has 424 herds, 306,610 cows, and analytical results from this database are widely used in educational programming. Refinement of the financial statement and managerial accounting methodology continues with a coordinated effort with the Farm Financial Standards Council (FFSC) new management accounting project. This effort is helping to develop a consistent methodology in stocker/feeder cattle cost accounting for more informed, economic-based decision making by ranchers. An application of the SPA program was to evaluate the value of the adoption of technology in beef cattle through the Beef PEP program. Demonstration herds that adopted best management practices were shown to increase average net returns by \$52.96 per exposed cow. Statistical analysis indicated that 61 percent of this increase could be attributed to the Beef PEP program. Conservatively, if five percent of the cattle in Texas are in herds that adopt the best management practices in Beef PEP, the impact on the economy would be \$5.3 million.

Output Indicators:

No. of people completing non-formal risk management education programs—24,594

Outcome Indicators:

The total number of people completing non-formal risk management education programs who plan to adopt one or more risk management tools or strategies after completing these programs—4,140

The total number of people completing non-formal risk management education programs who actually adopt one or more risk management tools or strategies after completing these programs—2,413

C. Sources of Federal Funds

TCE: Smith-Lever and State Matching; USDA competitive grants and user fees

TAES: Hatch, and state, federal and private contracts and grants

D. Scope of Impact

Multi-State Extension – KS, OK, MS, MT, MN, IA, VA

Multi-State Research – MO, VA, CA, GA, OK, HW, AR, LA, NM, NY

Integrated Research and Extension: In the highly competitive and complex economy associated with food and fiber production, research and extension led efforts have allowed the industry to better understand the probabilistic aspect of their decisions, and the decisions of others in our global economy on their economic well-being.

State TCE-TAES Plan of Work Program 2: Field Crops and Forage Production
Key Theme: Agricultural Competitiveness, Agricultural Profitability

A. Description of Activity

Environmental stresses, crop pests and global market forces make profitable and sustainable production of crops and forages a continuing challenge. It is through understanding and adoption of technologies that improve productivity, profitability and global competitiveness of crop and forage production systems that Texas farmers and ranchers will enhance their competitive position to other producers around the world. The target audience includes farmers and ranchers who produce field crops and forage in Texas.

B. Impact of Programs

Applied research and outreach education programs through Texas Cooperative Extension had significant impacts on the production and economic success of growers in Texas in 2006. Through local, regional and statewide programs, Texas producers are the recipients of timely, sound and objective information to enhance their production success.

Texas is the largest cotton production state, producing four to five million bales annually, although favorable weather, improved pest management strategies and better adapted cotton varieties have pushed this total over 7 million bales in 2004 and over 8 million bales in 2005, with over 5.65 million bales of this record crop coming from the High Plains. The strong, interdisciplinary approach to cotton production through Extension education has had a marked effect on fiber quality and quantity in the Texas crop.

A notable success has been achieved by faculty at the Lubbock Agricultural Research and Extension center through a multi-year, multi-location set of cotton systems trials which evaluate the value of new cultivars and their fiber properties as well as transgenic traits in these cotton varieties.

With high input costs, low prices and foreign domination of mills, High Plains producers will struggle with profitability unless substantial gains can be made both in terms of yield and quality. Identification of more profitable newer transgenic and conventional varieties is resulting in important variety shifts by High Plains producers. It is expected that continuing increases in "new variety" acreage will have a major impact on both profitability and quality/marketability of High Plains cotton over the next few years. The new transgenic varieties containing Roundup Ready Flex and Bollgard II will be being closely scrutinized for yield and quality. According to the USDA, Cotton Varieties Planted reports for 2001 through 2006, significant variety changes in the High Plains can be documented. Varieties/technologies with lower overall economic returns are quickly being replaced by improved types. This is due to teamwork with industry (funding and willing cooperators) and the credibility we have garnered due to our large-plot projects.

One example is the rapid adoption of the FiberMax 958 conventional variety, which has been identified by the large scale Systems Variety Testing Project as a more profitable type. FiberMax 958 was NOT noted as one of the top 12 varieties planted in the 2001 USDA report, but was observed to be the number 5 planted variety in the 2002 crop with 7.7% of the total Lubbock Classing Office (territory acreage of about 2.9 million acres). In 2003, the FiberMax 958 variety was planted on 17.7% of the Lubbock Classing Office territory acreage

(second place ranking variety). In 2005, the percentage of acres planted to FiberMax 958 in the Lubbock Classing Office territory was 23.4%, again the highest ranking for a variety. For 2006, FiberMax 958 was again the number one planted variety in the Lubbock territory, at 14.6%.

In 2001, the Lamesa Classing Office (territory of about 700 thousand acres) indicated that FiberMax 958 was not listed among the top 12 varieties planted. By 2003, it was the top ranked variety (10.5% of acres). During the 2005 crop year, on the heels of the record sized crop of 2004, 29.1% of the Lamesa Classing Office territory was planted to this variety, which again was the top ranked variety. In 2006 28.0% of the Lamesa Classing Office territory was planted to FiberMax 958.

The High Plains of Texas, due to good growing conditions, timely rainfall, and excellent breakthroughs in genetics identification and adoption set record yields back to back (4.8 million in 2004 and 5.6 in 2005). In 2006, considerable acres were shifted to newer Roundup Ready Flex varieties and to older existing Roundup Ready genetics due to an aggressive drought relief program initiated by Monsanto. This is likely the reason why some decrease in planting of conventional varieties was noted in 2006. Incredibly, the 2006 cotton crop from the High Plains-- with about 1 million dryland acres failed-- will be the third largest crop ever with close to 4 million bales harvested.

The adoption of FiberMax 958 indicates that significant gains in yield, quality, and thus income are being obtained on these planted acres in a continuous manner. A variety planted to 28.0% of the Lamesa Classing Office territory represents about 196 thousand acres. A planting of 14.6% of the Lubbock Classing Office territory amounts to about 423 thousand acres. The total for planted acres of FiberMax 958 in 2006 from the two classing offices is about 620 thousand. If producers realized an average of \$50/acre in increased profits (due to combined yield and quality advantage) on these acres compared to what they were planting just a few years ago, this translates to a \$31.0 million increase in returns to the region in 2006 alone with the adoption of just this one variety.

In 2006, significant monetary gains were made by growers who planted this variety. The TASS Districts 1N and 1S production is estimated at 4.0 million bales. This is very strong production when considering about one-fourth of the total acres was lost due to drought. This means that for the most part, the High Plains 2006 production will be mostly from irrigated fields.

Based on classing office results for the 2006 crop, the following can be determined. The High Plains of Texas should break the record for longest average staple at about 36.1 (previous record was set in 2005 at 34.8; earlier record was in 1996 at 34.4 and slid precipitously to a low of 32.4 in 2000 due to poor environments and inadequate genetics). We should also set a record for bales classed with ≥ 34 staple, at about 96% of the 4.0 million bales. The previous record was 2005 with 83% on 5.6 million classed. For staple of ≥ 36 , 70% of the 2006 crop should fit into that category, again a record amount, which broke the previous record of 2005, which had 33%. According to the AMS Classing Offices at Lubbock and Lamesa, in 2005 we had 10% of the bales classed with a 37 or longer staple (about 560,000 bales total). In spite of the drought year of 2006, 42% of the crop will have a 37 or longer staple. On the 4 million bale 2006 crop, that amounts to over 1.68 million bales total.

Due to the aggressive use of harvest aids, as promoted by Extension education, and relatively dry weather for harvesting and ginning, the 2006 crop produced about 50% color grades 11 and 21, the highest color quality values possible. Bark contamination was also reasonably low with essentially 80% of the crop bark free. Average leaf grades will be in the 3.1

range, which is good, especially following the late season rainfall obtained in September and October.

In terms of bale volume for various staple length classes, the High Plains again produced record numbers of longer staple bales for some categories.

2006 staple length properties of Texas High Plains cotton

≥ 34 = 96% of all bales or 3.84 million (1996 had 79% of 3.1 million bales = 2.45 million total, compared to 3.26 million total for 2004, and 4.6 million for 2005).

≥ 35 = 88% of all bales or 3.52 million (1996 had 48% on 3.1 million bales = 1.49 million total, compared to 2.07 million total for 2004 and 3.33 million in 2005).

≥ 36 = 70% of all bales (2004 produced a record high percentage of 20%, with 920 thousand bales with this staple; the 2005 crop shattered that record with 1.83 million bales in this category; *and for 2006, there will be 2.8 million bales in this category*).

The impact of this could be described as follows. For a 37 staple (compared to a 34 staple, with same 21 color, leaf grade 3; loan rate of \$0.5445/lb), the CCC Loan Chart for 2006 indicates there is a 345 point premium (loan rate of \$0.5790). For 1.68 million bales that are 37 staple or longer, that translates into \$28 million in potential premiums for the region. On a two-bale/acre crop, this amounts to a \$34.50/acre quality premium above a 34 staple. This does not include any yield advantage which we have noted in many of our trials and have reported at numerous Extension meetings and in handouts.

Individual producers have indicated that our systems variety testing program is of significant benefit to them. In March 2004, a grower from Spur (Marshall McGalliard) sent an e-mail commenting as follows: *"I would like to express my thanks for your assistance in selecting cotton varieties last year. Your information meant an additional \$50,000 return for our farm since we did not have the 7 cent/lb dock for high micronaire. Production was very good in a very difficult year. Our production was in the premium price range on the loan chart (54 to 56 cents plus). All of this resulted in the least stressful refinancing period I have ever had in farming. Your information is in a format that is easily applied to our operation."* Other growers have responded to questionnaires submitted and have indicated that after surveying our project reports, they have changed varieties and increased staple length of the cotton produced on their farms. At the Southwest Farm and Ranch Classic held at the Lubbock Civic Center on January 23, 2007, Brant Baugh and Mark Brown asked the following questions on a survey.

1) Do you utilize Extension Demonstrations Results to make cotton variety selection decisions? 100% of the 39 respondents surveyed indicated "Yes."

2) Do you intend to make any changes in your farming practices based on the information provided in today's seminar? 87% of the 38 respondents surveyed indicated "Yes."

Over several years, this Soil and Crop Sciences project group has undertaken a project to fundamentally change cotton stalk destruction on the Gulf Coast and in Central Texas from a mechanical process to the use of a well defined BMP with herbicides immediately following

stalk shredding. It has had a profound impact on the mortality of cotton stalks and a proportional decrease in favorable feeding sites for cotton boll weevils. In 2005 the unit distributed 8,000 copies of a stalk destruction publication describing BMPs for stalk destruction in the Rio Grande Valley, Coastal Bend, Upper Gulf Coast, Brazos River Valley and Southern and Northern Blacklands production regions. The Boll Weevil Eradication Foundation estimates that due to this comprehensive educational program that 60% of the acreage (about 664,000 acres) was treated with herbicides for stalk destruction.

The shortage of moisture during crop production remains the one variable which most limits yield and sustainable crop production. Water availability in the state has been identified by many sources as the number one concern of public officials and citizens alike. It is documented that conservation tillage systems typically conserve between 1- and 2 inches more stored soil moisture when compared to crops produced with conventional tillage systems. The educational programs of Texas Cooperative Extension and partner agencies have resulted in a significant trend towards the adoption of high residue crop production with reduced tillage practices. In addition to reducing fuel, equipment and labor usage in crop production, reduced tillage practices on 3.9 million acres of cropland are estimated to conserve 6 million acre inches of water from precipitation and irrigation, as well as reducing soil erosion and stream sedimentation by significant amounts.

With the increasing urbanization of the state, ornamentals are comparable in value to our highest value field crop, cotton. Extension Program Specialist in Overton, TX has been instrumental in conducting educational programs for Biotype Q whitefly. This whitefly can become a problem in ornamentals, vegetables and cotton due to insecticide resistance to some of the newer compounds. Texas Extension has interacted with co-workers in Florida and Arizona to conduct major educational campaigns to keep producers informed of the pest. Thus far no Biotype Q has been reported in Texas and Extension has led the way to get out 4000 newsletters all over the country plus major publications (Greenhouse Grower and Cotton Grower) that have reached over 20,000.

Extension horticulture and entomology were involved with a new scale species on ornamental grass. This was the first documentation of the armored scale *Duplachionaspis divergens* in the state of Texas. Extension suggested the grower cultural and chemical control techniques based on Texas Extension current research in scale. The Texas Department of Agriculture was notified of the find by the grower and Extension. TDA has been unable to find any live scale on the plants after Extension's suggestions were followed. The grower figures Extension's rapid response saved him \$4000 in crop loss since TDA could have put a stop sale on the plants.

Pecans in Texas can be a \$20 to \$50 million industry depending on production. The pecan is a native tree that is under attack by a number of pests. Commercial and backyard pecan growers must apply insecticides for pecan nut casebearer in most years in the spring to protect the nut crop. Proper timing of this treatment is critical to success yet difficult to determine. Extension Entomology has major projects in pecan nut casebearer and stink bugs. Extension specialists recruited homeowners and county agents and trained and provided pheromone traps to 40+ volunteer pecan producers in 14 counties. Trap data from these producers were used to generate the Texas PNC prediction map that was posted on line on the pecan web site <http://pecankernel.tamu.edu/> and emailed to all CEA's-Ag, EA-IPM, CEA-Hort agents and to 80+ producers on the pecan email newsletter list. Using trap data, optimum dates for applying insecticide can be predicted and communicated to growers by TCE. Monitoring casebearer

flights was especially important in 2006 as insect activity was 7-10 days earlier than usual due to the warm spring in south and north central Texas. Trap data allowed TCE to alert growers to this early flight and thus avoid economic damage due to poorly timed insecticide treatments. Extension Entomologists in West Texas monitored several commercial pecan orchards for PNC activity and made pest management recommendations to them. The total acreage for the orchards we monitored was 450. TCE recommendations (if followed) potentially resulted in a savings of \$130,000. The figure is based on a conservative yield loss of 20% without treatment, an average yield per acre of 1800 lbs and a market price of \$1.50.

A complex of stink bugs (Pentatomidae) and leaffooted bugs (Coreidae) feed on pecans during the growing season with most of the economic damage occurring during the late summer and fall. Late season stink bug feeding results in black spots on kernels thus rendering the pecan inedible. Management of late season infestations is difficult because of limitations on the use of insecticides close to harvest, difficulty in scouting for damaging populations and the lack of established treatment thresholds. Four counties (Bastrop, Burleson, Fort Bend and Victoria) were identified from either 2004 county pecan show samples or producer complaints on late season stink bug damage for establishing trap crop demonstrations. In these demonstrations, an alternate host plant (Pearl millet) was planted as a trap crop for kernel feeding stink bugs and leaffooted bugs. Within each of the four counties, volunteer producers will establish a trap crop next to their pecan orchard to draw mid and late season populations of stink bugs and leaffooted bugs away from pecans. Populations of stink bugs and leaffooted bugs in these alternate host plants can be controlled with insecticide applications if needed. Results from this program are summarized by location:

Bastrop County. From a total of 90 Pawnee pecans collected near the millet plot with the most activity, kernel damage from stink bugs/leaffooted bugs was 6.6%. From the producer's evaluation/grading of Pawnee near the same plot, damage ranged from 3 to 6%. On the same variety away from the plot no damage was observed. Grading by the producer for 55 samples representing 1,500 pounds, no stink bug damage was observed. In comparison of other varieties between 2004 and 2005 from the producer's records in Navaho variety in 2004 had 20% stink bug loss while in 2005 no damage (0%). For one planting of the Wichita variety, the harvest had 10% loss in 2004 while no stink bug damage was observed in 2005. The added income to the producer would be \$540 per acre assuming saving a 20% loss of 1800 lbs of nuts per acre and a price of \$1.50 per pound.

Victoria County: Several different varieties were sampled at various distances from 4 Pearl millet plots. Damage varied extensively across the orchard ranging from 0% on a Desirable tree 500 feet from a plot to almost 60% on a Kiowa tree adjacent to a millet plot. The high percent damage is thought to be due to the movement of the insects from the millet to the trees as millet plots dried down. Again added income would be \$1620/acre assuming a 60% loss.

Waller County: At the Waller county demonstration site, 275 pecans were collected from 11 Pawnee trees across the orchard. Damage per tree ranged from a high of 36% from one tree adjacent to a millet plot to 0%. Averaged across all trees, stink bug damaged pecans from Pawnee averaged 5.8%. From the producers evaluation of 600 pounds the same variety, only a 1% loss was observed.

The Texas IPM program continues to conduct outstanding work that has a major impact on Texas crop production. The program averages 300 applied research projects, 12,000 farm visits, 250 county meetings and 140 crop tours and field days annually. The program also leverages state and federal funding by averaging \$500,000 annually in extramural funding. Producers in Texas continue to benefit from IPM programs being conducted by EAs-IPM across the state. Two programs are just an example of the benefits that producers say they received from the program. The program in Ellis and Navarro (Glen Moore) conducted a survey of their participants. Fifty percent of the participants valued the program at \$11-\$15 per acre, 17% valued the program at \$6-\$10 per acre and 33% valued the program at \$1-\$5 per acre above costs. With 10,000 acres in the program this resulted in a net gain for producers of approximately \$88,500. The Northwest Plains Pest Management Program (Monti Vandiver) reported similar results. Surveyed producers indicate that IPM has reduced their pest management costs. One producer stated *“the scouting program saved me at least one spraying and possibly two this year”*. This saved this producer \$7,200.00 (one spraying), preserved his beneficial insects, and reduced the amount of pesticides applied thus reducing environmental risk. According to program participants the Northwest Plains Integrated Pest Management Program has reduced pest management costs \$20.00 per acre in cotton and \$25.00 per acre in corn and increased net profit by \$41.00 per acre. This translates to \$563,955.00 in net profit for all acres participating in the Northwest Plains IPM Program since 2002 and \$34,850.00 per producer per year if applied to the average producer in Bailey and Parmer Counties. Chris Bass, winner of the 2004 and 2005 National Grain Sorghum production contest and IPM program participant since 2004, stated in an article in the “Southwest Farm Press” that integrated pest management plays a big role in protecting his crop. The article further quoted Chris stating *“I am fortunate to have a good IPM Agent, Monti Vandiver, and two good county Extension agents, Curtis Preston (Bailey CEA) and Cody Hill (Parmer CEA). Monti advises me on all my crops and has saved me money. Several times if I hadn’t followed his advice I would have treated when I didn’t need to.”*

Assistance with insect management decisions in the Lower Coastal Bend counties experiencing severe drought resulted in savings of an estimated \$11.80 per acre on approximately 200,000 acres. Specific action included recommendations to use cheaper seed treatments on sorghum, modification of the threshold for treating cotton fleahopper, providing forecast for insects in sorghum, and emphasis on more critical field scouting before money is spent for insect control.

In chinch bug infested areas of the Coastal Bend some people suggested that the high rates of newer seed treatments were necessary on corn to achieve effective control. Extension demonstrated in three previous field studies that the low rate was more cost effective even where heavy chinch bug numbers occur. Improvements in methods to manage stored grain insects are needed to reduce loss in weight, quality and costs associated with control, and loss of markets. Changes associated with increased use of protectants added to the grain as it was placed in storage was easier to evaluate than other IPM techniques. It was much more difficult to determine how many managers had actually adopted practices such as improved sanitation, grain cleaning, leveling of the grain mass once in storage, improved aeration technique, periodic monitoring of insect numbers, construction or sealing of storage facilities to hold gas fumigants, and development of fumigation management plans (now required by phosphine gas labels). Slightly over 17% of on-farm and nearly 5% of country elevator managers have begun to use protectants since Extension’s research data has shown the benefit. Greater adoption was not

obtained due the cost of such treatments (\$0.04 to slightly more than \$0.08 per bushel. The managers indicated that they desire 12 to 13 months effective control with protectants; therefore, another study was initiated with 7 treatments where the cost was maintained at \$0.04 per bushel or less to demonstrate products which will provide the protection for the period desired. Results will not be available for 12 more months. Work with two on-farm grain storage units indicate that the reduced rates will provide the requested control period (12-13 months). Currently grain managers, especially at the country elevator level, believe they can achieve adequate control with fumigants at a cost of \$0.02 per bushel; the on-farm fumigation cost is greater which probably accounts for the increased adoption of protectants with that group. We believe weight loss due to insect feeding may actually result in a loss where only fumigants are used due to increase in insect numbers between fumigations. Extension's studies on stored corn have shown slightly more than a 5% loss in weight in 12 months and nearly 16% loss after 20 months where no protectant was used with minimal loss in the better treatments (fumigants were not used). Adoption of protectants should increase dramatically if the tests (using less expensive treatments) currently in progress are successful. County Extension agents in Colorado, Wharton, Matagorda, and DeWitt counties along with the Texas High Plains GEEPS chapter have assisted with programs. Extension Agents- IPM have been of special help on the High Plains in conduct of the High Plains Grain Elevator Workshop. The annual Texas Gulf Coast Grain Handlers Conference was another forum where interaction occurred.

A screening program to identify host plant resistance to cotton fleahopper evaluated 108 genotypes representing *Gossypium barbadense*, *G. mutselinum*, *G. tomentosum* and converted race stocks from Mexico. Plants were exposed to cotton fleahopper adults in cages in no-choice trials and squares were rated for damage by examination with a dissecting scope. Also, screening 150 wild race stocks from Mexico was initiated late in the fall when these day sensitive genotypes began squaring under shorter day lengths. Many of these exotic lines have not been previously evaluated for plant bug resistance and may provide unique sources of genetic resistance to cotton fleahopper and related plant bugs

A statewide monitoring program that evaluated resistance in male bollworm was conducted from April to September 2006 surveying 10 Texas Counties. Moths were trapped near cotton fields using pheromone, Hercon Luretape® with Zealure. Vials were prepared in the Toxicology Laboratory, Department of Entomology at Texas A&M University, College Station, Texas, and shipped as needed to Texas Cooperative Extension personnel. Data from all areas in Texas was sent to Texas A&M University Toxicology Laboratory for analysis. Calculations included lethal concentrations that killed half of the population (LC_{50}); 90% of the population (LC_{90}), resistance ratios (number of times that the amount of insecticide used to kill 50% of the susceptible population has to be multiplied by to kill half of the field populations), and the statistical significance test for the resistance ratios. A great variability in response to cypermethrin was detected in bollworms across the state. Based on the lethal concentration fifty (LC_{50}) data, the most resistant populations were from Nueces, Burleson, Williamson and Uvalde Counties. The most susceptible populations were from Tom Green, Hockley, Swisher, and Parmer Counties. The status of cypermethrin resistance in Nueces County populations has changed in that highly resistant populations were found earlier in the season. For the first time *H. zea* was tested in Tamaulipas, Mexico, with a resistance ratio of 4.34 for the LC_{50} while simultaneously, Nueces Co. populations, across the border, revealed a resistance ratio of 10. Burleson County populations showed an improving situation, with a progressive return towards susceptibility from 2003 to 2005 and stabilizing in 2006.

Field experiments were conducted to quantify the effect of nitrogen fertilizer on cotton aphid population dynamics under a drip irrigation system. Soil residual nitrogen was determined for each treatment plot before treatment application and leaf nitrogen was monitored weekly for 5 weeks during July-August. Data will be used to establish a relationship between soil nitrogen and leaf nitrogen.

Two identical field studies were conducted by an experiment station scientist near New Deal to quantify the compensation ability of cotton to cotton fleahopper and *Lygus* bug-induced fruit losses at two phenological stages: three weeks pre-flower and the first three weeks of flowering. Experiments were designed to achieve different levels of pre-flower square loss and the loss of fruiting structures (squares and bolls) during early flowering by augmenting natural populations of cotton fleahopper or *Lygus* bugs with laboratory reared nymphs. Four treatments each were utilized for pre-flower and during-flower stages: 1) 3 bugs per plant augmented, 2) 1 bug per plant augmented, 3) naturally occurring background density (NC), and 4) 0 bug achieved through insecticide spray application (SC). The most significant finding of this study is that while cotton has tremendous ability to compensate the early fruit loss, there is a clear difference in cotton plant's ability to compensate in response to manual removal versus insect-induced fruit loss.

A comparative study was conducted to quantify the compensatory ability of cotton to insect-induced early fruit loss in furrow irrigated (low input) versus drip irrigated (high input) cotton in the Texas High Plains. Preliminary data indicate that high input production system allowed plants to compensate proportionately more at a higher bug density compared with that in a low input production system but at a cost of delayed maturity. More research is underway on this subject.

A cotton variety trial was conducted to compare the economics of Bollgard II/Roundup Ready Flex versus Roundup Ready Flex-only cotton varieties under simulated commercial production conditions and measure insect damage (including an end-of-season boll damage survey), insecticide and application costs, yields, and economic returns. Even at the sub-economic levels of bollworm infestation this year, Bollgard II varieties provided marked reductions (to undetectable levels) in bollworm larvae and subsequent bollworm damage. Because negligible level of bollworm infestations in the 2006 growing season prevented us from discerning the entomological effect of these cultivars on lint yield, the yield differences observed amongst these cultivars were primarily due to their agronomic trait differences.

A number of seed treatment trials occurred across the state. Insecticides include Cruiser, Gaucho Grande, and Orthene seed treatments as well as experimental treatments (Valent (V-10112, V-10170)). The Gaucho Grande and Orthene treatments are applied to seed at higher rates than in previous years. Granular materials include the standard Temik and a numbered granular material from Bayer (KC 791230). The drought impacted many of the tests and the pest insect numbers were generally not high enough to obtain striking results. Insecticides evaluated for use against cotton fleahoppers included Carbine, Centric, Intruder, Trimax, Diamond, Orthene, and Bidrin. All products performed well.

Chemical stalk destruction was evaluated in the Blacklands and the Coastal Bend area. Chemical stalk destruction with 2, 4-D amine was extremely effective in both regions and could save the producers millions in costs associated with the boll weevil eradication effort. This was especially true in 2006 when late season rainfall prevented growers in those two regions from timely mechanical stalk destruction.

Boll weevil resistance monitoring to cypermethrin (a pyrethroid) and malathion (organophosphate) was conducted in South Texas. Published information by Plapp and Kanga on their work with weevils was used to calculate the resistance ratios. For cypermethrin, the resistance ratio of the Cameron population is 6 for the LC50 and 8.9 for the LC90. The confidence intervals for the LC50 and LC90 of the Cameron weevils do not overlap with those of the Ebony susceptible colony. Based on the information gathered by the Pietrantonio laboratory with this bioassay and on the published information on responses of weevils to cypermethrin in the past, the Cameron 2006 weevils are more tolerant to cypermethrin, and this could cause field control failures. The malathion bioassay analysis shows that the resistance ratios for the Cameron weevils are twice as high as the susceptible colony from Mission, TX. For both the LC₅₀ and the LC₉₀, the resistance ratios are statistically significant at the 0.05 probability level of error. However since the resistance ratios are around 2-3, it is expected that ULV malathion will control these populations in the field.

Forage.

More than 70 per cent of the 157 millions acres of Texas agricultural lands are classified as rangeland and permanent pastures. These lands produce the forages that sustain the Texas grazing livestock industry. The value of forages is largely measured through the value of the livestock that consume them. Forages supply about 70 per cent of the lifetime nutrients consumed by Texas livestock. The most recent cash receipts for all forage-consuming livestock in Texas were about \$7 billion, with nearly \$6 billion attributed to beef cattle. An educational program has been designed to reduce winter feeding costs of beef cattle and other livestock by establishing forage management systems which create year round pasture by the incorporation of annual legumes and ryegrass into management systems and through the use of stockpiled hay. This program has been very successful as indicated by the increased interest reported by County Agents from their producers in east, central and south Texas. The potential cash savings per cow per winter are significant. The average savings for cow-calf operators approximates \$100 per cow due to reduced winter feeding costs and lower fertilizer requirements for hay meadows. If this dollar amount is multiplied by the 3.2 million head of beef cows in the eastern one-third of Texas, there is a potential economic impact matched by few other programs in the state. One case study utilized this protocol and initial input costs for fertilizer on hay meadows have been reduced by over \$6000 in one year, or approximately \$60/head. Continued implementation of the program will result in increased adoption of sustainable pasture management techniques and additional savings for Texas ranchers and cow-calf operators.

Another example of a successful educational program targeting pasture and land management is the Pasture & Livestock Management Workshop for Novices. This joint TAES-TCE program targets urban absentee landowners who have a limited understanding of the soil-plant-animal interface. An intensive 3-day event has been held annually for several years at the Texas A&M Research and Extension Center at Overton. Both directly and indirectly, information provided by this workshop helps insure the wise use of the state's natural resources by this growing non-traditional clientele. The demand for this short course has resulted in a waiting list for interested participants. A follow-up, advanced course is now being offered for graduates of the introductory course. This has caused forage faculty with TCE and TAES to initiate new courses which will be offered at Huntsville in conjunction with Sam Houston State University and at Stephenville to help satisfy the demand for information by new and absentee

landowners in forage and land management. Due to the demand for this course, a new location was added in 2006 at Huntsville in collaboration with Sam Houston State University.

The feedyard industry is currently the largest consumer of silage in the Texas High Plains. However, dairy production in the area is steadily increasing and should create additional demand for quality silage. With the decreasing water table and increasing demand for silage, irrigation water may soon be the limiting factor in beef cattle and dairy production. Sorghum silage requires about 45% less water than corn, but growers have not widely produced this crop because of a preference for corn silage by the feedyards. Our research has shown that some sorghum silage hybrids contain energy values similar to that of corn silage. Because of declining water levels and increased pumping costs associated with high natural gas and diesel used in irrigation wells, the production of corn silage in some locations cannot be sustained. However, new genetics in sorghum may provide an opportunity for an alternative crop to corn that would reduce water usage but produce acceptable silage for the cattle feeding and dairy industry. Based on the research and education programs associated with this 6 year project, several of the major feedyards are now buying sorghum silage that previously had only purchased corn silage, and the National Sorghum Producers Association is adopting a list of “blue ribbon” sorghum silage hybrids that have both quality and yield sought by dairies and feedlots. The criteria for this blue ribbon list will come solely from the research and extension program conducted by faculty at the Amarillo Center. An economic study completed in 2006 showed a shift in corn silage acreage to sorghum silage, saving producers \$1.35 million in production costs and 300,000 acre inches of irrigation water in addition to offering farmers with a limited water supply another economically viable crop.

Nutrient Management.

The Texas 303(d) list is a list maintained by the TCEQ of water bodies which have exceeded or are threatening to exceed accepted levels of one or more contaminants. Eight water bodies which provide public drinking water in the Central Texas Blacklands were placed on this list in the late 1990s due to the presence in these lakes of atrazine, a popular corn, sorghum and turf grass herbicide. Upon determining the threat to public water supplies, specialists from the Department of Soil and Crop Sciences took leadership in an educational effort designed to reduce off-target losses of atrazine. They brought a group together which included state and federal agencies, industry and agricultural producers to focus on developing BMPs to mitigate the problem of off target atrazine runoff, while allowing continued use of this inexpensive, yet highly effective herbicide. It is estimated that loss of this herbicide would increase weed control costs in the affected areas by approximately \$45 million annually. Prolonged presence of excessive concentrations of atrazine in surface water supplies would most likely lead to label cancellation and withdrawal of the herbicide from current uses.

This work has been targeted to corn and sorghum producers in the Central Texas Blacklands where the eight atrazine-impacted watersheds lie. Our goal is to reduce off-target losses of atrazine from surface runoff while allowing producers access to atrazine in their toolbox.

From a water treatment standpoint, reduction of atrazine to below 3 ppb (the maximum contaminant level) costs a water supplier \$15 per 1,000,000 gallons of water treated. An estimate of this increased cost can be calculated. For example, the Aquilla Water Supply District which supplies 2.36 million gallons a day, the annual cost of treated for one ppb of atrazine is estimated at \$12,921. For the City of Cooper which supplies 0.492 mgd, an annual treatment

cost is estimated at \$2,694. However, if having to supply their customers with an alternative source of drinking water (required by TCEQ and the US-EPA if an MCL violation has occurred), costs for meeting just the daily human consumption (one gallon per day) demands of both water supply systems could reach approximately \$10 million per year.

By involving corn and grain sorghum producers in the program, ambient lake concentrations for atrazine in Big Creek Lake near Cooper, Texas has decreased from a level above 3 ug/L in June of 1998 to below detection limits by late 2004. In the Aquilla watershed, atrazine concentrations in Lake Aquilla have dropped by over 60% to levels well below the one half MCL (trigger point for listing/delisting on 303(d)) of 1.5 ppb. Similar trends in concentrations are being noted throughout Aquilla watershed from the TAES/TCE monthly and storm water sampling program completed in 2004. This data combined with continued TCEQ water quality monitoring associated with Lake Aquilla shows lake concentrations for atrazine in Lake Aquilla are now meeting water quality standards. In 2004, TCEQ and TSSWCB approved the delisting of these water bodies as well as Richland-Chambers Reservoir, Lake Tawakoni, Lake Lavon, and Lake Joe Pool. These recommendations are currently being reviewed by Region 6 of the US-EPA for final approval. By delisting these lakes, TCEQ and TSSWCB are confirming that these water bodies which provide drinking water to over 1.5 million Texans are now meeting water quality standards for atrazine. This has proven to be a major victory in pollution prevention through education and the implementation of best management practices. It should be noted that Marlin City Lake was delisted in 2002 through similar efforts and the final two lakes (Bardwell and Waxahachie) are expected to be recommended for delisting when the 2006 303(d) list is prepared.

While somewhat dependent upon crop species and location; herbicides are the most widely used class of pesticides. The judicious use of herbicides reduces the expense of crop production by reducing tillage and labor demands; enhances crop yields by minimizing competition with weed species, improves crop quality by reducing foreign matter and moisture in the crop at harvest and reduces spoilage in post harvest storage. The adoption of transgenic crops by Texas farmers has met with a very wide acceptance. Texas Cooperative Extension in collaboration with TAES are largely responsible for disseminating information related to utilizing new weed management systems in an environmentally safe manner. In 1996, the first transgenic crops were commercially planted in the state. This amounted to less than 25,000 acres of soybeans, with no transgenic traits in cotton and corn. In 2005, it was estimated that 80% of the state's 230,000 acre soybean acreage was transgenic, 56% of the state's 5.93 million acre cotton crop and 35% of the state's 2.05 million acre corn crop were transgenic. To accomplish this rapid large scale transition to genetically enhanced varieties, Extension faculty initiated approximately 300 weed management trials in 2004, as well as large scale plots in the Texas High Plains to compare the value and production expense of transgenic technologies in cotton. Hundreds of educational events were conducted which discussed the new technologies, utility of the transgenic traits in aiding insect and weed control, and potential drawbacks regarding technology fees, marketing and impact on yield and quality. The herbicide and insect resistance in these major field crops has significantly reduced crop production risk, allowing farmers to produce food, feed and fiber with less production expense, improved environmental quality by allowing farmers to use more environmentally benign herbicides as well as using thousands of tons less herbicides and insecticides. These transgenic crops have also allowed the development of no-till and high residue conservation tillage crop production systems which

reduce erosion, decrease consumption of fossil fuels, decrease production cost and improve wildlife habitats.

A new generation of herbicide and insect tolerant cotton varieties hit the market in 2006 with as many as 80 new varieties available with enhanced insect resistance and properties to allow new weed control strategies. Texas Cooperative Extension and the Texas Agricultural Experiment Station had hundreds of trials in the field to evaluate these new technologies and provide science based information to producers on the economic value of these new traits.

In South Texas, the Sorghum cropping systems program investigated alternative strategies for cropping systems management. Row spacing studies comparing 15, 19 and 20 inches showed significantly better yields compared to conventional row spacing (36, 38 and 40 inch row spacing). Plant populations of 50,000 and 70,000 plants/acre in coastal irrigated and dryland areas, respectively, significantly improved yields and profit margins. Studies also showed that Gaucho and Cruiser seed treatments and granular Counter provided net returns of \$42 to \$69/acre through control of yellow sugarcane apid. Systemic insecticidal seed treatments improved crop returns from \$2 to \$24 per acre. Field studies of newly developed foliar micronutrient treatments increase grain yields by 16%, providing an \$18.53/acre return above product and application costs. In the Rolling Plains, sorghum/cotton cropping systems that include interseeded rye were used to capture rainfall and produced yields of both crops which were well above long-term averages. In the Southern High Plains, rotation studies showed a 26% increase in lint yields with 19% less seasonal irrigation for sorghum-cotton rotations compared to continuous cotton.

Educational programming and collaboration between and among several agencies have been used to expand the use of nutrient management planning in crop production systems. This includes training programs for industry and consultants and efforts to enhance the adoption of soil testing as an important economic and environmental BMP. The following paragraphs include examples of programs in these areas.

Field correlation studies to evaluate current soil test phosphorus recommendations were conducted across the state in both field and forage crops by TCE and TAES. At the same time, laboratory evaluations were conducted to compare alternative extractants for determination of soil test P. Joint efforts also were conducted with Oklahoma State, Louisiana State and the Noble Foundation to improve the strength and consistency of recommendations for agricultural producers. As a result of these efforts, the TCE Soil Testing Laboratory adopted the Mehlich III soil test extractant in January of 2004. Field and laboratory studies are ongoing in collaboration with public and private laboratories in Texas and surrounding states to create a uniform Mehlich procedure and a uniform field sampling procedure which will correlate well with environmental samples.

Texas Cooperative Extension, working with USDA-NRCS developed and implemented the Texas Certified Nutrient Management Planner program. The course and exam certify individuals affiliated with the government, private consultants and/or growers to develop nutrient management plans approved by state water resource agencies. The 4-day training event has been conducted 18 times at locations across Texas. To date, a total of 260 professionals have been trained, with 205 receiving full certification. All future new and revised state and federal conservation plans will be impacted by this program.

Nutrient management education for field and forage crop producers also was conducted through a series of 43 county and regional meetings and workshops which provided educational

information and resources to over 8,800 producers in 122 counties regarding soil testing and nutrient management.

Soil Testing/ Nutrient Management Campaigns in the Blacklands, Coastal Bend and Lower Rio Grande Valley regions of Texas were conducted by TCE in cooperation with USDA-NRCS, Texas Commission on Environmental Quality, Texas State Soil and Water Conservation Board, and other agencies, as well as in cooperation with numerous commodity support organizations, including Cotton Incorporated. In one 4-county program conducted in the Lower Valley, 746 samples representing 38,000 acres (a 67% increase in the use of soil testing in the area compared to the previous year) were obtained. Results of the testing showed the potential for growers to reduce fertilizer applications by 869,883 lbs of nitrogen and 1,390,847 lbs of phosphorus compared to rates proposed before testing. In addition to the environmental benefits, the total economic impact for producers was estimated at \$553,612 based on average per pound costs of nitrogen and phosphorus. Average per acre savings for major crops in the regions ranged from \$11.64 to \$25.53.

Other Impacts.

Soil science research has determined chronological effects of soil and crop management practices on soil quality, nitrogen cycling, carbon sequestration, and fractionation into different organic matter pools which will enhance the efficiency and productivity of cropping systems while maintaining environmental quality. Research by the same project leader identified significant residual nitrate in soil profiles of monoculture cotton from the Rio Grande Valley to the Southern High Plains which will improve the economics of crop production in light of high price of nitrogen fertilizer, and for water quality and associated human health.

The Texas A&M ryegrass-breeding program continues to have a significant impact on the livestock industry in Texas and in Oregon. Several million pounds of the variety TAM 90 are produced in Oregon and planted annually in Texas. Collaborative programs between TAES and TCE have shown that the use of ryegrass in conjunction with winter annual legumes significantly lowers the winter feeding costs for cattle.

Emphasis in the forage improvement program is presently being placed on the development of forage cultivars which may also be used as food plots for wildlife. Efforts are underway to develop a new Lablab cultivar, a low coumarin sweetclover, cowpeas, and several new annual medics. The release of four bundleflower cultivars (Bedes 06, 08, 37 & 57) which will be marketed as a blend ('BeeWild') is anticipated to positively impact both livestock and wildlife industries.

Forestry research has focused on ecological, evolutionary and population genomics of conifers and other gymnosperm plants. The most important impact is on how forest genetics and breeding diverges greatly from its agricultural counterpart. This has implications for federal, state and corporate policy and public investment in research. Results from this research is being used to assist with climate change forecasts in the southern U.S. pine forests, and in developing an understanding of why the ancient conifer genome changes so little in comparison to flowering plants. This latter will be important in elucidating higher plant genome evolution. The tree growth rate research has immediate relevance to genetic gain per year in breeding programs for U.S. timber companies and researchers are working closely with commercial companies, Department of Energy and the USDA-Forest Service to transfer and implement this new technology.

Data on the 18,000-year ecological histories and unique generic descriptions of U.S. forests are being updated to include new information. Additionally, practical and effective silvicultural and management alternatives are being analyzed for restoring and sustaining pre-European settlement forests in the U.S. When complete, these descriptions and techniques can guide the management of protected forests, public working forests, and industrial forests. This research has led to the introduction of The National Historic Forests Act of 2001 (H.R. 2119) in the U.S. House of Representatives.

Twelve improved varieties have been developed/co-developed and/or released from the Texas Potato Breeding and Variety Development Program led by Creighton Miller of the TAMU Horticultural Sciences Department. Virtually all of the russet potatoes grown in Texas in 2006 were the improved Texas Russet Norkotah strains from this program. When this program was initiated in 1973, the average yield of the summer crop in Texas was about 200 Cwt/A. By 2005, the average summer crop yield in Texas was reported to be 440 Cwt/A, the highest in the nation among 12 states with summer crop production. In addition, the farm gate value of the crop has grown from less than \$20 million to about \$70 million with an annual economic impact to the state estimated to exceed \$150 million. Of all varieties released over the past 15 years by the 12 potato breeding programs in the U.S., those developed by the Texas program rank second nationally in total acreage approved for seed certification in 2006. This is especially significant, because the state does not have a potato seed industry to promote Texas varieties.

The Texas cowpea research program continues to develop pinkeye, black-eyed, and cream varieties possessing improved plant architecture, high yield, and disease and drought resistance. The related program on mungbean continues developing improved varieties with synchronous flowering and improved yield and sprouting characteristics. The Texas mungbean release, 'TexSprout', is grown nationally and internationally. The program continues screening investigations for chlorosis in cowpea grown on high pH soils. Recent studies have also been aimed towards understanding the inheritance of antioxidant activity and its association with seedcoat color in cowpea. This work has determined that breeding for high antioxidant activity is possible using highly pigmented parental lines.

The peanut industry is demanding high oleic/linoleic oil peanuts for improved flavor and enhanced shelf-life of peanut products in the U.S. marketplace. The release of three new peanut cultivars, OLIN and Tamrun OI01 and Tamrun OL02 is having a huge impact on the Texas peanut industry. In 2003, yields of Tamrun OI01 approaching 5,000 lbs/ac were recorded in south Texas. The success of this variety is directly responsible for the increase in acreage of peanuts in south Texas in 2004. A conservative estimate of value for these lines (increase over present varieties) to Texas Peanut Growers is as much as \$20 million per year after the seed increase generations have been completed. With the harvest completed on the 2005 crop, value added due to the high oleic lines and high yielding lines from other breeding programs due to Texas A&M variety testing and educational programs was estimated at \$1.9 million.

Competition among cotton producers in a global market and a decreasing genetic base make it imperative that cotton be improved for Texas' producers. About 15 varieties are commercially available that contain germplasm from the Texas program, and significant improvement in fiber quality of cotton produced on the Texas High Plains has placed Texas cotton in demand by the textile industry. The quality of our cotton ranks second only to California. The high quality germplasm released from the Texas program for use in varietal development has improved the selling price from 2 to 5 cents per pound of lint.

A College Station based sorghum breeder identified the genetic basis of sugar production in sweet sorghum which increases biofuel potential of this renewal agricultural resource for bioenergy production. With a major national emphasis on enhancing self reliance and renewable energy resources, this discovery holds great promise in enhancing ethanol yields from sweet sorghums and forage sorghums. This breeding program also developed and released sorghum inbred lines that have been adopted by private sorghum breeders in drought tolerance, disease resistance and grain quality for sorghum hybrids grown in the U.S. and throughout the world. The Texas Agricultural Experiment Station and Texas Cooperative Extension are in the forefront of investigating new concepts in converting crops and crop residue into energy. In preliminary studies, sweet sorghums appear to have great potential to replace or supplement feed grains as a source of ethanol due to their high sugar content, high yield, potential for multiple cuttings per year and their tolerance to heat and drought. Ongoing investigations include the breeding programs as well as investigations at the genome level to assess properties associated with energy yield and cropping systems work to establish BMPs with this potential energy crop.

The nutrient value of sorghum as a food product has long been ignored in the U.S. A Soil and Crop Science food scientist recently found significant levels of non-tannin bioactive compounds in certain sorghum types that have significant potential in improving human health. He also confirmed that special black sorghums with genes that give a pigmented testa have high levels of condensed tannins along with high levels of anthocyanins which could produce foods with improved health benefit due elevated levels of antioxidants. These new sorghums have antioxidant levels that surpass blueberries, which to this point have been the standard for health foods with respect to antioxidants. He demonstrated that these black sorghums can be easily decorticated to produce bran with high levels of dietary fiber and antioxidants. Along with this line of research, prototype research products from special sorghums with dark natural color also enhanced dietary fiber levels.

Sorghum downy mildew, a potentially devastating disease of grain sorghum has been kept under control primarily by the use of resistant grain sorghum hybrids and seed-treatment fungicides containing the active ingredient metalaxyl. Recently, a new variant (pathotype) of the downy mildew fungus was discovered when the disease became prominent in fields planted to resistant grain sorghum hybrids in several counties on the Texas Upper Gulf Coast. Research and extension faculty of the Department of Plant Pathology identified the problem as a new pathotype of the pathogen which was capable of overcoming the host resistance to pathotype 3, the most predominant pathotype in the Upper Gulf Coast. The new pathotype is also resistant to the widely-used seed-treatment fungicide metalaxyl. Grain sorghum germplasm is now being screened for resistance to the new sorghum downy mildew pathotype.

Asian Soybean rust is a devastating disease of soybean, newly introduced into the United States, and is projected to cause significant yield loss in United States soybean production in the near future. In Texas, a system of sentinel plantings of soybean-rust-susceptible plants has been established during each growing season to detect soybean rust early enough to alert growers of its progress in a timely manner. Grower educational programs have been conducted in all the soybean productions areas in Texas. Field tests have been established to evaluate fungicide efficacy and timing.

It should be noted that the crop improvement programs conducted by TAES represent a partnership with TCE specialists and county agents, farmers, consultants, and agribusiness in Texas as the germplasm, parental lines, and varieties which are ultimately released are tested statewide prior to release. Grain sorghum and cotton in the Texas Coastal Bend area that yield of

grain sorghum may be sustained better using lower plant populations (30,000 to 40,000 plants/ac in 38 in.-rows) under severe dryland conditions. Cost of production is also lowered using lower plant populations (60,000 plants/ac) under irrigated conditions. Grain sorghum yields are dramatically increased (20-25%) using narrow rows (double rows 12" apart in 38 inch beds) under irrigated conditions. Double rows also increase yields under mild dryland conditions. Lower planting populations (30,000 plants/ac in 38"-beds) also sustain yields better in cotton compared to higher populations normally used by farmers in South Texas.

C. Source of Federal Funds

TCE: Smith-Lever and state matching

TAES: Hatch, and state, federal and private contracts and grants

D. Scope of Impact

Multi-State Extension - OK, KS, GA, MS, AR, TN, KT, NM

Multi-State Research - AL, AR, CA, LA, MO, MS, SC, CO, ID, ME, MI, MN, ND, OR, WA, NE, NM

Integrated Research and Extension: Breeders work, closely with their extension counterparts in the field trials and evaluation of new cultivars, varietal plantings and demonstrations of advanced lines for county agents, farmers, and specialists.

State TCE-TAES Plan of Work Program 3: Livestock Quality and Profitability
Key Theme: Agricultural Competitiveness, Agricultural Profitability

A. Description of Activity

Texas ranks first in the nation in total livestock value and also has the broadest spectrum producers and variation in production environments. High production costs and variable sale receipts for all livestock species necessitates adoption of best management practices to efficiently produce livestock and their resulting end-products that are cost-competitive with consumer alternatives while meeting the food quality and safety standards expected by our society. Educational programs are needed to increase producer awareness of consumer concerns and implementation of advancements in research proven production practices and developments in technologies to meet those needs while increasing net returns from livestock operations.

Research and education programs will focus on livestock genetics, nutrition, reproduction, both enhanced value and cost effective best management practices and how producers can increase profitable production efficiency while still producing high quality, safe, wholesome end products. Specific livestock recommended management practices in selection, nutrition, reproductive physiology, health, identification and meat science will be emphasized. Other factors that influence product acceptability in the market such as marketing methods and food safety issues will be stressed. The target audience is composed of beef cattle, horse, dairy, sheep, goat and swine producers, commodity group leadership, Extension educators and youth enrolled in 4-H and FFA livestock projects. Working relationships have been established with CSREES, NRCS, USDA, Texas A&M College of Veterinary Medicine, TAMU College of Agriculture and Life Sciences Departments (Ag Economics, Ag Engineering, Entomology, Rangeland Ecology and Management, and Soil and Crop Sciences), Texas Forest Service, Extension Disaster Education Network (EDEN), National Incident Management System (NIMS), Texas State Animal Resource Team (TxSart), Texas Commission on Environmental Quality (TCEQ), Texas Soil and Water Conservation Board, Texas A&M Kingsville, A&M Corpus Christi, Texas Tech University, West Texas A&M University, Oklahoma State University, New Mexico State University, Texas Beef Council, Texas Cattle Feeders Assn., Texas & Southwestern Cattle Raisers' Association, Independent Cattlemen's Assn., Texas Association of Dairymen, Texas Pork Producers Assn., Texas Sheep and Goat Raisers Assn., Texas Quarter Horse Association, Texas Thoroughbred Association, American Horse Council, Texas Farm Bureau, Texas Animal Nutrition Council, and the feed manufacturing and pharmaceutical industries.

B. Impact of Programs

Texas Adapted Genetic Strategies (TAGS) is an Extension training program for genetic management of beef herds that integrates prevailing production and marketing conditions, functional genetic types appropriate for those conditions, applicable breeding systems, breeds to fit conditions and breeding systems, and selection of individual breeding stock. TAGS is supported by 11 TCE publications, with accompanying Power Points. Genetic mapping is a part of the last component, individual selection.

Texas Beef Quality Producers have been certified through Extension BQA training with emphasis on food production safety resulting from efforts in the validation and verification program of beef carcass decontamination collaborative research involving Extension specialists, scientists, and classroom educators to implement a stepwise process to determine industry decontamination procedures and parameters currently in use. Cattle at the same facilities are

sampled for the presence of *Escherichia coli* O157:H7 and fluorescent protein producing indicator bacteria. Laboratory testing of decontamination procedures is conducted according to industry parameters, and verification of pathogen reduction is tested in the laboratory followed by implementation in the industry. Educational materials, including an interactive CD, are being used by personnel in this work, and are included in formal university courses and industry-appropriate workshops. This work is providing a logical outline of microbiological data collection from the beef industry, combined with extensive laboratory studies to investigate the possibility of using non-pathogenic indicator bacteria for validation and verification of decontamination critical control points in slaughter processing. Ultimately, the resulting educational materials and programs will be used by both industry and in formal university courses.

Almost 4,000 beef industry leaders have participated in Beef 706 to learn more about what creates value in beef carcasses and ways they can change management practices and genetics to enhance quality, consistency and value of beef products. Eighty percent (80%) indicated they would make different business and safety decisions in their ranching operation as a result of participating in this educational program and 100% said they would recommend attending 706 to other beef industry members.

Texas Cooperative Extension continued to work closely with the Texas Beef Council and the Texas and Southwestern Cattle Raisers' Association in conducting Texas Beef Quality Producer Programs across the state. By close of 2006, a total of 78 level one trainings and 6 County Extension Agent Professional Development Updates had been conducted, with over 4,500 cattle producers representing 808,000 head of cattle. So far, 63 % of level one producers also have completed level two.

Beef 101 is a three-day intensive hands-on program designed for anyone with an interest in expanding their knowledge of the total beef industry (beef production to retail/foodservice cuts). This is the leading education program for basic information about the beef industry provided anywhere in the U.S. The workshop, initially conducted in 1989, concluded the 35th, 36th and 37th sessions during 2006 in the Texas A&M University Department of Animal Science facilities. A maximum of 35 participants per session are accepted to maximize hands-on participation and interaction with TCE/TAMU/TAES faculty, staff and graduate student instructors. Approximately 1,100 participants from 42 states, the District of Columbia and 25 countries have completed Beef 101. Beef 101 participants have included 94 participants from 24 state beef councils, 95 participants from the National Cattlemen's Beef Association and participants from 262 companies ranging from very small to leading food corporations.

Since 1991, over 2,300 cattle producers from 14 states have evaluated over 23,000 steers and heifers in the Texas A&M Ranch to Rail program. The program helped producers learn more about how their calf crop fit the needs of the beef industry in terms of productivity, profitability and quality, all the traits that create value in beef marketing. Consignors learned that they could increase their net return per head from \$50 to \$100 through the proper use of breeds and breed crosses, sire selection, improvements in health programs and retained ownership. Effective health vaccination and weaning programs at the ranch of origin reduced bovine respiratory disease at the feedyard to reduce production costs by more than \$90 per head. As a result of this, the Texas Value Added Calf (TEX VAC) program was developed and interest in preconditioning feeder calves to reduce health costs was reinitiated nationally. The development of specific protocols calling for different viral vaccination and length of preconditioning period were developed (VAC 45, VAC 34, VAC 24 etc). The four largest cattle marketing organizations in

the Texas have adopted the VAC guidelines and have special feeder calf sales that have resulted in increased values for ranches in excess of \$70 per head due to industry demands for healthier cattle. In addition, of the 50 plus nationally recognized Value Added or Premium Programs require or highly recommend the VAC preconditioning program. In the future, educational efforts will focus on the lessons learned in breed use, sire selection, health program improvements and beef quality lessons learned in the Ranch to Rail Program.

The Annual TAMU Beef Cattle Short Course has hosted 26,400 beef cattle producers since 1990, averaging over 1,400 participants annually. Participants of the three-day event are exposed to a variety of topics that include current industry issues, forage management, reproduction, genetics, nutrition, beef quality assurance and record keeping. The 2006 Texas A&M Beef Cattle Short Course attracted over 1,500 participants and addressed many issues that beef producers are facing with the current drought. Participants mirror Texas beef producer demographics related to herd size, acreage and many characteristics of beef cattle producers. Annual evaluations indicate that 90 % expect to adopt learned management practices that represent an \$80 per head increase in net value, or an increase of just over \$5,000 annually for the average sized beef cattle operation. With 88 % of participants ranking the short course as excellent, 90 % indicated they would continue to use the TAMU Beef Cattle Short Course as a future information source for beef cattle production.

Water quality and water conservation were addressed in 2006 via specialists' collaborative efforts across Animal Science, Soil and Crop Sciences and Rangeland Ecology and Management. The Copano Bay project in south Texas along the gulf coast began with focus on grazing pressure and waste effects on existing wetland areas. In the panhandle, the Forage Sorghum Silage Research efforts continued to investigate the comparative usefulness of sorghum vs. corn with emphasis on production while conserving water. This forage sorghum research team received the Vice Chancellor's Award in Excellence for team research efforts.

Adoption of best management practices in reproduction include reduced calving (or breeding season) length, breeding soundness examinations in bulls, realistic body condition scores prior to breeding, pregnancy testing of exposed females, reproductive tract scoring of heifers prior to breeding, proper development of heifers prior to bull exposure, etc., have all been shown to improve conception rate, especially first service conception rate either naturally or by artificial insemination. These reproductive management practices alone can improve calf weaning weights by 45 lbs or more, currently worth \$50 or more per head. Coupled with appropriate breed or breed cross and bull selection, artificial insemination using superior sires, incorporating EPD for traits of economic importance and utilizing adapted cows to produce market acceptable calves, producers can add 25 to 50 lbs additional weaning weight, currently worth \$30 to \$60 per head. Utilizing most of the practices could increase returns \$80 to \$110 per head.

The Texas dairy industry has been undergoing diverse structural changes. The western portion of the Panhandle has had significant dairy expansion beginning in 2000, while the northeastern and central portions of the state have had contracting industries as a result of drought and inability to acquire environmental permits for expansion. Although there is a great deal of diversity in the various regions, many issues are shared. Programs that incorporate biosecurity, as well as all health issues, and increased traceability through animal ID assist this diverse population in maintaining their economic competitiveness. Producers across the state with confined animal feeding operations are required to protect the environment; however climatological and regulatory differences influence their management. Nutrient Management

Continuing Education Units are required for dairy producers in eight designated counties in Texas. Dairy Extension Specialists work in coordination with Extension Specialists from Agricultural Engineering and Soil and Crop Sciences, County Extension Agents, and the Texas Commission on Environmental Quality to offer various educational opportunities at which dairy producers may earn continuing education units (CEUs). Any dairy producer with over 200 milking cows from the designated counties are required to earn eight credit hours the first year of their permit and, in following years, eight credit hours every two years. Over 120 dairy producers, representing over 60,000 cows, are required to attend courses to earn CEUs.

Dairy specialists continued to define management practices beneficial to the reduction of Johne's Disease in large herds. Emphasis continued on measuring the impact of this disease on productivity. A cohort study in 2005/2006, although still in progress, has been investigating lifetime milk production, and from data already collected, there is a nearly 10,000 pound reduction in lifetime milk production. From the herd that initiated control measures back in 2001, the incidence of ELLISA-positive home raised animals has decreased from some 12 % to 2 %. This was attributed to adoption of a two key management practices. Research also included four (4) beef herds in a demonstration project, and these efforts in dairy and beef herds have increased participation in the state's voluntary Johne's control program. Voluntary herd enrollment increased from 50 to 80 herds at present.

Dairy education and industry involvement also addressed both environmental issues and bio-security in 2006. Significant outcomes are listed at the end of this report. Knowing that federal regulations could potentially require some species of livestock to have radio frequency identification (RFID) tags, Dairy Records Management Systems procedures for using wireless wand, Bluetooth and hand-held computer technologies continued to be evaluated by TCE Dairy Specialists. Regardless of any future legislation, the purpose has been to integrate collected data into the on-farm herd management system. Dairy specialists reported significant accuracy of identification, with a reduction in the amount of time required to identify dairy cows.

Horse research in nutrition, exercise physiology and reproduction continued to be based on graduate training in the Department of Animal Science. The year 2006 was a transition period as two Extension Horse Specialists and one resident faculty member oversaw all graduate nutrition/reproduction research while 3 new faculty members were being identified and hired. Ten (10) M.S. and PhD students were actively involved in research during the year. Research-based information was again shared with horse owners at the annual Horse Industry Workshop Series, including the TAMU Mare/Foal Workshop which has now reached 1,301 individual mare owners representing 12,100 horses. The 2006 Mare/Foal initiative reached a total of 866 horse owners via 16 programs. Performance horse owner education for adult and youth audiences included 55 programs, workshops or clinics that reached over 11,000 people. A collaborative effort with a major feed manufacturer expanded the Mare/Foal Initiative via the planning of the 2nd Equine Professional Symposium, where some 20 ranches with about 12,000 head of horses will gather for a two-day program in 2007. Outcomes being targeted include the fine-tuning of Reproductive Performance Measures and enhanced record keeping to be used in breeding farm management. Research and educational cooperation for horses included the Department of Ag Economics, College of Veterinary Medicine, Soil and Crop Sciences, the Texas Veterinary Medical Diagnostic Lab, two major breed associations and four (4) sources of research/education support. Continuing education with the feed manufacturing industry reached 56 territory managers and veterinarians from Texas, 10 other states and two (2) foreign countries. Outcome measures indicated that attendance at horse owner programs was representative of the typical

horse-owning household across the state. Well over 90 % reported increased confidence in decision-making, and 55% reported management changes associated with eliminating an old practice or adopting research-based management practices. Owners learned to decrease management costs by 4 % up to 20 % per farm. Feed industry representatives experienced a 20-25 percentage point increase in research-based knowledge of horse nutrition and feeding management.

The Horse Theft Awareness and Prevention Initiative, created via 1997 legislation related to Horse Theft Protection, continued in 2006. Education via 86 programs/demonstrations/exhibits at 44 different county locations, reached 10,000 horse owners in 2006. In the past eight (9) years, 69,795 people in Texas have accessed the information via 833 programs/educational exhibits. Thirteen (13) Law Enforcement Officer Schools have educated 590 officers from 165 different counties. Collaborators have been the TSCRA and the Sheriff's Association of Texas. The horse theft awareness video tape was updated, converted to DVD, and placed on the animal science website.

Sheep/goat specialists' efforts with the Hair Sheep Initiative and 'A Gathering of Goat Producers', educated and informed livestock and land owners about natural resource use and opportunities involving hair sheep and meat goats. Hair sheep are breathing new life into the domestic sheep industry. Programs such as the National Hair Sheep Symposium increase awareness about production potential of hair sheep. Small ruminants remain an excellent choice for small acreage landowners seeking involvement in a livestock production enterprise. Several management challenges exist, the most universal of which are internal parasite management and toxic plants. Anthelmintic resistance development by the primary nematode (*Haemonchus contortus*) is a huge concern, so management strategies need be well designed. With the financial support of Fort Dodge Animal Health and in response to these challenges, TCE Specialists developed and hosted a pair of educational opportunities entitled Perennial Challenges: Parasites & Toxic Plants was developed by Texas Cooperative Extension faculty in District 10 and delivered in partnership with Fort Dodge Animal Health. Total attendance for the series was 237. There was a 90% or greater improvement in knowledge related to both toxic plant and internal parasite management. All participants reported improved decision-making ability as a result of the education.

TCE Sheep/Goat Specialists again developed and hosted the Western Texas Veterinary Conference, which was attended by 22 veterinarians from across the state, representing over 300,000 head of sheep and goats. The focus was small ruminant medicine, with collaboration including the pharmaceutical industry and the Texas Veterinary Medical Diagnostic Laboratory. Veterinarians received four continuing education credits that they valued at \$75 per credit hour. These types of programs highlight the ongoing efforts by sheep/goat specialists to translate research-based recommendations, even to non-traditional sheep and goat producing areas, to promote the opportunities available to current and future producers.

The Texas Pork Quality Assurance Youth Program was created and a curriculum was developed to educate the 26,000 youth swine project exhibitors annually at livestock shows on food and pork quality wholesomeness. More than 500 County Extension Agents and Vo-Ag instructors have been trained to deliver the curriculum. The National Pork Board has adopted the curriculum and created a handbook distributed nationally. This national curriculum was further developed into an interactive distance learning module by TCE faculty. Released in 2005, this module was distributed via 12,000 CD's. For Texas livestock exhibitors, this curriculum has been modified and extended to include the other red meat livestock projects (beef cattle, lambs,

and goats) and has been reintroduced as “Quality Counts”. A new curriculum was introduced in 2002, with an on-line, interactive learning module released in late 2006. The Quality Counts educational team was recipient of a 2006 Vice-Chancellor’s Award in Excellence.

Enhancing Productivity of Small Pork Producers - Most small swine operations in Texas are involved with the show pig industry. Educational programs on increased reproductive efficiency to understanding their role in the overall swine industry have been implemented to enhance overall confidence in their operations and increasing productivity.

Cross – Species Educational Initiatives – In year 2006, TCE specialists became more involved in the National Center for Foreign Animal and Zoonotic Disease Defense. Often referred to as Foreign and Emerging Animal Diseases/Emergency Management projects, this initiative involved Animal Science, College of Veterinary Medicine and Agricultural Economics. Specialists worked on projects 7 and 8 to identify and develop subject materials related to best management practices for the livestock industry. Late in 2006, preliminary work began on Carcass Disposal education as well. This initiative includes beef, dairy, horse, sheep/goats and swine. Specialists also became involved in the Extension Disaster Education Network (EDEN) by volunteering to serve on newly formed Incident Resource Teams (IRTs). This preliminary organizational work in 2006 will continue into 2007 as materials are put in place for 1) Severe Storms, 2) Drought, 3) Wildfires and 4) Animal Issues.

Livestock specialists devoted considerable time in education of livestock owners about current and pending recommendations associated with the **proposed** National Animal Identification System (NAIS). This was/is a controversial issue in Texas, as Specialists worked closely with County Extension Agents to provide neutral, unbiased updates on the status of the proposed NAIS. This included power point information, press releases and web-based information on Premises ID. Specialists also served on some of the NAIS Specie Working Groups at the national level, to evaluate recommendations being considered for tiers one and two, as well as recommendations for future tracking of livestock movement. One such example is the NAIS Equine Species Working Group, which critically reviewed recommendations that could eventually apply directly to horse owners across the state.

The drought of 2006 brought about significant shortages in both grazing and hay for livestock owners and producers across the state. In fact the 2006 problem was a continuation of 2005, and represents the third compromised hay and forage period in the past 10 years. Animal Science Specialists with educational responsibilities in beef, horse, sheep/goat and dairy actively addressed the drought situation. Collaborative efforts included Soil and Crop Sciences, Rangeland Ecology and Management, the Texas Veterinary Medical Diagnostic Laboratory, and the College of Veterinary Medicine. Six (6) Beef Cattle Specialists presented drought related information at 86 different meetings, contributed to 10 popular press articles, and had over 500 individual one-on-one contacts in 2006. Education on drought management for horse owners was delivered via some 20 programs, as well as articles in the horse magazines, the Texas Cattleman, and via 3-page news articles for County Extension use in newspapers and radio spots. Dairy Specialists developed seven (7) drought related fact-sheets for web based delivery in 2006.

Output Indicators:

Statewide Educational Programming: The above mentioned Goal 3 educational programs, and youth livestock programs, to improve the production efficiency and end product quality of livestock and livestock products, typically reach 51,000 people per year who attend just over 500 programs, via direct contact methods alone.

Integrated Research:

TCE Specialists served as Principal Investigators on Grants/Contracts totaling \$607,000 in 2006, with an additional 5 grants submitted and pending for \$1,021,000.

TCE Specialists' Involvement on Graduate Student Committees: 9 specialists served on 22 graduate student (M.S. or PhD) committees in 2006.

Publications in 2006 Reflecting Integrated TCE/TAES Collaboration:

- New TCE Numbered Publications – 3
- Drought Management Publications 2005/2006 – 10
- Conference & Short Course Publications 2006 - 11
- Refereed and Scientific Society Publications – Published in 2006 = 17, In Process = 8
- Journal Publication Sources:
 - J. Eq. Vet. Sci. - Meat Sci. - Theriogenology J.
 - Am. J. Vet. Res. - J. Anim. Sci. - Am. Soc. Ag. & Biol. Eng.
 - Prev. Vet. Med. - J. Dairy Sci. - Plains Nutrition Council
 - Reciprocal Meat Conference - 24th World Buatrics Conf.
 - Am. Assoc. Bovine Pract. - Prof. Anim. Sci.

Web-based Educational Materials: For 2006, unique hosts averaged 30,500 per month, and successful page visits averaged 140,000 per month.

Outcome Indicators:

Animal Science Specialists continue to provide research-based education that helps livestock producers, owners and industry persons Improve Quality, Save Time, Reduce Costs and Make Money. Evaluation respondents have reported the following benefits:

- 1) Beef Quality Best Management Practices have produced knowledge gains of 33 % in grid marketing and 20% or higher in carcass evaluation, live-animal valuation and beef quality assurance. Over 89% report adoption of a new practice. 83% save money, with average savings that range from \$25.77 to \$53 per animal unit.
- 2) Horse Management and Use Best Management Practices have helped over half (55%) reduce management costs by 4 to 10.8 %, and over two-thirds (69%) save time in routine management. 65 % increased their decision-making skills and 87 % adopt a new management practice.
- 3) Sheep and Goat Management Best Management Practices have helped over 89% of goat raisers adopt new marketing and health management strategies.
- 4) Veterinarians save money (up to 50% savings) in CEU credit costs by attending sheep/goat and horse industry workshops where CEU credits were valued at \$75/hour.
- 5) Feed manufacturing industry representatives achieve a 40% knowledge gain from education provided at specialty workshops.

Specialists educate livestock owners and related agencies on Animal Issues that help in prevention of loss, recovery from disasters/tragedies, and sustained production as relates to compromised herds, land and natural resources: Evaluation respondents have reported the following benefits:

- 1) 78% of dairies reduce biological risk by adopting 1 or more best management practices. These practices include security systems, signage, protective footwear, isolation for new milking cows.
- 2) Producers affected by wildfires received information on how to reduce livestock costs by 5 % using cull pricing compared to replacement cattle costs.
- 3) 11 % of horse owners made decision to have horses permanently identified and 75% started a record keeping system. 100% adopted at least 1 of the 15 best management practices related to horse theft protection. 63% of youth audience ‘definitely’ learned how to prevent or minimize agricultural-related thefts.
- 4) 75 % of law enforcement officers increased confidence and competence in communication with industry persons on issues related to theft of livestock.
- 5) Drought has increased production/management costs at least 10 percentage points. Collaborative TCE/TAES research is investigating alternative silage sources for cattle compared to traditional silage, with emphasis on improved water efficiency. 81 % of sheep/goat producers adopt a new forage to maximize performance and 24% adopt water-usage technology to support forage production. Horse owners make decisions on alternative roughages with emphasis on keeping costs at 30% of total cost/head/year, with additional savings related to avoiding feed-related sickness.
- 6) Extension faculty/staff served new clientele, of whom 77 % have no rural background. These new land/livestock owners enter Agriculture for quality of life, agricultural land exemptions, brush control and production for both food and profit.
- 7) Livestock owners were surveyed to determine status of permanent identification and receptiveness to new/emerging technology associated with national and state regulatory issues that are controversial. In one species, these TCE surveys determined that animals are currently branded two to one over electronic methods, and new survey information indicates that receptiveness of industry persons to electronic identification changes with increasing cost. At the same time, technology could eventually impact market offerings to producers. Extension is challenged to serve as a major educational resource on animal issues with unbiased information.

Specialists worked with volunteers and youth to increase Confidence, Competence, Decision-making and to promote Quality Thinking, Performance and Production.

- 1) Quality Counts has tremendous potential for direct application to all youth who are consumers of products and have interest in livestock/agriculture. Quality counts applies to decision-making and best management practices of interest to both producers and consumers.
- 2) Youth are not required to own animals to participate in livestock judging and evaluation, method demonstrations/public speaking, quiz bowl and other life skills activities. Thousands of youth participate in these opportunities/activities annually.
- 3) A new on-line evaluation/judging series was introduced in 2006 that allows youth to expand decision-making. 92% of volunteer leaders who previewed the new offering indicated ‘definite’ support for teaching beginners, and 80 % indicated ‘definite’ support for more experienced youth.
- 4) Volunteer leaders need training on subject matter delivery to urban youth with video, DVD and web-based curriculum. From 1 such workshop, 62% of volunteers reported ‘definite’

increase in teaching competence and 64 % reported 'definite' confidence gain in teaching youth.

- 5) Established Extension programs continue to meet the needs for new customers. There is demand for expanded youth programs across Agriculture. From the summer of 2006, one program, in 28 Texas counties, provided education with these results:
- 86% learned more advanced techniques in livestock handling
 - 71% gained more confidence and 78 % became more competent
 - 78% improved decision-making/problem solving skills
 - 75% avoid a potential problem in livestock handling
 - 72% increased enjoyment of livestock involvement

C. Sources of Federal Funds

TCE: Smith Lever and State Matching

TAES: Hatch, and state, federal and private contracts and grants

D. Scope of Impact

Multi-State Extension * OK, AR, LA, TN, FL, and NM

Multi-State Research * Multi-State Project NRSP-8 (IL)

*CSREES (WERA-01) involved Texas, New Mexico, Arizona, Colorado, Idaho, Montana, Hawaii and Alaska, and USDA-ARS (Miles City, Mt)

*S-1013 involved Texas, Louisiana, Arkansas, Mississippi, Georgia, Florida, South Carolina, Kentucky, and USDA-ARS (Brookesville, Florida & Clay Center, Nebraska).

Integrated Research and Extension: Extension faculty worked with research scientists to:

- Identify technologies that could enhance production efficiencies, improve data collection, optimize meat quality and validate effectiveness of food safety interventions.
- Further adapt electronics to livestock production and management. Electronic individual ear tags were used in Ranch to Rail to facilitate computer-assisted data collection. Also, ultrasound technology developed by researchers was used to determine body composition as it relates to carcass quality. Research faculty updated producers in Beef 706 on how electrical stimulation of carcasses and controlled aging can be used to improve tenderness of retail cuts. Horse research included use of the new bio-thermal chip for implantation to monitor body temperature.
- Evaluate various methods of testing for Johne's Disease and quantify the impact of bovine paratuberculosis on milk production in dairy cattle and weaning weights in beef cattle.
- Further refine factors that influence mineral and protein quality needs of horses, as well as dietary fat sources for exercising animals with emphasis on bone response and inflammation, equine gastric ulcers and effects of exercise and diet on embryo recovery rates and embryo quality, as well as management of geriatric horses.
- Further investigate the usefulness of forage sorghum in the cattle feeding industry with emphasis on improved water efficiency of existing aquifers in the state.

Goal 2: A safe and secure food and fiber system

Overview

The Centers for Disease Control and Prevention (CDC) estimate that foodborne diseases cause approximately 76 million illnesses, 325,000 hospitalizations and 5,000 deaths each year. Populations most vulnerable to foodborne disease include pregnant women, the elderly, the very young, and those individuals with weakened immune systems.

These foodborne diseases are linked to various bacterial, viral, and parasitic pathogens. According to information from the Centers for Disease Control and Prevention, over two hundred and fifty different types of foodborne diseases have been described. Common symptoms of foodborne disease include nausea, vomiting, diarrhea, abdominal cramping, fever, and headache. These symptoms are dependent on the microbe ingested.

In the year 2000, the United States Department of Agriculture Economic Research Service estimated that the medical, productivity loss, and premature death costs related to five foodborne pathogens totaled \$6.9 billion dollars annually. The specific foodborne pathogens used in this estimation included *Campylobacter*, *Salmonella*, *E. coli* O157, *E. coli* non-O157 STEC, and *Listeria monocytogenes*.

More than half of all foodborne illnesses is attributed to improper food handling in restaurants. Because 43-50% of all food dollars are spent on food prepared outside the home, food safety is a top concern among consumers. Therefore, food safety education is critical to help reduce the risk for foodborne illness.

Programs in the areas under Goal 2 continue to develop and provide research-based information to commercial food handlers, food service and child nutrition directors in public schools, the medical community, corporate food companies, as well as lay citizens in the state. Educational programs are designed in order for participants to make sound decision on the implementation of best management practices and adoption of recommended food safety practices. Educational programming has been and will continue to be driven by the needs of our clientele. Results from the Texas Community Futures Forum, and guidance from Executive Program Councils and program committees, and representatives from major medical and industry groups serve as the basis for this strategy.

The TCE/TEAS data presented in this summary and the following section represents the efforts of 2006. Research and educational programming efforts have been ongoing for many of the areas represented and continue to provide Texas food service managers, food service handlers, processors, and other industries with opportunities for increased food safety knowledge and skills. Future plans will build on past experiences and emerging issues that may affect our state and clientele.

Sources of TCE-TAES Funding and FTEs

TCE: Smith Lever and State Matching

	\$ X 1000
	Actual
	<u>FY 2006</u>
Program 4 – Food Protection Management	783
FTEs	31.38
Allocated Resources Goal 2	1,101
FTEs	46.76

TAES: Hatch, and state, federal and private contracts and grants

Source of Funding and FTEs

Federal Funds (\$ x 1000): 352

State Funds (\$ x 1000): 525

FTEs: 7.37

Number of Projects: 37

Number of Publications: 73

State TCE-TAES Plan of Work Program 4: Food Protection Management
Key Theme: Food Handling, Food Safety, and Food borne Illness

A. Description of Activity

The Centers for Disease Control and Prevention (CDC) estimate that foodborne diseases cause approximately 76 million illnesses, 325,000 hospitalizations and 5,000 deaths each year. Populations most vulnerable to foodborne disease include pregnant women, the elderly, the very young, and those individuals with weakened immune systems.

These foodborne diseases are linked to various bacterial, viral, and parasitic pathogens. According to information from the Centers for Disease Control and Prevention, over two hundred and fifty different types of foodborne diseases have been described. Common symptoms of foodborne disease include nausea, vomiting, diarrhea, abdominal cramping, fever, and headache. These symptoms are dependent on the microbe ingested.

In the year 2000, the United States Department of Agriculture Economic Research Service estimated that the medical, productivity loss, and premature death costs related to five foodborne pathogens totaled \$6.9 billion dollars annually. The specific foodborne pathogens used in this estimation included *Campylobacter*, *Salmonella*, *E. coli* O157, *E. coli* non-O157 STEC, and *Listeria monocytogenes*.

More than half of all foodborne illnesses is attributed to improper food handling in restaurants. Because 43-50% of all food dollars are spent on food prepared outside the home, food safety is a top concern among consumers. Therefore, food safety education is critical to help reduce the risk for foodborne illness.

The Food Protection Management (FPM) program was utilized to meet the need for quality food safety education in Texas retail food establishments. Using the curriculum *Food Safety: It's Our Business* FPM programs on safe food handling and foodborne diseases were conducted by county Extension agents to food service owners, managers, cooks and supervisors. The FPM program is accredited by the Texas Department of State Health Services as a Certified Food Manager Program. Individuals who complete this course are prepared to sit for the state exam to become a Certified Food Manager. The program emphasizes the knowledge and behaviors that are critical for the prevention of foodborne diseases:

- Enhanced use of temperature control measures in food service, such as thermometer use, time and temperature control, safe internal cooking and holding temperatures, thawing procedures and general storage temperatures.
- Increased adoption of proper hygiene and hand washing practices of food service employees and managers.
- Increased adoption of practices to avoid cross-contamination such as proper storage, washing and sanitizing of utensils and equipment between use, and employee hygiene practices.
- Improved knowledge and practices in purchasing and accepting safe food.

Target Audience for Food Protection Management Program.

The target audiences for this educational program were primarily food managers and employees in food service institutions and small privately owned foodservice businesses who

needed or desired training. These contacts included those in both urban and in the under-served rural areas of the state where public health oversight is limited.

Linkages.

Linkages included the following: private sector partnerships, school districts, bed and breakfasts, and food distributors. Interagency cooperators included the Texas Department of State Health Services and local public health jurisdictions.

B. Impact of Program

Output Indicators:

During 2006 year, 1396 food service employees in participated in *Food Safety: It's Our Business* trainings through local Texas Cooperative Extension offices. Of those participants who provided demographic information (n=1321), 55% were Caucasian, 29% were Hispanic, and 7% were Black. Less than 3% of the respondents were Asian. A majority of the participants (80%) identified English as their preferred language while Spanish was the preferred language identified by the remaining participants (20%). Age of participants varied greatly; 11% reported their age between 18 and 24 years, 20% were between 25 and 34 years, 25% of the participants were between 35 and 44 years, and 24% were between 45 and 54 years of age. Nearly 16% of the individuals were age 55 or older.

Outcome Indicators:

Program participants (n=1396) who completed either a one-day or two-day course between the months of January and early December 2006 were invited to participate in a retrospective post evaluation to determine the extent that food safety behaviors were being adopted in their workplace. The instrument utilized to evaluate the program focused on the extent to which they practiced selected food safety behaviors, both before and after completing the program. Participants self-reported the frequency they practiced these behaviors (3 = always; 2=sometimes; 1=never) before and after attending FPM. A paired comparison t-test – measuring the difference between the before and after mean (of a “frequency of behavior” scale) – was used to test for statistical significance (program impact). The significance level was set at 0.05.

Questions about number of meals served, numbers of hours of food safety training provided to employees in their food service establishment along with selected demographic questions were included in the survey. Of the 1396 participants surveyed, 433 (31%) were returned. Three hundred eight-two (382) of those surveys (27.4%) were complete enough to be utilized for data analysis.

Respondent Characteristics

Characteristics of the 382 survey respondents are shown in Table 1. Of the surveys returned, 26 (6.8%) were completed using the Spanish language instrument. A majority of the FPM program participants were female and white although other ethnic groups were represented. Participants generally were classified into one of three age ranges; 30 to 39 years, 40 to 49 years, or 50 to 69 years. Job title of the participants also varied, with nearly 30% of respondents identifying themselves as the manager of their food service establishment. Participants reported being employed in the food service industry for an average of 10.8 years (range less than one

year to 50 years). On average, the food service establishments where the participants were employed served 316 customers a day and employed 8 full- and/or part-time workers.

Table 1. Subject Characteristics

	N	%
<u>Gender</u>		
Male	74	19.4
Female	293	76.7
No response	15	3.9
<u>Age</u>		
Under 30 years	42	11
30 to 39 years	71	18.6
40 to 49 years	102	26.7
50 to 59 years	115	30.1
60 years and older	45	11.8
No response	7	1.8
<u>Ethnicity</u>		
African American	18	4.7
Hispanic	100	26.2
White	243	63.6
Other	12	3.1
No response	9	2.4
<u>Job title</u>		
Assistant manger	27	7.1
Cook	64	16.8
Dietary services director	11	2.9
Manager	114	29.8
Owner	97	25.4
Supervisor	28	7.3
No response	30	7.9

The extent to which selected food safety behaviors were being followed before and after the FPM program is shown in Table 2. Compared to before FPM, survey respondents reported significant behavioral changes after participating in the program.

Table 2. Extent to which food safety behaviors were practiced pre-FPM vs. post-FPM, for all participants (n=number of participants responding)

Behavior	Mean score (pre)*	Mean score (post)*	Significance (P-value)
Frequency of maintaining food temperatures at 41 degrees or below (n=352)	2.72	2.99	.000
Frequency of measuring internal temperature of hot/cold foods being held	2.21	2.87	.000

at least every 2 hours (n=320)			
Frequency of date marking all ready-to-eat refrigerated potentially hazardous foods (n=339)	2.48	2.92	.000
Frequency of using a thermometer to determine the doneness of food (n=337)	2.34	2.83	.000
Frequency of using the 2-stage cooling method to cool foods to 41 degrees or below (n=327)	2.15	2.82	.000
Frequency of washing hands for 20 seconds using soap and hot water (n=362)	2.69	2.98	.000
Frequency of showing employees proper hand washing techniques (n=336)	2.41	2.95	.000
Frequency of cleaning and sanitizing cutting boards between uses (n=347)	2.75	2.98	.000
Frequency of cleaning equipment, utensils and food contact surfaces used for preparing potentially hazardous foods every 4 hours (n=349)	2.63	2.95	.000
Frequency of cleaning and sanitizing all clean-in-place equipment every day (n=337)	2.70	2.93	.000
Frequency of storing raw foods below ready-to-eat foods in the refrigerator (n=330)	2.63	2.97	.000
Frequency of maintaining proper pest, insect, and rodent controls as specified by HACCP law and code (n=343)	2.78	2.96	.000
Frequency of minimizing the presence of pests through routine inspections and control measures (n=344)	2.85	2.97	.000

* Likert scale defined as 1=Never, 2=Sometimes, 3=Always

In addition to the noted changes in behavior, nearly 85% of the participants received a passing score on the Texas Department of State Health Services Certified Food Manager exam. Respondents also reported that the amount of time they spent training employees about food safety rose from 7.1 hours before participating in FPM to 10.5 hours afterwards (P = .0001). Another interesting finding was that 82% (n=314) of the respondents identified FPM as their first Extension program ever attended.

Results of this evaluation suggest that the Food Protection Management program is effective in promoting the adoption of specific food safety behaviors that are critical to preventing food borne disease outbreaks in retail/commercial food establishments. This is evident by the extent to which behaviors were being practiced after FPM compared to before. The finding that a majority of the surveyed participants passed the DSHS Certified Food Manager illustrates that the program is effective in successfully preparing employees for the state

exam. Finally, results indicate that this program allows Texas Cooperative Extension to deliver quality programs to new audiences who otherwise might not have the opportunity to participate in Extension programs.

C. Source of Federal Funds

TCE: Smith-Lever and State Matching

TAES: Hatch, and state, federal and private contracts and grants, USDA-CSREES

IFAFS Grant # 00-52102-9637

D. Scope of Impact

Multi-State Extension - Multi-State projects include working with Colorado, Ohio and Washington to develop program indicators and working with South Carolina, North Carolina, Florida, Georgia and California to prioritize and diffuse post harvest fruit and vegetable safety technologies.

Collaboration with USDA-FAS, USDA-APHIS and California Farm Bureau Federation in a “Framework of Equivalency” discussion and symposium on phytosanitary uses of irradiation for produce. Collaboration with the International Atomic Energy Agency- to provide technical training on phytosanitary and sanitary uses of food irradiation technology.

Multi-national Research and Development – Southeast Asia Food Science and Technology Center Project with Indonesia.

Multi-State Research – Multi-State Project W-195

Integrated Research and Extension: Integrated Research and Extension include working closely with professors in the Department of Food science and Technology, Animal Science, and the Department of Food Science and Engineering on projects such as the food safety, HACCP, genetically modified foods, and programs for delivering a safe reliable food supply continue the focus of this highly integrated program.

Goal 3: A Healthy, well-nourished population

Overview

The TCE-TAES Programs under Federal Goal Three cover the areas of General Health Education, Diabetes Education, and Better Living For Texans.

General Health Education. General health research and education programs are represented by the Walk Across Texas, the Passenger Safety Project, the Cancer Risk Reduction for Rural Texans Project, and efforts of the Vegetable and Fruit Improvement Center. These programs, with the exception of the Passenger Safety Project, are designed to promote the prevention chronic diseases or to reduce the impact of chronic diseases such as heart disease, stroke, cancer, and diabetes. Prevention and reducing impact of these very costly chronic diseases is extremely significant since 70% of deaths and 75% of health care costs in the U.S. are due to chronic diseases. The Passenger Safety project is designed to provide a safe environment for children and adults using our roadways.

Walk Across Texas. According to the Task Force on Preventive Health Services, 29% of American adults are not physically active at all, and 50% are not active enough to achieve health benefits. Only 27% of students in grades 9 to 12 engage in the recommended amounts of moderate-intensity physical activity. Daily participation in high school physical education classes dropped from 42% in 1991 to 32% in 2001. Adequate physical activity lowers risk and improves management and outcomes for leading causes of death including heart disease, hypertension, stroke, and diabetes. This program is aimed at helping participants establish the habit of physical activity with support from their peers.

Passenger Safety. The proper use of child safety seats reduces the risk of injury and death, leading to reduced medical costs, avoidance of lost future earnings, and improved quality of life. These economic benefits were an estimated \$1,820 per child age 0 to 4 and \$2,130 per child age 4 to 7 for new seats distributed, and \$505 per child for seat misuse. In 2005, an estimated 420 children under the age of 5 were saved as a result of child restraint use. If all child passengers ages 14 and under were restrained properly, an estimated 7, 500 lives would be saved by child restraints.

Cancer Education. Cancer is the second leading cause of death in Texas and the United States. This project's target population is rural residents, with an emphasis on reaching youth, working adults, minorities, low-literacy, and older adults. Rural Texas populations are more at risk for death from cancer because 30 percent are over 65 years old, and accessing early detection services and knowledge about the need for early detection, as well as medical care, are difficult. Research indicates that up to two-thirds of cancer cases occurring each year could have been prevented if behavioral changes had been made, thus showing that prevention plays a key role in the fight against cancer.

The Texas Cancer Council estimates 37,000 Texans will die each year from cancer. Of those, over 10,500 Texans die because of tobacco use or exposure to tobacco smoke. Overall, breast cancer is the most common cancer in Texas women, regardless of race or ethnicity. Approximately 11,000 new cases of breast cancer are diagnosed annually. Cervical cancer is the seventh leading cause of cancer in women and is the most amenable to prevention and early detection through screening. Approximately 1,100 new cases of invasive cervical cancer are diagnosed each year in Texas. According to the American Cancer Society, skin cancer accounts for 23 percent of all cancer deaths statewide. Blistering sunburn in childhood and adolescence is a universal risk factor for melanoma in non-Hispanic white populations. Lastly, research also suggests that it may be possible to reduce cancer deaths by up to another 30-35 percent by

improving nutrition and physical activity behaviors, and by keeping a normal body weight. Research also indicates that 30-60 minutes of physical activity each day may reduce the risk of developing colon, breast, endometrial, and prostate cancers by 20-40 percent.

Lifestyles and eating habits have resulted in a major increase in the incidence of diet-related diseases. This has serious implications for the individual, family and the overall economy. There is an increasing focus on preventing diseases through diet rather than curing diseases with drugs and surgery. TAES and TCE have an integrated program designed to have maximum impact across Texas and the nation. A component of the overall approach includes the Vegetable and Fruit Improvement Center (VFIC), a research and extension concentrated effort to address diet and health. This center working with scientists from the state's top medical centers, have devised and implemented a research and education plan that will not only make fruits and vegetables more healthful for people to eat but also economically strengthen the total produce industry. The VFIC is organized with industry partners which fund a part of the research and graduate assistantships. There are 42 partners located in eight states, the U.S., Germany, and the United Kingdom. The membership represents seed companies, grocery stores, restaurants, grower/shippers, national associations, nutraceutical companies, processors, and individuals.

Diabetes Education. Diabetes is a significant problem affecting 1.3 million (8.1%) of adult Texans diagnosed (Texas Behavioral Risk Factor Surveillance System, 2003) and another 343,000 adult Texans (NHANES age-adjusted prevalence estimate of 2.4) not yet diagnosed. Failure to control blood glucose levels to prevent long term complications results in increased health care costs, increased loss of time from work due to illness, amputations, poor health status leading to decreased quality of life. Education is the single most important thing people with diabetes can do to improve their health status and prevent the onset of complications. Additional benefits possible might be that health care insurance costs could decrease by controlled blood glucose levels through proper nutritional management and increased exercise resulting in fewer chronic complications, less time lost from work due to better nutrition practices and self-care health management, and reduction in long term illness and health care costs. The *Do Well, Be Well Program*SM's estimated \$73.8 million total economic impact using net present value analysis gives the difference between health care costs for people with and without diabetes. This program helps reduce health care costs with improved self-care, nutrition and management of disease.

Better Living for Texans. An estimated 16.3% of Texans live in poverty, a figure that is higher than the national average of 12.7%. Research suggests that individuals who live in poverty consume diets that are not in agreement with the Dietary Guidelines for Americans or the recommended food guidance system (MyPyramid). For example, diets of individuals in low-income households have been shown to be lacking in fruits, vegetables, and dairy products. Individuals who live in poverty are also at risk for having poor food security status, characterized by having their typical eating patterns disrupted due to an inability to purchase/acquire food. In 2006, the USDA reported that 16% of Texas households had experienced food insecurity between the years 2003 and 2005. By comparison, the national figure was 11.4%. A 2002 survey of 1,000 households participating in the Food Stamp Program throughout Texas found that more than half of those households had experienced food insecurity or hunger (now termed "very low food security") within a 12-month period.

Programs in the areas under Goal 3 continue to provide citizens of Texas with research-based information in order for them to make sound decision on the implementation of best

management practices, adoption of technologies, and behavior changes to improve the quality of life. Educational programming has been and will continue to be driven by the needs of our clientele. Results from the Texas Community Futures Forum, and guidance from Executive Program Councils and program committees serve as the basis for this strategy. The data presented in this summary and the following section represents the efforts of Year 05 of this Plan of Work. Educational programming efforts have been ongoing for many of the areas represented and continue to provide Texans with opportunities for increased health and well-being. Future plans will build on past experiences and emerging issues that may affect our state and clientele.

Sources of TCE-TAES Funding and FTEs

TCE Funding: Smith Lever and State Matching

	\$ X 1000
	Actual
	<u>FY 2006</u>
Program 5 – General Health Education	1,135
FTEs	29.45
Program 6 – Extension Diabetes Education	598
FTEs	24.15
Program 7 – Better Living for Texans	598
FTEs	22.41
Total TCE Allocated Resources Goal 3	2,463
FTEs	87.27

TAES Funding: Hatch, and state, federal and private contracts and grants

Source of Funding and FTEs

Federal Funds (\$ x 1000):	307
State Funds (\$ x 1000):	564
FTEs:	7.33
Number of Projects:	31
Number of Publications:	90

State TCE-TAES Plan of Work Program 5: General Health Education
Key Theme: Human Health

A. Description of Activity

Walk Across Texas. According to the Task Force on Preventive Health Services, 29% of American adults are not physically active at all, and 50% are not active enough to achieve health benefits. Only 27% of students in grades 9 to 12 engage in the recommended amounts of moderate-intensity physical activity. Daily participation in high school physical education classes dropped from 42% in 1991 to 32% in 2001. Adequate physical activity lowers risk and improves management and outcomes for leading causes of death including heart disease, hypertension, stroke, and diabetes. This program is aimed at helping participants establish the habit of physical activity with support from their peers.

Walk Across Texas is a physical activity program aimed at helping participants establish the habit of physical activity with support from their peers. This program started in 1996 in one East Texas county. Since then, it is available for all counties to offer each year. Extension agents offer either the team or the school option or a combination of both in their counties. Agents in participating counties organize a coalition of community people who assist in the planning and implementation of the program. To promote peer support, groups such as worksites or schools were encouraged to have a “friendly competition” to see which team or class would walk the 830 miles across Texas first and/or accumulate the most mileage during the eight weeks. To encourage school participation, 200+ activities, consistent with the Texas Essential Knowledge and Skills, were developed by teacher consultants and made available on-line to agents and teachers. Team member participants could also attend classes and receive information on nutrition, exercise, weight loss, and other health topics like arthritis and diabetes.

Participants access program materials and track their progress on-line at <http://walkacrosstexas.tamu.edu>, a data collection web site developed during 2002. Participants can immediately receive feedback on their progress towards increasing their physical activity. Participants may see how their individual or team progress compares to others in their groups. Participants compete within groups such as their own work sites or schools, thereby enhancing peer support for accomplishing their goal of increased activity. The website has enabled the implementation of this program in major metropolitan areas, including Dallas and Ft. Worth.

In 2006, Extension agents in 70 counties across Texas organized teams of eight people to participate in the program for eight weeks. 345 school classes in 80 schools were also recruited to walk across the state.

Internal linkages have been formed with Agricultural Communications, Foods and Nutrition, and Extension Information Technology. External linkages include families, schools, work sites, families, neighborhoods, churches, and civic clubs. Almost one-half of the teams continue to come from work sites. County agents reported collaborating with local health departments and a number of other agencies like parks and recreation and senior centers. Other states including Tennessee, Idaho, Kansas, Arkansas, Louisiana, Kentucky, Alabama, Florida and Illinois have requested the manual to adapt this program for their states.

Passenger Safety Education. Misuse of child safety seats is reported to be approximately 85%. Texas Cooperative Extension Passenger Safety personnel see a 99% misuse rate. According to a recent National Safe Kids study, child safety seat checkup events are successful in helping parents and caregivers properly restrain children in back seats.

Certified child safety seat technicians provide child safety seat checkup events where parents learn how to correctly select and install safety restraint systems for their children. Technicians demonstrate the correct installation in parents' vehicles in rural counties across Texas.

Collaborations are with other agencies, both in-state and out-of-state. Included in collaborations are the following agencies: Texas Department of Transportation (TX-DOT); National Highway Traffic Safety Administration (NHTSA Region 6); Texas Department of State Health Services (TDSHS); Texas Department of Public Safety (DPS); Texas Transportation Institute (TTI); Texas Municipal Police Association (TMPA); Regional Advisory Councils (RAC); Local and Statewide Law Enforcement; Local and Statewide Fire Departments; Local and Statewide EMS Professionals; Statewide Health Professionals; and State Farm Insurance Company. The project distributed 65,611 educational resources to support occupant protection. The project's three Rollover Convincers were viewed by over 27,960 participants.

Cancer Risk Reduction for Rural Texans. Cancer is the second leading cause of death in Texas and the United States. This project's target population is rural residents, with an emphasis on reaching youth, working adults, minorities, low-literacy, and older adults. Rural Texas populations are more at risk for death from cancer because 30 percent are over 65 years old, and accessing early detection services and knowledge about the need for early detection, as well as medical care, are difficult. Research indicates that up to two-thirds of cancer cases occurring each year could have been prevented if behavioral changes had been made, thus showing that prevention plays a key role in the fight against cancer.

The Texas Cancer Council estimates 37,000 Texans will die each year from cancer. Of those, over 10,500 Texans die because of tobacco use or exposure to tobacco smoke. Overall, breast cancer is the most common cancer in Texas women, regardless of race or ethnicity. Approximately 11,000 new cases of breast cancer are diagnosed annually. Cervical cancer is the seventh leading cause of cancer in women and is the most amenable to prevention and early detection through screening. Approximately 1,100 new cases of invasive cervical cancer are diagnosed each year in Texas. According to the American Cancer Society, skin cancer accounts for 23 percent of all cancer deaths statewide. Blistering sunburn in childhood and adolescence is a universal risk factor for melanoma in non-Hispanic white populations. Lastly, research also suggests that it may be possible to reduce cancer deaths by up to another 30-35 percent by improving nutrition and physical activity behaviors, and by keeping a normal body weight. Research also indicates that 30-60 minutes of physical activity each day may reduce the risk of developing colon, breast, endometrial, and prostate cancers by 20-40 percent.

This project addresses the continuing need for cancer prevention, risk reduction, and early detection education—particularly in under-served groups, including those in rural Texas areas. Funding from the Texas Cancer Council provides educational resources and professional support and training to county Extension agents and their volunteers in the areas of tobacco prevention, breast and cervical cancer prevention and early detection, skin cancer prevention and early detection, increasing physical activity, and colon cancer early detection. Funding provides a collection of cancer-focused educational resources such as exhibits and models to agents at District Extension Centers for use in their communities at events including fairs, livestock shows, health fairs, Texas Extension Educators Association meetings, civic club meetings, 4-H meetings and events, camps, and many other events in their counties.

In 2006, 44 agents were awarded mini-grants with a total value of \$19,839 to support the delivery of skin cancer prevention training at school and summer farm safety camps. A group of 11 Extension agents worked with a program health specialist to develop and implement a new program, *Hallelujah to Health*, to improve early detection of breast and cervical cancer by African American women in East Texas. Mini-grants also supported the delivery of a program, Put It Outside, to encourage parents, day care, and other caregivers to insure children in their care are not exposed to second-hand smoke. Mini-grant activities alone, directly served 19,952 people.

The project also provides support for these educational websites for youth developed by youth: <http://coolshade.tamu.edu> , <http://dontdip.tamu.edu> , <http://nobutts.tamu.edu> , and <http://getmovin.tamu.edu/> .

Reducing Youth Tobacco Use in Rural Communities. According to the Centers for Disease Control, there is a lack of programs to reduce youth tobacco use in rural communities. To address this issue, funding was also obtained from the Texas Cancer Council to develop and implement a community focused process to reduce tobacco use in rural communities. The program is now being implemented in 9 Panhandle counties with double the national rate of tobacco use (22% vs. 43%) by high school students. The comprehensive community approach includes a community advisory group in each of the counties, a peer education team in each county (trained in a summer leadership camp and called the *Students Winning Against Tobacco* team), community assessment, and implementation of the nationally recognized, 10 class series, *Towards No Tobacco* curriculum in schools. In addition, Harrington Cancer Center and the American Cancer Society in Amarillo are providing cessation information and services in these counties.

Internal collaborations include the 4-H program and Agricultural Communications. External linkages have been formed with the Texas Cancer Council, and a variety of others including M.D. Anderson Cancer Center in Houston, American Cancer Society, Harrington Cancer Center in Amarillo, Texas Department of State Health Services, the Texas Comprehensive Cancer Coalition which includes a wide array of cancer-focused agencies, a variety of local hospitals and clinics, civic clubs, fair and livestock show boards, other Texas Cancer Council funded projects like the Stop Spit Tobacco Network, work sites, churches, and many others.

B. Impact of Programs

Walk Across Texas. Since starting in 1996 over 120,000 Texans have participated and significantly increased their physical activity level. In 2006, 20,305 people, including 14,526 who participated in the team option, 5,568 children who participated in the school team option, and 211 people who participated in the individual option. Team option participants, increased mileage from 19.4 miles in week one to 23.4 miles in week eight, a statistically significant increase. These team participants could potentially save \$173,193,865 in future health care costs if they continue walking as they had during Walk Across Texas. Consistently, 50% of the participants report a side benefit of feeling less stress. Four example participant “success stories” in their own words are:

“...Over the past two months I’ve lost 20 pounds and walked over 200 miles. I can’t wait for the program next year....” (Brazos county participant)

“...Now I have increased my exercising to walking 3 miles most days and exercise class twice a week. I lost over 20 pounds during this 8 weeks. I feel so much better physically my mood has become more upbeat and I have a lot more energy to keep leading this active lifestyle. I now make exercise a priority on a daily basis and have stopped making excuses. Thanks WAT! This program along with my on going commitment has saved my life.” (Caldwell county participant)

“My success story is that I realize how important walking can be. I have lost 10 pounds. I use to walk just to be walking. But now I know that I have to continue my walking. Reason why is that I had a triple bypass surgery February the 10th. Which was a real surprise to me and my family. But I thank God everyday that He allows me to wake up. And so I’m a witness of how much it means to keep yourself healthy. Walking is very important...” (Cass county participant)

“I’m a grandmother in Coleman County and I have a 2nd grade granddaughter who is slightly overweight and has responded favorably to Walk Across Texas. She has never liked physical activity and last year she made up all kinds of excuses not to go to P.E. This year the new P.E. teacher started the year with Walk Across Texas and she loves it. She doesn’t know it’s exercise. She can’t wait till the day of the week they walk and she has a much better attitude about P.E. in general. (Coleman county)

Passenger Safety. The proper use of child safety seats reduces the risk of injury and death, leading to reduced medical costs, avoidance of lost future earnings, and improved quality of life. These economic benefits were an estimated \$1,820 per child age 0 to 4 and \$2,130 per child age 4 to 7 for new seats distributed, and \$505 per child for seat misuse. In 2005, an estimated 420 children under the age of 5 were saved as a result of child restraint use. If all child passengers ages 14 and under were restrained properly, an estimated 7,500 lives would be saved by child restraints.

Data from the Passenger Safety project indicates that 1,234 child safety seats were inspected and parents were instructed how to correctly install their child safety seats. 801 new child safety seats were distributed by project members and project-trained agent/technicians. 27,960 Texans attended events where they viewed the three Rollover Convincers to increase their awareness of the importance of using safety belts consistently. The project distributed 65,611 educational resources to support occupant protection.

For the 1,234 safety seats inspected in 2006, the economic benefit is an estimated \$1.3 million.

Cancer Risk Reduction for Rural Texans also had an impact on its participants. A total of 78,846 Texans were directly served by this project. As a result of the program, many Texans have made their homes smoke-free to improve the health and well-being of their children. Sun safety programs throughout the state have led to suspicious lesions being checked; others have said they will begin using sunscreen and protective clothing as well as avoiding tanning beds. African American women in East and South Texas received information on early detection of breast and cervical cancer and reported they intend to seek mammograms, clinical breast exams, and receive pap smears when they might not have prior to attending the informational classes. Texas youth gained valuable information from *Cool in the Shade, Don’t Dip, No Butts, and Get Movin* websites. These websites provide cancer prevention information created by youth for others their age. Mini-grants to agents have resulted in the delivery of a variety of programs aimed at reducing the impact of skin cancer, tobacco use, breast, cervical, and colon cancers. These mini-grant supported programs enabled agents to provide cancer prevention activities at summer camps and at a number of civic groups.

Reducing Youth Tobacco Use in Rural Communities directly served 9,621 youth during 2006. They received the best practice, 10 class series, *Towards No Tobacco* and participated in a variety of other community activities focused on reducing tobacco use.

Output Indicators:

Walk Across Texas

Number of people completing non-formal education programs on health promotion.
20,305 participants.

Passenger Safety Education

Number of people completing non-formal education programs on health promotion.
29,194 participants.

Cancer Risk Reduction for Rural Texans

Number of people completing non-formal education programs on health promotion.
88,467 participants.

Outcome Indicators:

Walk Across Texas

The total number of people completing non-formal education programs on health promotion who actually adopt one or more recommended practices within six months after completing one or more of these programs. 20,305 people participated in Walk Across Texas. Participant mileage increased from 19.4 miles in week one to 23.4 miles in week eight miles in week eight. This was a statistically significant increase.

Vegetable and Fruit Improvement Center's Foods for Health Program

A. Description of Activity

The Vegetable and Fruit Improvement Center (VFIC) is an interdisciplinary Research and Education Center within the Texas Agricultural Experiment Station (TAES). The Center consists of scientists from 23 institutions and research centers. Included in this group are several TAES units, Texas A&M Health Science Center, Texas A&M University at Kingsville, Baylor College of Medicine, USDA-Children Nutrition Center, Baylor College of Dentistry, New Jersey School of Medicine, the University of Arizona at Tucson, the University of Connecticut, the USDA-ARS at Lane Oklahoma, and the University of Houston at Victoria. Since 1996, the VFIC has focused on the research task of "Foods for Health". The Center is based on interdisciplinary scientists and industry working in partnership with a goal to develop quality fruit and vegetable products with enhanced health and nutritional benefits in an efficient, economical, and environmentally sound manner.

The goal of the VFIC is to provide solutions through the development of new technologies and plant materials for producing quality vegetable and fruit products. The VFIC enables science and industry partners to promote research that solves existing problems while offering an opportunity to explore new ideas such as designing true "health foods". The plant breeders, plant protection specialists, biotechnologists, food scientists and medical researchers work as teams. The total scope of the VFIC work includes improvement in genetics, pre- and post harvest effects on bioactive compounds, marketing, education, and related areas that allow

the Texas fruit and vegetable industry to remain competitive in the national and international marketplace.

The VFIC conducts research and extension efforts in four major areas: 1) health promoting bioactive compounds through *in vivo* and *in vitro* studies; 2) post harvest handling and processing to develop techniques for optimizing healthful compounds in fruits and vegetables, 3) the development of production techniques which optimize the concentration of bioactive compounds, and 4) breeding and genetics to enhance the levels of naturally occurring bioactive compounds that help prevent human diseases.

B. *Impact of Programs*

In FY 2006 the VFIC received a USDA Higher Education Challenge grant for “The Science of Foods for Health: A multi-institutional, multi-state effort for undergraduate education.” This grant will expand current multi-state undergraduate educational efforts as well as enhance hands-on training for undergraduate students.

Collectively scientists affiliated with the VFIC published 50 refereed journal articles and 15 book chapters, trained 11 graduate and 2 post-doctoral students and received more than \$ 1.0 M in grants. The VFIC hosted/sponsored several Symposiums/Conferences including:

- 2nd Pan-American Workshop on Plant Membrane Biology, May 17-21, 2006, South Padre Island, 120 participants from the U.S., Canada, and Mexico.
- VFIC 2006 Conference, June 5-7, 2006, College Station, TX, 100 participants.
- National Allium Research Conference, December 6-8, 2006, College Station, TX., 105 participants from the U.S. and 6 other countries.
- 4th ISHS Int'l. and 8th National Symposium on Seed Transplant & Stand Establishment of Horticultural Crops, December 3-6, 2006, San Antonio, TX., 100 participants from the U.S. and 7 other countries.

The VFIC continues to host an age-appropriate outreach program VICKids (<http://vickids.tamu.edu>) to promote the health benefits of fruits and vegetables in their diet and the science to improve the fruits and vegetables that they eat. The program has gained acceptance through public schools and utilizes the Trans Texas video network to reach children outside the local area.

The health-promoting properties of fruits, vegetables, nuts and whole grains have been intensely studied by VFIC scientists and this information transferred to consumers through Extension educational programs. Anti-inflammatory, anti-proliferative, anti-cancer evidence of specific bioactive compounds such as anthocyanins, beta-carotene, lycopene, quercetin, etc. has been found in carrots, citrus, muskmelons, onion, peach, pecan, plum, and watermelon. Research is being conducted, including studies in cell culture and animal models, to further validate these findings, to determine the most effective levels of these compounds, validate their mechanisms of action, and investigate their availability, absorption, metabolism, and interaction with other chemicals. Additionally, plant breeding programs affiliated with the VFIC are using this information to select for enhanced level of desirable phytochemicals.

Epidemiological studies by VFIC scientists support the theory that whole grain foods are protective against type 2 diabetes, coronary heart disease, and certain cancers. Other studies have

shown an association between the consumption of whole grain foods and decreased body mass index.

C. Sources of Federal Funds

TCE: Smith-Lever and State Matching

TAES: Hatch, and state, federal and private contracts and grants

D. Scope of Impact

Multi-State Industry Support – CA, MI, MO, OR, TX, VA, WA, WV

International Industry Support – UK, GER

Multi-State Education – TX, MI, IN, OH

Integrated Research and Extension: Research and Extension faculty cooperate to develop program in general health and foods for health.

State TCE-TAES Plan of Work Program 6: Diabetes Education
Key Theme: Human Health, Human Nutrition

A. Description of Activity

Diabetes is a significant problem affecting 1.3 million (8.1%) of adult Texans diagnosed (Texas Behavioral Risk Factor Surveillance System, 2003) and another 343,000 adult Texans (NHANES age-adjusted prevalence estimate of 2.4) not yet diagnosed. Failure to control blood glucose levels to prevent long term complications results in increased health care costs, increased loss of time from work due to illness, amputations, poor health status leading to decreased quality of life. Education is the single most important thing people with diabetes can do to improve their health status and prevent the onset of complications. Additional benefits possible might be that health care insurance costs could decrease by controlled blood glucose levels through proper nutritional management and increased exercise resulting in fewer chronic complications, less time lost from work due to better nutrition practices and self-care health management, and reduction in long term illness and health care costs. The *Do Well, Be Well Program*SM's estimated \$73.8 million total economic impact using net present value analysis gives the difference between health care costs for people with and without diabetes. This program helps reduce health care costs with improved self-care, nutrition and management of disease.

Developed in 2002 and updated yearly through 2006 was the diabetes curricula *Do Well, Be Well with Diabetes* on the following newly revised (2006) components: **4 Nutrition Lessons** include the following: Nutrition—First Step to Diabetes Management; “One Diabetes Diet” - No Longer the Sole Option!; Nutritional Labels; For Good Measure At Home and Eating Out. **Self Care Lessons** include: Overview: What is Diabetes? Managing Your Blood Sugar; Diabetes and Exercise; Preventing and Managing Complications; and Medicines for Diabetes. During 2002 to 2006, total of 165 trained agents in Texas counties were selected according to their performance and ability to plan, implement and evaluate their programs.

*Do Well, Be Well with Diabetes*SM – Phase 2. *Cooking Well with Diabetes* is the practical application for participants completing the diabetes nutrition and self-care lessons and targets DWBW completers—91 percent never participated in cooking schools—to motivate them to keep their glucose at more normal levels. Nutrition and health specialists, county faculty, administration and other experts planned and pilot-tested a 4-lesson cooking school series entitled *Cooking Well with Diabetes*SM with chapters on Carbohydrate (starchy and non-starchy), sweeteners; Reducing fat, saturated fat and trans fatty acids; Reducing sodium and increasing fiber; and holiday meal preparation with diabetes in mind. Those who attend all four of the cooking school lessons and complete the surveys are given an incentive *Cooking Well with Diabetes—Tastes of Texas*—diabetes cookbook with a regional Texas culture flair.

Special Opportunity for Under-served, Hispanic and African-American Audiences:

Hispanic: A special grant was provided by the Texas Department of State Health Services (TDSHS), Texas Diabetes Program Council for developing an alternative source of diabetes education for people with limited or no access to diabetes education. The primary target of this award are Spanish-speaking Texans with limited or no understanding of English, no access to Spanish-speaking health professionals and with limited or an inadequate transportation. To address this need, multiple copies of a comprehensive diabetes self-care management video

tape were be made available through county Extension educators trained to deliver our program, *Do Well, Be Well with DiabetesSM*. Outputs from this collaborative effort support Texas Cooperative Extension diabetes programming effort. Distributed were at least 600 [163 English (HV-29) and 434 Spanish (HV-14)] home patient videos (Spanish and English) entitled *Diabetes Home Video: Skills for Self-care* with personalization as follows: This program is presented through the combined efforts of the: Texas Cooperative Extension - the *Do Well, Be Well with DiabetesSM* - Texas A & M University. Texas Department of State Health Services-Texas Diabetes Program to provide culturally-sensitive video purchase to assist in reaching more of the under served ethnic audience in Texas.

African-American: Texas Cooperative Extension, TAMU at Prairie View received a grant from the Texas Department of State Health Services - Texas Diabetes Program to conduct the Diabetes Education and Awareness Program (DEAP) advisory task force to plan an educational program and a diabetes conference for clientele. This was conducted through the 1890 Extension program counties to plan, implement and evaluate a diabetes conference. In 2006, outputs were conducting 6 lesson series culminating in a day's diabetes conference on the Prairie View campus were positive. This task force reached over 100 persons with diabetes at the conference with nutrition and self-care education motivating clientele to eat healthful foods, increase exercise and monitor their blood glucose. The nutrition specialist from TCE, TAMU served as technical expert on the planning task force and presented the nutrition education at the conference.

Extension Diabetes Programming Efforts: The target audiences for these programs include persons with type 2 diabetes, family members, limited income adults, ethnic groups with a high incidence of diabetes (Hispanics, African-Americans, Native-American, other) and Youth with Type 2 diabetes mellitus; and secondary, health professionals working in counties throughout the State.

106,691 group contacts and 70,524 individual contacts Number of Participants Reached
26,636 identified by Race/Ethnicity
~37 % of Participants Under served

Partnerships and cooperative relationships will be established or maintained with:

External: Texas Commission for the Blind, Texas Diabetes Program - Texas Department of State Health Services, Advocacy Committee members and regional offices, American Diabetes Association, American Association of Diabetes Educators, American and Texas Dietetic Associations, National Center for Farm Health, Denton, Dallas and Tarrant Counties Diabetes and Cardiovascular Coalitions, Diabetes Institute and University of Texas Health Science Center of San Antonio, certified diabetes educators, county hospital associations, local hospitals, local health professionals, health organizations, pharmacists, pharmaceutical and diabetes suppliers. Texas Department of State Health Services-Texas Diabetes Program to provide culturally-sensitive video purchase to assist in reaching more of the under served ethnic audience in Texas.

Internal: Extension Food/Nutrition Specialist - Special Food/Nutrition Needs, Family Development/Resource Management–Health, Evaluation and Program Development Specialists, School of Rural Public Health, TAMU Medical School faculty, and TAMU Health Sciences Center faculties health professionals, County Extension Agents in

Family and Consumer Sciences, other Extension programs such as those targeting limited incomes or specific ethnic groups.

B. *Impact of Programs*

Summary of Outcome Measures

Extension diabetes programming efforts educated clientele in 1,825 programs with 106,691 group contacts and 70,524 individual contacts with approximately 37 percent representative of under served populations. In the previous five years, the county programs attracted more than half of consumers with diabetes and health professionals in an average of 165 Texas counties. Some volunteers and faculty were trained to lead 909 sessions in diabetes nutrition and self-care educational 12-part lesson series and 4-part cooking school. These volunteers made 9,151 and faculty made 61,373 individual contacts and reached 17,371 diabetetic individuals in group settings. With more collaborations, coalitions, and partnerships within the medical communities in local counties, Extension has gained respect in their leadership role of the health coalition as a reliable resource for nutrition and self care. Today, more than ever, nutrition education and self-care education using strategies for effecting behavior changes are recognized as essential in the management of diabetes and in reducing the risk of developing long-term complications. County Extension agents, trained in diabetes education and in additional professional diabetes education meetings, are well-equipped with knowledge and skills needed to help persons with diabetes achieve the ultimate goal of glucose control. Extension educators are trusted for providing sound advice and their leadership ability in establishing local health coalitions. Ongoing diabetes education was noted with 1,825 individual diabetes education sessions in Texas counties.

Outcome Measures (Indicators) Examples

Preliminary data supports that Extension diabetes education has enabled persons with diabetes to make positive changes in behavior and practice self-care as shown from the Extension Diabetes Proxy Study (*Diabetes Educator Journal*, Sept./Oct., 1995). The study was conducted to show the impact of diabetes programming, significant behavioral changes ($p < 0.05$) made by clientele, and additional information from focus groups for insight into the barriers preventing diabetetic compliance. Evaluation of baseline knowledge and current behavior provided invaluable information about what personal characteristics and knowledge of practices lead clients with diabetes to change certain habits thus improving diabetes control, and leading ultimately to better health and well-being. In 2006, some 87 outcome summaries from programs included the following Texas counties: *Anderson, Andrews Bailey, Bastrop, Bee, Bell, Brazos, Brooks, Caldwell, Camp, Castro, Cherokee, Cochran, Coleman, Collin, Colorado, Comal, Cooke, Crosby, Dawson, Denton, DeWitt, Dimmit, Ellis, Floyd, Fort Bend, Freestone, Galveston, Garza, Gregg, Hale, Hardeman, Harris, Harrison, Haskell, Hidalgo, Hockley, Hood, Hopkins, Jack, Jefferson, Jim Wells, Jones, Karnes, Lampasas, Limestone, Llano, Matagorda, McCulloch, McLennan, Medina, Midland, Milam, Nacogdoches, Navarro, Nolan, Nueces, Orange, Palo Pinto, Panola, Parker, Randall, San Patricio, San Saba, Scurry, Smith, Starr, Stephens, Taylor, Travis Tarrant, Tyler, Upshur, Van Zandt, Val Verde, Victoria, Walker, Waller, Washington, Wilbarger, Williamson, Wilson, Wise, Wood, Yoakum, Young.*

2006 Key Results of *Do Well, Be Well with Diabetes*SM

In 2006, some 1,378 registrants diagnosed with diabetes with mean age of 62 years of age in *Do Well, Be Well with Diabetes*SM. Of the 1,378 registrants, 69 percent were females; 72 percent Anglos; 16 percent Hispanics; 8 percent African American; 2 percent Native-Americans; and 2 percent other ethnic groups. Some 1,378 registered for the course with 871 completed both

the pre- and post-tests. However, the 6 month follow-up produced only 112 useable data sets for comparison of results of the three evaluation instruments. Though the sample was small, the positive changes participants made were worth noting. Here are some of the most significant of those results:

- ◆ Of 1,378 registering, 939 (68 percent) indicated that they had no diabetes classes before joining this Extension diabetes program.
- ◆ 112 participants attended all 12 classes offered.
- ◆ The days per week they check their blood glucose, as reported on pre- and post-test instruments, increased from 0 to 11 times.
- ◆ Before the classes, the number of participants who tested their blood glucose today themselves was 617 (72 percent of those beginning the program—as opposed to having it done by a doctor, or someone else, or no one at all). After the classes with 112 data sets, 78 (72 percent) reported same outcomes.
- ◆ Before the classes started, the average blood glucose reading before meals for 1,378 participants was 140.1 milligrams per deciliter(mg/dL). The wrap up reading was 129 mg/dL for 871; and the six months follow up classes, the average blood glucose before meals reading for 112 participants dropped to 122.5 mg/dL.
- ◆ During registration, the average times that blood glucose reading was given for before meals was 684 (56 percent); two hours after meals, 265 (22 percent); before bedtime, 334 (27 percent) for 1,378 participants. Six months follow up classes with 112 respondents, the average times that blood glucose was tested before meals was 69 (62 percent); two hours after meals 44 (40 percent); before bedtime, 48 (43 percent).
- ◆ Before classes, 588 (45 percent) participants reported working out for 30 minutes, 5 days per week. Some (632) 48 percent reported doing no exercise at all. After the classes, 69 (63 percent) reported that they exercise 30 minutes. Only 35 (32 percent) reported no exercise at all.
- ◆ On the pre-test, some 559 (45 percent) of the 1,378 participants reported that they follow no meal plan to manage their condition. Eight percent (98) ate regular meals with no added sugar. Other meal plans were [74 (6 percent) diabetes exchanges; 199 (16 percent) carbohydrate counting; 28 (2 percent) plate method] continue to be ordered by their physicians with little variation between that time period.
- ◆ In 2006, net savings for 948 female participants are estimated at \$68,569 and for 430 male participants at \$54,545 for a total estimated economic benefit of >\$73.8 in 2005 to \$80 million dollars in 2006.
- ◆ Specialist took the DWBW presentation and qualitative results to the 2006 San Juan, Puerto Rico for the National Program Leaders annual conference; and to (Virginia Cooperative Extension, 2006).
- ◆ Unsolicited testimonial from client: Thirty six year old, Hispanic male attended the Do Well, Be Well Diabetes classes last year under the leadership of the Brazos County Extension Agent and her health coalition A 130 pound weight loss followed as result of his participation in this class series. Before, he knew very little about nutrition, exercise and practicing self-care; the effects that diabetes could have had; and he weighed well over 300 lbs. From the DWBW classes and team of presenters, the message was very clear—a need to make lifestyle changes. His wife and daughter have also joined him in this new lifestyle of eating more healthful foods and increasing daily activities. His wife no longer has to shop at "special" female stores. He commented to his county agent: *The work that you do has saved my life and the life of my family. We are much happier now, and we enjoy life to the fullest.* Here are his results:
 - ▶ Clinical Results
 - ▶ Weight loss of 130 pounds
 - ▶ Diabetes symptoms disappeared

- ▶ Total Cholesterol from 230 to 109
- ▶ Triglycerides from 141 to 55
- ▶ HDL's from 36 up to 43 (we want those high)
- ▶ LDL's from 113 down to 66 (his ratio of HDL:LDL is now astounding.)
- ▶ Resting glucose from 157 to 83 (under 100 is good)
- ▶ Blood pressure from 160/120 to 130/80
- ▶ Disappearance of sleep apnea in which 10 episodes occurred during a one hour period and no breathing machine is needed to sleep.

Lifestyle Changes

- ▶ The fact that he was both motivated and willing to change every aspect of his lifestyle leads to his success.
- ▶ Increased exercise now riding his bike to work twelve miles each way and works with a trainer.
- ▶ Watches his food intake and follows guidelines he learned for nutrition and self-care from his DWBW classes.

2006 Key Results of *Cooking Well with Diabetes, Phase 2. Do Well, Be Well with Diabetes*SM

During 2004 to 2006, some 70 trained agents conducted cooking schools. Though the sample was small, the positive changes participants made were worth noting. Here are some of the most significant of those results:

- ◆ Had 1,392 diabetic individuals completing registration surveys; 1000, wrap-up surveys; and 710, reunion surveys providing 710 sets useable data.
- ◆ Average age was 62 years of age with 1,130 females (82.5 percent) and 262 males (18.7 percent).
- ◆ Some 92 percent respondents never previously participated in a cooking school.
- ◆ Average hemoglobin A_{1C} was reported at 7.3.
- ◆ When asked about type of meal plan they followed, some 13.4 percent (175) answered diabetes food exchanges; carbohydrate counting, 17.9 percent (331); plate method, 4.4 percent (54); 10.6 percent (127) other meal plans; and 42 percent (553) receiving no meal plan at all.
- ◆ Responses on the registration, wrap-up and reunion surveys documented increased knowledge utilizing healthy food choices for persons with diabetes, the plate method for portion control, and overall knowledge increase in lifestyle choices (for example, modifying recipes to cut fat, sugar and salt and increase fiber).
- ◆ CWWD report was made at the 2006 National Extension Agent Meeting (Denver, CO) by the Cooking School Training team of agents.
- ◆ Specialist took the CWWD poster presentation to the 2006 American Dietetic Association annual conference and exposition, Honolulu, HI.

Other Outcome Indicators

Awareness of Managing Food Choices through Healthful Eating To Control Blood Glucose

1,825 programs with 106,691 group contacts and 70,524 individual contacts became aware of importance of controlling blood glucose through healthful eating (decreasing fat, sugar, increasing carbohydrates with more fiber) and self-care (self-glucose monitoring, exercise, visiting with health care provider, and taking medications and/or insulin diabetes) through the Extension diabetes programming in Texas counties.

Awareness of importance Self-Blood Glucose Monitoring

106,691 group contacts and 70,524 individual contacts awareness of importance of adequately monitoring blood glucose levels 4 times a day

Awareness of Exercising to Control Blood Glucose

106,691 group contacts and 70,524 individual contacts awareness of importance of engaging in daily exercise

Visiting with Health Care Provider

Number of individuals visiting with physician, dietitian, nurse, diabetes educators - Data not available

Taking Prescribed Medication and/or Insulin

Number of individuals taking prescribed medication and/or insulin - Data not available

Summary of Output Measures

(Via 12 individual districts summaries for diabetes, diabetic individuals)

1,825	Number of group method contacts
106,691	Number of people completing programs (Group Methods)
70,524	Number of participants served by (Individual Methods) (Trend is that clientele with diabetes continue to seek information via individual assistance)
49,248	Number of written diabetes educational materials distributed via newsletters, self-study guides and others. Diabetes resources will be included in a diabetes curriculum Phase 1. <i>Do Well, Be Well with DiabetesSM</i> , a 5-week Nutrition and Self-Care TCE Curricula and Phase 2. <i>Cooking Well with DiabetesSM</i> , a 4-week diabetes cooking school curriculum with accompanying PowerPoint visuals with each lesson, handouts, and some web-based educational resources plus 600 additional publications for reaching Hispanic under-served audience

Many health professionals, clientele with diabetes, internet users, seek diabetes information via the web via Extension. To accommodate this continual access to knowledge, web based Extension diabetes nutrition/self-care information can be found at:

Food/Nutrition http://fcs.tamu.edu/food_and_nutrition/index.php and FCS; <http://fcs.tamu.edu/> and Health websites *Do Well, Be Well with DiabetesSM* <http://fcsagents.tamu.edu/health/diabetes/index.php> , <http://nutrition-newsletters.tamu.edu/> food/nutrition electronic newsletters Health Hints newsletters <http://fcs.tamu.edu/health/> , diabetes nutrition and health related bookmarks organized <http://micks-picks.tamu.edu/>

Texas Agricultural Experiment Station

The Texas Agricultural Experiment Station did not have research programs that complimented or supported TCE in its State Plan of Work Program 6, i.e., Diabetes Education.

C. Sources of Federal Funds

TCE: Smith-Lever and State Matching
TAES: None

D. Scope of Impact

Multi-State Extension: TX, AR, CO, MO, NM, WV, KY, KA, GA, IL
Multi-State Research: None.
Integrated Research and Extension: Collaboration among Extension nutrition (registered/licensed, dietitian) specialist, Department of Nutrition and Food Science, and Extension health specialist (registered/licensed nurse); diabetes response team made up of County Extension Agents in Family and Consumer Sciences in several Texas counties

trained in diabetes education via special Statewide training and participation in American Association of Diabetes Educators Annual Meetings; shared qualitative diabetes research plus economic impact report data with specialists and administrators in attendance at the Priester Conferences (St. Louis, MO, 2004; Lexington, KY, 2005) diabetes cooking team members presentation NEAFCS (Denver, CO, 2006); qualitative results shared poster session, American Dietetic Association Conference and Food Exposition (Honolulu, HI, 2006); qualitative results of DWBW (Virginia Cooperative Extension, 2006; State Program Leaders Administrator Meeting, San Juan, Puerto Rico, 2006) and various outside partnerships/support (see Target Audience) and various outside partnerships/support (see Target Audience).

State TCE-TAES Plan of Work Program 7: Better Living for Texans
Key Theme: Human Health, Human Nutrition

A. Description of Activity

An estimated 16.3% of Texans live in poverty, a figure that is higher than the national average of 12.7%. Research suggests that individuals who live in poverty consume diets that are not in agreement with the Dietary Guidelines for Americans or the recommended food guidance system (MyPyramid). For example, diets of individuals in low-income households have been shown to be lacking in fruits, vegetables, and dairy products. Individuals who live in poverty are also at risk for having poor food security status, characterized by having their typical eating patterns disrupted due to an inability to purchase/acquire food. In 2006, the USDA reported that 16% of Texas households had experienced food insecurity between the years 2003 and 2005. By comparison, the national figure was 11.4%. A 2002 survey of 1,000 households participating in the Food Stamp Program throughout Texas found that more than half of those households had experienced food insecurity or hunger (now termed “very low food security”) within a 12-month period.

The core of the Better Living for Texans (BLT) program during 2006 included a series of 3 lessons which focused on food resource management, meal planning, and food safety. Curricula and supporting educational materials used in BLT were research-based, targeted toward limited resource audiences, and available for county Extension agents in both English and Spanish. Newspaper articles as well as television and radio were other avenues used to market the BLT program and distribute information about food safety, food resource management, as well as basic nutrition to limited resource audiences.

As in previous years, the primary audience for BLT during 2006 was food stamp recipients and applicants. However, BLT was granted five waivers by USDA/FNS which allowed the inclusion of additional audiences: (1) families of students in schools with more than 50% of the student population eligible for free and/or reduced price lunches, (2) families of Head Start participants, (3) families whose children participate in the Summer Food Service Program, (4) families of women and children who participate in the Special Supplemental Food Program for Women, Infants, and Children (WIC), and (5) families of participants who receive food from commodity food distribution sites.

During 2006 year, more than 10,900 BLT programs were conducted in 208 counties across Texas, resulting in 304,434 direct educational contacts. Of those contacts, 35% were made to Caucasian, 13% to African Americans, and 38% to Hispanics. Less than 1% of those contacts were made to individuals who identified themselves as Native American or Asian American. Women and youth comprised 50% and 42% of the educational contacts, respectively.

Internal linkages were developed with several sources. Nutrition specialists recommended curricula and educational materials, and participated in the training of agents and paraprofessionals. Evaluation specialists assisted in the development of instruments to measure the impact of the program. In addition, linkages were developed with external sources including the Texas Department of State Health Services (WIC program), the Texas Health and Human Services Commission (Food Stamp Program), as well as local housing authorities to identify and recruit eligible participants. Agents also marketed and conducted BLT programs in conjunction with other community organizations that serve the targeted audience including public housing

authorities, food banks, food pantries, churches, community centers, and congregate feeding sites.

B. Impact of Programs

Outcome Indicators:

The extent to which participants met selected outcome indicators was based on a statewide telephone survey of a sample of individuals who had completed a three-lesson series as a part of the BLT program during 2006. Survey respondents were asked the extent to which they practiced specific food handling and food resource management behaviors, both before and after participating in BLT. Demographic questions as well as the 18-item USDA Household Food Security Module were included as part of the survey instrument. This module evaluates the food security status of households and identified the extent to which hunger is present in the home. Trained interviewers administered the telephone survey to the 177 individuals who agreed to participate. Nearly one-third (31%) of the surveys were conducted in Spanish.

Outcome Indicator #1:

Extent to which BLT participants adopt planning meals in advance, shopping for food with a list, and comparing food prices, to extend food dollars until the end of the month.

Results: The percentage of participants who planned meals, shopped with a list and compared prices either “always” or “most of the time” was significantly ($p < .05$) higher after completion of the BLT program compared to before. Nearly 38% of respondents reported that they planned their meals either “always” or “most of the time” before attending the BLT program. After completing the program, the percentage rose to 65%. Less than one-half (47%) of respondents reported that they shopped with a list “always” or “most of the time” before BLT. Afterwards, however, that percentage rose to 69%. While more than half (61%) of the respondents acknowledged that they compare prices when shopping either “always” or “most of the time” before BLT, more participants (84%) were practicing this behavior afterwards. The extent (1=never; 5=always) the identified food resource management behaviors were being practiced by the respondents before and after BLT are illustrated in the following table.

Targeted Behavior	Extent to which behavior was practiced before BLT	Extent to which behavior was practiced after BLT	Level of significance
Planning meals (n=177)	3.16 ^a	3.88	<.05
Shopping for food with a list (n=177)	3.30	4.05	<.05
Comparing prices when shopping for food (n=177)	3.69	4.33	<.05

^a Likert scale was utilized to measure extent of change and was defined as 1=never, 2=seldom, 3=sometimes, 4=most of the time, and 5=always.

Participants were asked to identify one food shopping practice they had changed since attending the BLT program. Of the 76 participants who provided usable responses, 21% (n=16) reported comparing food prices, 17% (n=13) reported shopping with a list, and 8% (n=6) reported buying only what was needed.

Additionally, participants were asked to estimate the amount of their own money spent on food each month both before and after participating in BLT. On average, survey respondents reduced their monthly out-of-pocket food expenses by \$10.33 per month (6.2% reduction). The mean reduction was not statistically significant. Nearly 47% (n=83) were classified as having low or very low food security status and nearly one out of every four respondents acknowledged that they had received emergency food assistance during the 30 days prior to being interviewed. Although reason(s) for the noted low food security status and the reported use in emergency assistance are not known, it is possible that the rising cost of fuel (as well as its subsequent impact on food prices) during 2006 played a role. In addition, only 27% of the respondents who participated in the survey were receiving food stamp benefits at that time.

Outcome Indicator #2

Extent to which BLT participants practice safe food handling behaviors to reduce the risk of foodborne disease.

Results

This outcome indicator is related to three food safety practices: (1) reducing the amount of time cooked foods are left out before eating or refrigerating; (2) hand washing; and (3) the frequency in which cutting boards, knives and counter tops are washed with hot soapy water after working with raw meat or poultry.

Prior to the program, respondents reported leaving food out before eating or refrigerating for an average of 99 minutes. After BLT, the average amount of time food was left out significantly ($P < 0.05$) dropped to 34 minutes. With respect to hand washing, 72 of the respondents reported that before BLT, they “always” washed their hands before preparing food. After the program, this percentage significantly rose to more than 90%. In addition, the percentage of participants who reported “always” washing their cutting boards, knives, and countertops with hot soapy

water after working with raw meat or poultry rose from 75% (before BLT) to 91% (after BLT). The extent (1=never; 5=always) the identified food safety behaviors were being practiced by the respondents before and after BLT are illustrated in the following table.

Targeted Behavior	Extent to which behavior was practiced before BLT	Extent to which behavior was practiced after BLT	Level of significance
Wash cutting board, knife, and counter tops with hot soapy water after cutting up raw meat or poultry (n=177)	4.49 ^a	4.85	<.05
Washing hands with soap and water for 20 seconds before and during cooking (n=177)	4.55	4.87	<.05

^a Likert scale was utilized to measure extent of change and was defined as 1=never, 2=seldom, 3=sometimes, 4=most of the time, and 5=always.

Participants were also asked to identify one food safety practice they had changed since attending the BLT program. Of the 65 participants who provided usable responses, 38% (n=25) reported storing food properly, 12% (n=8) reported thawing food, especially meat, correctly, and 9% (n=6) reported washing hands more often.

Impact of the Program

A majority (73%) of subjected who participated in the BLT program rated the program as excellent. In addition, 77% of the respondents reported that BLT was their first exposure to a Cooperative Extension educational program. These findings along with the reported behavioral changes and the reduction in out-of-pocket food expenses suggest that BLT is effective in teaching limited resource audiences important skills that improve one’s ability to prepare safe meals on a limited budget.

Texas Agricultural Experiment Station

The Texas Agricultural Experiment Station did not have research programs that complimented or supported TCE in its State Plan of Work Program 7, Better Living for Texans.

C. Source of TCE-TAES Federal Funds

TCE: Smith-Lever and State Matching
 TAES: None

D. Scope of TCE-TAES Impact

Multi-State Extension – WS, OH, CO

TAES – None

Integrated Research and Extension - Research methodology was integrated into the BLT program via the state-wide telephone survey which has been conducted annually. Results, which have been featured in this report, have been presented at national nutrition meetings for discussion with other nutrition researchers and program directors. Results from the 1999-2000 state-wide survey were published in the December 2001 issue of the *Journal of Extension* (<http://www.joe.org/joe/2001december/rb4.html>).

Goal 4: Greater harmony between agriculture and the environment

Overview

As the population of Texas increases, the need for water becomes greater. It is becoming increasingly apparent that several regions of the State will be unable to provide sufficient supplies of high quality water for agriculture, drinking water, urban uses, industry, and the environment unless extraordinary measures are taken.

To help Texas manage its water resources to the greatest possible extent, scientists and specialists with the Texas Agricultural Experiment Station (TAES) and Texas Cooperative Extension are working with the Texas Water Resources Institute and other partners to develop and implement comprehensive research, outreach, and extension programs. Common goals of these programs include the following:

- Ensure that water supplies are used efficiently in agriculture production, landscape maintenance, in the home, and in other settings.
- Protect water quality by preventing contamination in a number of settings, including agricultural practices, the operations and maintenance of on-site wastewater treatment systems, landscape and turfgrass maintenance, and the use and disposal of household chemicals.
- Identify opportunities to develop alternative, untapped, sources of water, including extensive efforts in water conservation, water and wastewater reuse, the efficient treatment of saline and brackish waters, and recovery of brines resulting from oil and gas operations.
- Provide objective research-based information that water managers, policy makers, and the public can use to evaluate the merits of proposed measures to conserve water, increase water supplies, develop infrastructure, and improve water quality by treating sources of impairment.
- Bring timely information about critical issues to water resources managers, policy makers, and the public, including such topics as water marketing, the formation of groundwater districts, the need to manage storm water runoff, and new governmental regulations and programs that affect water resources management.
- Promote widespread education programs directed at school children and adults, including efforts touching on such issues as drinking water quality, environmentally-friendly methods to maintain landscapes, and ways to achieve water conservation in the home and on the farm.

Data supporting these goals and work in the area of agriculture and the environment are provided in this section. The Texas Agricultural Experiment Station and Texas Cooperative Extension remain committed to a focused effort in this area.

Sources of Funding and FTEs

TCE Funding: Smith Lever and State Matching

	\$ X 1000
	Actual
	<u>FY 2006</u>
Program 8 – Water Quality & Quantity Management	4,808
FTEs	196.26
Allocated Resources Goal 4	5,297
FTEs	224.92

TAES Funding: Hatch, and state, federal and private contracts and grants

Source of Funding and FTEs

Hatch Funds (\$ x 1000):	1,714
State Funds (\$ x 1000):	6,068
FTEs:	57.10
Number of Projects:	172
Number of Publications:	617

State TCE-TAES Plan of Work Program 8: Water Quality and Quantity

Key Theme: Water Quality, Natural Resource Management, Drought Prevention and Mitigation

A. Description of Activity

As the population of Texas increases and needs for water become greater, it is becoming increasingly apparent that several regions of the State will be unable to provide sufficient supplies of high quality water for agriculture, drinking water, urban uses, industry, and the environment unless extraordinary measures are taken.

To help Texas manage its water resources to the greatest possible extent, scientists and specialists with the Texas Agricultural Experiment Station (TAES) and Texas Cooperative Extension are working with the Texas Water Resources Institute and other partners to develop and implement comprehensive research, outreach, and extension programs. Common goals of these programs include the following:

- Ensure that water supplies are used efficiently in agricultural production, landscape maintenance, in the home, and in other settings.
- Protect water quality by preventing contamination in a number of settings, including agricultural practices, the operations and maintenance of on-site wastewater treatment systems, landscape and turfgrass maintenance, and the use and disposal of household chemicals.
- Identify opportunities to develop alternative, untapped sources of water, including extensive efforts in water conservation, water and wastewater reuse, the efficient treatment of saline and brackish waters, and recovery of brines resulting from oil and gas operations.
- Provide objective research-based information that water managers, policy makers, and the public can use to evaluate the merits of proposed measures to conserve water, increase water supplies, develop infrastructure, and improve water quality by treating sources of impairment.
- Bring timely information about critical issues to water resources managers, policy makers, and the public, including such topics as water marketing, the formation of groundwater districts, the need to manage storm water runoff, and new governmental regulations and programs that affect water resources management.
- Promote widespread education programs directed at school children and adults, including efforts touching on such issues as drinking water quality, environmentally-friendly methods to maintain landscapes, and ways to achieve water conservation in the home and on the farm.

B. Impact of Programs

Output Indicators

A.4.1.3: The total number of people completing non-formal education programs on sustaining and protecting ecosystem integrity and biodiversity while improving the productivity of the U.S. agricultural production system.

A variety of educational programs were implemented to deliver information on sustainability and maintaining agriculture production systems. Agricultural production is vital to

the Texas economy. These production systems required chemical inputs for viability. These inputs are managed to minimize impact on our ecosystems. Several watershed management programs are being implemented to raise awareness regarding the ecosystem and how all of the activities in an ecosystem are interrelated. Watershed protection plans are being developed for watersheds with impaired stream segments and their associated implementation plans will compliment the educational programs. Delivery methods included one-to-one contacts and producer meetings conducted by Extension agents and specialists. Total attendance at these events was 63,146 contacts.

The Arroyo Colorado watershed protection plan was completed outlining strategies to improve dissolved oxygen levels within the waterway. Organics, nutrients and sediments will be targeted for reduction to meet water quality goals. Urban and agricultural best management practices will need to be implemented to reduce the contaminant loading to the watershed.

A.4.2.1: The total number of people completing non-formal education programs on sustaining and/or protecting the quality and quantity of surface water and ground water supplies.

A variety of education methods were utilized to deliver information on sustaining and protecting the quantity and quality of surface water and ground water supplies. North Central Texas includes rapidly-urbanizing watersheds with growing water demands. To meet these demands, education programming focused on educating residents about best management practices to conserve water, including efficient irrigation devices and management strategies to save water on agricultural crops and in the home. Proper landscape management is needed to protect the water resources from contamination and efficiently utilize water. A program addressing athletic fields was utilized to improve turf conditions and reduce water use. Delivery methods included one-on-one contacts and producer meetings conducted by Extension agents and specialists. Total attendance at these events was 166,522 contacts.

B.4.2.1: The total number of people completing non-formal education programs on water quantity and water quality who plan to adopt one or more water management practices after completing one or more of these programs.

Several Extension programs provide extensive training to participants as a requirement of State-mandated programs for licensing and continuing education, including efforts in onsite wastewater treatment and landscape irrigation management. Onsite wastewater treatment systems provide the wastewater infrastructure for rural and suburban Texans. The performance of routine operation and maintenance activities facilitates continued system function. A training program was implemented during the summer of 2006 to reach the wastewater practitioners. A total 1615 participants were taught using a 16 hour training curriculum. This program reached approximately 90% of the target audience. Course participants reported approximately a 20% gain in knowledge critical to performance of operation and maintenance activities. This program was implemented through cooperation with the Texas Onsite Wastewater Association (TOWA) and the Consortium of Institutes for Decentralized Wastewater Treatment.

A.4.3.2: The total number of people completing non-formal education programs on public policy issues affecting agricultural production and ecosystem integrity and biodiversity.

Water policy is a key issue when managing a limited water resource. Programming raises awareness of everyone's needs regarding the water resource. Allocating this limited

resource is challenging and can result in intense local negotiations. The water planning framework in Texas allows redevelopment of the water plan every five years. The regional plans were submitted at the beginning of 2006 and were formulated into the next State plan which was published in January 2007. Extension and research professionals are delivering programs to raise awareness of water management strategies and what policies can be implemented to share this valuable resource to meet all needs: domestic, municipal, agricultural, industrial, recreational, wildlife, aquatic and marine. Delivery methods included one-on-one contacts and producer meetings conducted by Extension agents and specialists. Total attendance at these events was 47,806 contacts.

In cooperation with the U.S. Bureau of Reclamation, Cooperative Extension and TAES personnel continue to distribute a newsletter, "Drought Watch on the Rio Grande." This newsletter, circulated in both print and email forms, reaches a large audience and provides timely information on reservoir levels, expected stream flows, and groundwater supply data.

B.4.3.2: The total number of people completing non-formal education programs on public policy issues affecting agricultural production and ecosystem integrity and biodiversity who plan to become actively involved in one or more public policy issues after completing one or more of these programs.

Groundwater remains an issue of concern. Educational material describing water rights is being developed to assist in reaching landowners, concerned citizens and groundwater district managers. These groups need material that can help the public make informed decisions on how to best manage their local water resources. These educational materials provide the base knowledge about Texas water law and issues landowners should consider before marketing water from their property. A priority groundwater management area is being proposed for North Central Texas due to the growing demand for water resulting from the growing population. A priority groundwater management area designation will result in increased groundwater resource education programs.

Highlighted Programs

Earthkind program addresses Landscape Management

Landscape Water Conservation: Landscape irrigation in Texas accounts for up to 40%-60% of total residential water use during peak summer months. This issue is critically important to millions of urban residents throughout the state of Texas. Fertilizer and pesticide use in the landscape must be properly managed to limit risk to our surface and groundwater resources. Contamination from nitrogen and phosphorous fertilizers will lead to water resource degradation. This issue is critically important in preserving and protecting our valuable natural resources. A statewide model program was developed around the concept of proper management of our landscapes. This program facilitated the development of numerous targeted local training events to share information on proper landscape management.

Rainwater Harvesting information distributed through Master Gardeners

Texas Cooperative Extension is utilizing the members of the Master Gardener Associations around the state to educate Texans about using rainwater harvesting as an innovative way to control stormwater in urban and rural settings. In the first two trainings a total

of 76 Master Gardeners completed the 2 day, 16 hour training event. As a part of the requirements for being trained as a specialist in rainwater harvesting, each person trained is required to volunteer at least 12 hours of their own time to teach others in their area about rainwater harvesting. These volunteers will assist in reaching a greater number of Texans with information about the protection and efficient use of our water resources. Main objectives covered in the training include:

- Understanding what a watershed is and how our activities affect the water quality in it.
- Understanding how to reduce runoff from your property by using rainwater harvesting.
- Learning how to calculate supply, demand, and storage needs for rainwater harvesting systems.
- Learning necessary filtration and sanitation of rainwater based on use.
- Understanding how to mold your lawn into a water conserving landscape.
- Learning the function and purpose of soil storage and infiltration systems.
- Learning how rainwater can attract and sustain wildlife in urban and rural settings.
- Learning how raingardens function as a form of stormwater management.
- Understanding how to design and implement rainwater harvesting programs for youth.

Program evaluations have been overwhelmingly positive and requests have been pouring in for the training to be held in numerous locations. We currently have 4 more trainings scheduled. Program writing and presenting team: Rachel Alexander, John Begnaud, Jim Cathey, Monty Dozier, Molly Griffin, B.L. Harris, Janie Harris, Billy Kniffen, Bruce Lesikar, Justin Mechell, Mike Mecke, Russell Persyn, Dana Porter, Valeen Silvy, John Smith, Barbara Storz, and Doug Welsh.

Throughout 2006, scientists with the Texas Agricultural Experiment Station were significantly involved in a number of water resources studies, dealing with such issues as economic assessments, policies, the treatment and reuse of dairy manure to protect the environment, groundwater management in the High Plains, developing complex data about environmental issues that can be used to target watershed restoration efforts, water quality issues pertaining to fecal bacteria, and brush control to increase water yields. Highlighted programs identified here are discussed below.

Irrigation Scheduling for Efficient Water Use

Research and Extension personnel at the Texas A&M Agricultural Research and Extension Centers in Uvalde, Lubbock and Amarillo are collaborating on efforts to increase water conservation among agricultural producers through the Precision Irrigators Network (PIN) and High Plains ET Network. The work is led by Texas Agricultural Experiment Station (TAES) researcher Giovanni Piccinni and Extension Agent Ken White at Uvalde, Extension Agricultural Engineer Dana Porter and TAES researcher Tom Marek at Amarillo. Other cooperators include TAES researchers Tom Cothren of the Texas A&M University Soil and Crop Science Department and Tom Gerik of the Blackland Research and Extension Center in Temple. The goal of this research is to increase irrigation efficiency and water savings for agricultural producers using real-time climate data and training on the latest water management simulation models. The hope is that significant water savings can be achieved as agricultural producers in this region collaborate with the researchers and begin timing and scheduling irrigations based on climate data and plant water use needs. In addition to increasing conservation, this project also

has the potential to reduce the incidence of plant disease and other environmental stressors that can harm crop production. A coordinated effort between the research and extension program has the potential to increase water use efficiency and reduce crop production inputs to manage disease.

Researchers Evaluate Pathogen Transport to Water Resources

Bacterial TMDLs are being developed for several lakes and rivers in Texas. These TMDLs are attempting to allocate the pathogen load in the water resources to the sources in the watershed. The end goal is to improve the quality of the water resource by reducing the concentration of pathogens to a level below our water quality standards. Effective implementation of this program will require a thorough understanding of where the pathogens are originating, how effective are the best management practices at preventing pathogens from reaching the streams, what processes are occurring during transport to the water resource, what happens to the pathogens while in the water resource and how can this process be modeled. All of these questions will need to be answered through a comprehensive approach to evaluating pathogen cycling in the environment. TAES researches Binayak Mohanty, Patti Smith, Karthi Karthikeyan, Clyde Munster, Yongheng Huang and Srini Srinivasan of the Biological and Agricultural Engineering Department are developing predictive models to estimate pathogen transport, degradation, and regrowth in water resources.

Ogallala Water Management

Researchers and extension specialists formed a team that includes TAES, TCE, West Texas A&M University, Texas Tech University, Kansas State University and USDA-ARS, to address issues pertaining to sustainable groundwater use in the Ogallala Aquifer region. Research and extension programs are being strengthened through the cooperation between Universities and USDA-ARS. Research evaluating soil water management and crop water needs are being delivered to the clientele in the region. Water use efficiency is critical to increase productivity relative to the volume of water utilized. Educational materials are being developed and then delivered through traditional and electronic mechanisms.

Evaluating Water Loss in Canal Systems

Canals are utilized to convey water resources for agricultural and urban usage. These canal systems may be lined to reduce water loss. TAES researcher Zhuping Sheng of the Texas A&M University Research and Extension Center as well as Extension Agricultural Engineer Guy Fipps are evaluating water loss in the canal systems. Rehabilitation projects are actively being implemented in the Rio Grande Basin to reduce water loss in the canal systems. Seepage rates are being determined to assist in evaluating the water savings that may be generated through rehabilitation or installation of a liner. This critical information is being shared with irrigation district managers to determine water savings. Additionally, irrigation district managers are gaining valuable skills to improve their management of the water within the canal system.

C. Sources of Federal Funds

TCE: Smith-Lever and State Matching

TAES: Hatch, federal, state, and private grants and contracts

D. Scope of Impact

Multi-State Extension – AR, NC, MN, WS, AR, WS, MI, RI, MS, NM, OK, LA

Multi-State Research – Multi-State Projects NC-208, W-1128, NE-162 (LA, NM, AZ, CO, FL, ME, MT, OR, UT, WI)

Integrated Research and Extension: Integration of the Research and Extension program is being accomplished through the Texas Water Resources Institute (TWRI). TWRI assists the agriculture program consisting of both Texas Cooperative Extension and Texas Agricultural Experiment Station in identifying program areas needing additional attention.

Goal 5: Enhanced economic opportunity and quality of life for Americans.

Overview

Financial Management. Debt repayment consumes a large share of household income. Total consumer debt outstanding at the end of 2006 exceeded \$12.0 trillion nationwide. Personal bankruptcies increased nationally by 5.2% between 2002 and 2003. The Southern District of Texas led the nation with the highest percentage increase in total bankruptcy filings of any of the 94 federal judicial districts from 2002 to 2003, with a 22.2% increase. The bankruptcy filing rate increased in 2005 prior to changes in bankruptcy law, declined in the first two quarters of 2006, but are expected to increase as changes in interest rates impact families, especially those with adjustable rate mortgages. Approximately 65 million U.S. households will probably fail to realize one or more of their major life goals, primarily due to a lack of a comprehensive financial plan. In households with annual incomes of less than \$100,000, those with financial plans have twice as much in savings and investments as those without financial plans.

Parenting. Changes in family life over the last several decades have influenced the ability of family members to adequately address the needs of children and aging adults. Families need access to research-based educational resources and training programs to assist them in their job of raising responsible citizens. According to recent statistics, over one-fourth of today's children reside in single-parent households, where they are much more likely to experience poverty (Forum on Child & Family Statistics, 2005). Nearly five million infants, young children, and teens live in households headed by a grandparent. Over 20 million children are currently living apart from their biological fathers. Researchers have found that children who grow up with absent fathers are at a greater risk for poverty, school failure, child abuse, suicide, criminal behavior, emotional and behavioral problems, early sexual activity, and drug and alcohol abuse. These risks diminish substantially when children grow up with an active and loving father in the home (Horn & Sylvester, 2002).

Life Skills Education. Youth issues were identified by Texas residents as a high priority for Extension programming. Nationally, youth related issues include Weight Management, Harmful Substance Abuse, Teen Sexuality, Accepting and Respecting Others, Youth Violence, Unsupervised Time, Youth Literacy, and Death by Accident. During 2004, Texas Counties identified a number of youth related issues which strongly parallel national concerns. These issues continued as areas of focus for 2006.

Volunteer Development. Mobilizing and organizing a strong volunteer base is essential to the mission of Texas Cooperative Extension. TCE has the largest volunteer program of any agency in Texas. But with increasing competition for resources, funding, staff and time, sound decisions regarding volunteer recruitment and management will be crucial to sustaining current programs, partnerships and developing new opportunities. All research concerning agencies of the future leads us to know that expanding the outreach and programming components through all volunteer efforts is essential. Volunteers are the real heart and hands of many different Extension programs, extending the reach into every community and every neighborhood in Texas. Extension volunteers help people to gain knowledge and skills that will benefit them for life. And, in return, volunteers have the satisfaction of knowing they're making a difference for their friends and neighbors. Much of the work Extension volunteers do grows out of their interests and experiences, but they also receive training from educators from various disciplines. Thus volunteers improve their own skills while helping others.

Partnerships and Collaborations. During 2006, Texas Cooperative Extension conducted many successful educational programs which were expanded via partnerships and collaborations.

Historically, these partnerships and collaborations have been with citizen groups, other universities, other agencies and key stakeholders. The Texas Community Futures Forums were conducted in 2004 in all 254 counties with key input from many of these partners. Emphasis is being given to groups with interest in community, youth and family concerns. Special attention will be devoted to traditionally under served sectors. Care was given to meet the needs of the disadvantaged.

Community Development. Stakeholder input provided by over 10,000 Texans in all 254 counties of the state through the Texas Community Futures Forum indicate that issues associated with development of their communities are pervasive and a very high priority. Specific issues include concerns about individual, community and regional economic viability and maintenance of a high quality of life.

Programs in the areas under Goal 5 continue to provide Texans with research-based information in order for them to make sound decision on the implementation of best management practices and adoption of technologies. Educational programming has been and will continue to be driven by the needs of our clientele. Results from the Texas Community Futures Forum, and guidance from Executive Program Councils and program committees serve as the basis for this strategy. The data presented in this summary and the following section represents the efforts of Year 06 of this Plan of Work. Educational programming efforts have been ongoing for many of the areas represented and continue to provide Texans with opportunities for increased profitability and competitiveness. Future plans will build on past experiences and emerging issues that may affect our state and clientele.

Source of TCE-TAES Funding and FTEs

TCE Funding: Smith Lever and State Matching

		\$ X 1000
		Actual
		<u>FY 2006</u>
Program 9 – Financial Management Education		722
	FTEs	28.98
Program 10 – Parenting		1,698
	FTEs	68.08
Program 11 – Life Skills Education		2,311
	FTEs	92.66
Program 12 – Volunteer Development		1,239
	FTEs	49.84
Program 13 – Partnerships & Collaborations		390
	FTEs	15.69
Program 14 – Community Development		1,810
	FTEs	14.48

Allocated Resources Goal 5

9,079
FTEs 385.53

TAES Funding: Hatch, and state, federal and private contracts and grants

Source of Funding and FTEs

Federal Funds (\$ x 1000): 61

State Funds (\$ x 1000): 265

FTEs: 4.31

Number of Projects: 34

Number of Publications: 42

State TCE Plan of Work Program 9: Financial Management Education
Key Theme: Family Resource Management

A. *Description of Activity.*

Debt repayment consumes a large share of household income. Total consumer debt outstanding at the end of 2006 exceeded \$12.0 trillion nationwide. Personal bankruptcies increased nationally by 5.2% between 2002 and 2003. The Southern District of Texas led the nation with the highest percentage increase in total bankruptcy filings of any of the 94 federal judicial districts from 2002 to 2003, with a 22.2% increase. The bankruptcy filing rate increased in 2005 prior to changes in bankruptcy law, declined in the first two quarters of 2006, but are expected to increase as changes in interest rates impact families, especially those with adjustable rate mortgages. Approximately 65 million U.S. households will probably fail to realize one or more of their major life goals, primarily due to a lack of a comprehensive financial plan. In households with annual incomes of less than \$100,000, those with financial plans have twice as much in savings and investments as those without financial plans.

Thirty percent of the U.S. workforce who are eligible for 401(k) plans at work fail to participate, and only 20 percent of workers employed by companies with less than 100 workers have any kind of retirement plan.

Two-thirds of all employees in the United States report that they have trouble paying their bills on time and worry about money. Seventy-five percent of employees say that they have recently faced at least one significant financial problem. Individuals and families of all income, ethnic and educational groups in Texas are facing many financial challenges.

Internal and External Linkages were established and maintained as follows: During 2002, the new national Extension initiative, *Financial Security in Later Life*, was introduced to urban Extension agents through in-service training. Also in 2002, a new partnership agreement was signed with the Federal Deposit Insurance Corporation (FDIC) to promote *Money Smart*, a curriculum targeting the un-banked. County Extension agents collaborated with banks, savings and loans, credit unions, employers, consumer credit counseling services, bankruptcy trustees, and directors of programs targeting financially insecure families, including a multi-county prison system. Cooperative relations were established with Consumer Action, a San Francisco-based consumer organization, to promote the *Money Wi\$e* curriculum and a small grant for training new Extension Agents was obtained in 2004. Under contract with the Dallas Regional Office of the Women's Bureau, U.S. Department of Labor, a new project, *Wi\$e Up - Financial Planning for Generation X Women* was undertaken in 2003 and continued in 2004 and 2005 with new funding for 2005-06 and 2006-07 from State Farm Insurance.

In 2006, Texas Cooperative Extension was approved to issue certificates evidencing completion of a personal financial management course in compliance with the Bankruptcy Code, and began to offer debtor education courses which are now required by the changes to bankruptcy law in the United States. In Travis County (Austin, Texas), Extension leadership led to the creation of the Financial Literacy Coalition of Central Texas, a group of more than 30 collaborating groups from public, private, and non-profit sectors that now trains volunteers to provide financial education in the community. In partnership with Alchemy Systems, Extension began providing job and life skills training through a Texas Workforce Commission funded project in Hidalgo County in 2006.

Better Living for Texans programming is funded by the USDA through the Texas Department of Health and Human Services. Agents collaborate with local partners to obtain matching resources, to find sites for classes that are convenient for clients (food stamp recipients of various ages and in diverse county communities and neighborhoods). While the program's primary goal is to promote improved nutrition, another important goal is to teach how to make economic food choices while optimizing nutrition.

To implement the Financial Readiness program, Extension agents at Ft. Hood and Ft. Bliss coordinated with unit commanders, Consumer Credit Counseling and community consumer services organizations.

Teachers from Texas high schools link with county Extension agents and local credit unions to deliver the *NEFE[®] High School Financial Planning Program* curriculum enrichment program provided free of charge by the National Endowment for Financial Education in partnership with the Cooperative Extension System and Credit Union National Association.

Money 2000plusSM began in 1996 and continued through 2002, but two urban counties continue to publish a Money 2020SM Newsletter with a large circulation. Better Living for Texans began in 1998 and is a continuing program. The NEFE High School Financial Planning Program began in 1991 and is also a continuing program. Financial Readiness programming at Ft. Hood and Ft. Bliss began in 1999 and continues through 2007. Financial Security in Later Life began in 2002 for a five-year period. Wi\$e Up began in 2003 and will continue through 2007 or beyond.

B. Impact of Programs

Financial Literacy Coalition of Central Texas. In 2006, 2,406 educational contacts were made with low-income participants through 194 financial literacy classes. The classes were taught by trained volunteer instructors. Primary curricula used in the financial literacy classes include the FDIC Money Smart curriculum and the University of Illinois' 'Welcome to the Real World.' Classes were taught at thirteen locations throughout Austin. 52 percent of the participants attended classes taught in English and 48 percent attended classes in Spanish. Participants completed the Before and After Course Evaluation provided with the Money Smart curriculum for each class they attended. Findings based on perception of knowledge before and after taking the class showed the majority of the participants (82%) made significant improvement in their desire to change the following personal money management behaviors, compared to only 22% before the program began: build a relationship with a financial institution, develop and keep a spending plan, implement a savings plan, decrease spending, understand their credit history and how to make a credit card work for them, determine the right loan for their needs, know what they are borrowing before they buy, and access their readiness to buy a home. They increased their knowledge significantly about their rights as banking consumers, how money can grow when you save, differences between types of savings and investment accounts, how to order and read a credit report, the different types of consumer installment loans, the different mortgage programs and the basic terms used in a mortgage transaction. In 2005, the Financial Literacy Coalition of Central Texas (FLCCT) trained 29 new volunteer instructors. Trained volunteers are one of several types of volunteers who help extend the Texas Cooperative Extension Family and Consumer Sciences educational program to the public. The Financial Literacy Coalition of Central Texas (FLCCT), administered by the Texas Cooperative Extension of Travis County, implemented one Financial Literacy train-the-trainer program in San Marcos,

Texas and invited the surrounding counties' Extension offices (Travis, Hays, Caldwell, Bastrop, and Comal) to participate in the program. Sixteen volunteers from Hays County, eight from Travis county, three from Caldwell County, one from Bastrop county, and one from Comal county participated. To date, 101 volunteers have completed training with 39 Austin volunteers actively involved in teaching classes. A total of 21 volunteers are actively involved in teaching classes in the other counties, Hays, Caldwell and Bastrop. 36% of the volunteer instructors are bilingual and present the lessons in Spanish. The Austin volunteer instructors contributed over 5,000 volunteer hours to the program. As a result of 3 years of community outreach education and the support of numerous partnerships, the FLCCT received a 501(c)(3) status in May 2005. The partnerships included: Frost Bank, Consumer Credit Counseling Services of Austin, Texas Appleseed, Choice Investments, Texas Department of Insurance, El Buen Samaritano, Caritas of Austin, Foundation Communities, Randolph Brooks Federal Credit Union, Accion USA, University Federal Credit Union, Travis County Employee Wellness Program, Austin Habitat for Humanity, Manos de Cristo, Grant AME Church, Glad Tidings Hispanic Ministry, American Youthworks and Grove Place Apartments.

Building Fiscally Fit Families. The focus of this program in Harris County (Houston, Texas) was to assist families to establish and maintain financial well-being through individual consultation, group methods, short-course, newsletters, seminars, exhibits, information on the web site, involvement and collaboration of task force and community leaders. 10,756 people participated in the program, 748 were contacted to evaluate the program and usable information was received from 401 respondents. The findings showed that:

- 94% had learned new information
- 50% had learned new information for training others
- 77% learned new methods of saving money
- 48% learned new methods of tracking savings
- 66% learned new methods of planning bill paying
- 59% learned new methods to control spending
- 76% stated that their habits towards savings and credit had improved

Plane State Jail Inmate Distance Education Program. Program outcomes were reported by Harris County (Houston, Texas) on the financial management component of an Inmate Re-entry Life Skills Program to prepare women to handle challenges they will face upon their transition into the community.

- 34% indicated that they learned the concept of budgeting
- 47% indicated that they learned how to set financial goals
- 43% learned new methods of saving
- 28% stated that they learned new methods of tracking savings
- 77% stated that they learned new methods of planning bill paying
- 44% stated that the learned methods to control spending
- 37% indicated they learned new ways to stretch their food dollar
- 43% indicated they learned about credit reports and how they are used
- 44% indicated that they learned how to establish, manage and repair credit
- 40% indicated that they learned how to safeguard and prevent identity theft.

Dames and Dollars Educational Series. Financial literacy was identified as a Potter County TCFE issue in 2004. Previously, a local financial planner contacted Potter County Extension in 2003 because he believed many females take a passive role with family financial matters and are disadvantaged when faced with divorce or widowhood situations. To assist females in becoming more knowledgeable in financial areas, a six lesson educational series entitled 'Dames and Dollars' was first offered in 2004. Based on request of clientele and a decision of the FCS Advisory Committee, a second series which focused on the importance of credit histories was delivered in 2005. During the second series, spouses also expressed an interest to participate in the series. For this reason and because interest was expressed for more classes on savings and investing, the 2006 series entitled "Dames & Dollars...and Spouses, too!" will be offered to support programming with financial security in later life. The Money Matters Coalition comprised of several bankers, a consumer credit counselor, attorney, librarian and extension agent, began planning for the 2006 series at the conclusion of the '05 Dames and Dollars series. Response: A six-week educational series was conducted which reached 77 individuals of which 50 attended 2 or more sessions. Clientele testimonials: Some clientele were sorry that they had not learned of the series early enough and had missed the first several sessions. Several participants asked to get electronic files of the handouts (insurance) so that they could complete them on their computers. One participant told another individual at a senior seminar that this was the best financial management series she had ever attended. She appreciated the handouts and notebook given to each participant. Report of significant actions or result of event highlights: Participants were asked to report current practices related to having their financial records organized, investing and estate/end of life planning. 26 participants completed matched pre and post surveys. Results showed participants made the most change in the areas of financial record keeping, retirement needs, estate planning and health care directives. The number of participants who organized their records increased by 8 and an additional 5 communicated to someone where those records are kept. The number of participants indicating they had estimated their financial needs in retirement increased by 4 so that 50% of all participants had completed this task. The estate and end-of-life questions showed the most consistent increase in participants who have completed those tasks, except for long term care insurance. The most sizable increase was 6 additional participants indicated they had checked their beneficiary designations raising the total number of participants who had done so to 69%. One young participant (21 years of age) noted that her family had increased their annual income from less than \$25,000 to the \$25K-\$49K range during the six months following the program and they had increased their savings from \$0 to \$6000 in that time period.

Families Moving Ahead. This curriculum was revised by Texas Cooperative Extension to replace the original TCE curriculum, "Building Self-Sufficient Families." A new website was developed which makes it possible for trainers to download educational materials they need to conduct training workshops for participants. In Bexar County, a train-the-trainer training was held for 40 attendees whose evaluation forms revealed that they found the budget information, worksheets, visual materials, and a website helpful in their work in case management. Trainees used the website 77 times to download forms and seek additional information. A second programming effort in San Antonio was the Family Alliance Council training that reached 200 people. Conference evaluations from 126 indicated that the professionals gained knowledge of new resource and referral sources. As a result of the training, staff of the Bexar County Health

and Human Services Division have changed the curriculum taught by co-workers to the more than 1,200 families that seek assistance annually.

NEFE High School Financial Planning Program®. The High School Financial Planning program is evaluated through a national impact evaluation. The study showed that young people who studied the curriculum for as little as 10 hours significantly increased their understanding of money management and improved their financial behavior in ensuing months, suggesting that even relatively limited exposure to financial education can impart significant, lasting and practical financial knowledge to young people. Harris County Extension educator conducted a retrospective post-test of students' financial knowledge and practices in financial management. With usable evaluation data from all 99 participants, all participants increased their knowledge and indicated their financial management practices had improved. The NEFE High School Financial Planning Program was used as the teaching resource.

Better Living for Texans. The Better Living for Texans (BLT) program has a series of 5 to 6 lessons that included a component on food resource management. During the 2006 program year, BLT was conducted in 208 counties across Texas and reaching 304,434 individuals through group and individual methods. Audience composition was 33% Caucasian, 13% African American, 42% Hispanic and 12% non-identified. Results from a previous statewide telephone survey administered to 381 individuals revealed that more than 55.4% reported that their food stamps were lasting longer after they started to participate in BLT programs than they had prior to participating in BLT. Eighty-eight percent reported that they compared prices "always or most of the time" after participating in BLT, compared to 40.4% of the time before participating in BLT, thus being able to feed families nutritious foods in a more economical manner. [Note: See complete report in the State TCE-TAES Plan of Work Program 7: Better Living for Texans.]

Financial Readiness Program. Army families have met many challenges this year and hardships that can create financial burdens. Extension has responded with the Financial Readiness Program by providing classes at Fort Bliss and Fort Hood that have helped prepare soldiers and their families for deployments and the financial hardships that it can create. Extension has also prepared and presented budgeting classes for the family members left at home to assist them with financial concerns. Agents at Ft. Hood continue to train Ft. Hood personnel to teach financial responsibility to soldiers and their units. Agents at Ft. Hood and Ft. Bliss also provide basic financial education as a part of the 1st Termer program, an educational program to help new soldiers and their families get started on the right financial track. Agents at both installations also provide educational programming on budgeting, insurance, and protection against scams. Through the Extension Agents – Financial Readiness and Financial Education located at both Fort Bliss and Fort Hood, Texas, educational outreach to first termers, command, service members and their families in 2006 reached 46,188 persons through group and individual methods. 1,064 educational program sessions were conducted that reached 32,032. An additional 14,156 were reached through individual methods. Programs conducted included Financial Readiness Prior to Deployment, Banking and Checking, Saving and Investing, Credit Reports, First-Termer Sessions, Consumer Affairs Briefings, Understanding Insurance, Budgeting and Debt Management, Identity Theft Briefings, and Consumer Complaint Resolution. An example of one approach used: 28 senior NCOs were trained in basic budgeting principles and referral agencies to prepare them to assist young soldiers in budgeting and financial management. Evaluation results showed that 100% of the senior NCOs who returned a

post-evaluation (n=25) increased knowledge, acquired a skill, changed an attitude, and changed a behavior.

Starting Over Debtor Education Program. In 2006, 234 people participated in Personal Financial Management classes for bankruptcy filers. 120 of these participated in the National Pilot Program in Ft. Worth, which piloted the national curriculum provided by U.S. Trustee Program of the Department of Justice. Additional educational programs were conducted by Extension educators in Tarrant, Comal, Hidalgo, Midland, and Victoria counties.

Wi\$e Up – Financial Planning for Generation X Women. This national demonstration project of the U.S. Department of Labor – Women’s Bureau is managed by Texas Cooperative Extension who developed a 91-page handbook and an eight-module curriculum available as an online course as well as in classroom settings in educational institutions and by other service providers. Wi\$e Up’s performance goal is to increase women’s financial security. Two outcome measures are being tracked: the percentage of women participants who reduced their debt, and the percentage of women participants who increased their savings/investments as a result of their participation in the Wi\$e Up program. During FY06, evaluation tools were developed and piloted. Over 2200 individuals from across the United States registered for the online course in FY06 and the program was piloted with community partners who enrolled 162 participants. During the year, the website had an average of 200 visitors per day and a total of 21,845 unique IPs. During 2006, 105 professionals served as mentors to online participants. Monthly teleconference calls are organized by the Women’s Bureau and feature financial experts. Wi\$e Up professional partners include American Institute of Certified Public Accountants (AICPA) and Financial Planning Association (FPA). Wi\$e Up has been listed as a financial education curriculum resource by the U.S. Department of Treasury’s Office of Financial education in its promotion of financial literacy education.

Workforce Development. In partnership with Alchemy Systems, Extension is providing job and life skills training through a Texas Workforce Commission funded project in Hidalgo County. Employees at 3 fruit and vegetable processors are participating in this training designed to increase job skills and address family life skills (parenting, health literacy and financial literacy) to increase job stability of employees. The significant number of employees are limited English proficient. To date, more than 150 employees have received job training leading to employment with one of the 3 employers; 164 incumbent workers have received training to increase job skills; and 98 families have participated in one or more family life skills programs.

Workforce Education in DeWitt County. Texas Cooperative Extension (DeWitt County) cooperated with the local Workforce Center to conduct a series of four educational workshops, each consisting of three hours of information to help families develop self sufficiency. These workshops were repeated four times between February and June 2006. Workshop A included the following topics: Making a First Impression, Stretching your Money, and Healthy Eating. Workshop B included the following topics: Getting Along with People on the Job, Budgeting, and Stretching Food Dollars. Workshop C included the following topics: Conflict Management, How to Save Money When you Don't Have a Dime to Spare, and Meal Planning. Workshop D included the following topics: Communication Skills, Credit Card Management, and Food Safety. A total of 48 hours of intensive educational training was provided. Clientele testimonials: "Little amounts of money can really add up. I like having extra money around. It makes me feel like I have control of my finances." Report of significant actions or result of event highlights: According to numbers provided by the local Workforce Center 50% of participants found jobs. This number is significant because it includes participants who were limited to types of

employment due to health reasons and approximately 1/3 of participants had limited transportation available. Retrospective surveys were mailed to 32 workshop participants who provided addresses. 24 surveys were returned and used for evaluation purposes. Survey results were as follows: 92% (22 of 24) agreed that they felt like a better person as a result of the program. 92% (22 of 24) agreed that this was a fun and educational program. 50% (12 of 24) began setting goals. 41% (10 of 24) checked interest rates on credit cards. 41% (10 of 24) improved confidence in their ability to find and keep a job. 25% (6 of 24) said they now use the food guide pyramid in meal planning. 25% (6 of 24) said they now read food labels to select food. 12% (3 of 24) are getting along better on the job. -2% (3 of 24) are now saving money. -2% (3 of 24) are now using a budget to plan spending. Conclusions: Fewer than 40% of American credit card holders pay the entire balance of what they owe each month. Being aware of your interest rate (which 41% of participants are) can make the difference in the amount of income left after credit card debt, to use in paying other bills and to save. Only 4% of Texas families have a saving account. 12% of program participants started a savings account which will help them prepare for long term purchases and plan for retirement. 12% of the participants are now using a budget. This will help them began to save in the future. 50% of participants obtained a job and according to the survey 41% felt they had increased their confidence in keeping their job. Of these participants, 12% felt like they could get along better on the job. 25% of participants improved nutrition through using the food guide pyramid and reading food labels. Improving nutrition will help participants stay healthier and hopefully use less days of sick leave. Percent of all participants who "Increased Knowledge": 100%. Percent of all participants who "Acquired a Skill": 100%. Percent of all participants who "Changed an Attitude": 92%. Percent of all participants who "Changed a Behavior": 50%. Notes/comments from reporting Extension educator: "The results of this educational program indicated behavioral changes that had a positive impact on the participants and economic welfare of DeWitt County."

Summary of contact data for 2006 indicate that:

- 49,370 contacts were served by group methods
 - 30,744 contacts were served by individual methods
 - 304,434 contacts were served by group and individual methods through Better Living for Texans
 - 26,632 contacts were served by the web, including 2,200 online registrants in Wi\$e Up and 21,845 unique IP visitors to the Wi\$e Up website
-
- 704,720 contacts served through Financial Better Living for Texans, Financial Readiness Military, High School Financial Planning Program, Financial Security (financial education) Programs, Wi\$e Up, Workforce Development, and other specific targeted financial management education programs

Texas Agricultural Experiment Station

The Texas Agricultural Experiment Station did not have research programs that complimented or supported TCE in its State Plan of Work Program 9, Financial Management Education.

C. Sources of Federal Funds

TCE: Smith-Lever and State Matching

TAES: None

D. Scope of Impact

Multi-State Extension – HSFPP Program – All States

BLT - WS, OH, CO

Financial Security in Later Life (national initiative) - All States

WiSe Up – National demonstration project with U.S. Department of Labor – Women’s Bureau.

State TCE Plan of Work Program 10: Parenting and Child Care
Key Theme: Parenting, Child Care/Dependent Care

A. Description of Activity

Changes in family life over the last several decades have influenced the ability of family members to adequately address the needs of children and aging adults. Families need access to research-based educational resources and training programs to assist them in their job of raising responsible citizens. According to recent statistics, over one-fourth of today's children reside in single-parent households, where they are much more likely to experience poverty (Forum on Child & Family Statistics, 2005). Nearly five million infants, young children, and teens live in households headed by a grandparent. Over 20 million children are currently living apart from their biological fathers. Researchers have found that children who grow up with absent fathers are at a greater risk for poverty, school failure, child abuse, suicide, criminal behavior, emotional and behavioral problems, early sexual activity, and drug and alcohol abuse. These risks diminish substantially when children grow up with an active and loving father in the home (Horn & Sylvester, 2002).

Child maltreatment rates in the U.S. remain extremely high. Recent statistics indicate that over 900,000 children were found to be victims of child maltreatment in 2003, with the majority falling under the category of child neglect (63%) (U.S. Department of Health and Human Services, 2005). Nearly 84% of substantiated child maltreatment cases occurred at the hands of a parent or parents. In Texas, 224,010 children were alleged to be victims of child abuse or neglect in 2004. In that same year, 50,529 were confirmed victims (Texas Kids Count Annual Data Book, 2005). Parenting programs that provide education and skills training to parents covering a variety of topics (e.g., child development, communication, nutrition, health and safety, etc.) have been demonstrated to be effective in reducing child maltreatment rates (Bloom, 1996; Reppucci et al., 1997; U.S. Department of Health and Human Services, 2001; Willis et al., 1992).

As families have changed over the last several decades, so has the demand for quality child care. According to labor statistics, 65% of women with children younger than 6, and 78% of women with children ages 6 to 17 are currently working outside the home. Over 60% of children from birth through age 6 (not yet in kindergarten) received some form of child care on a regular basis from persons other than their parents (Forum for Child & Family Statistics, 2004). The Texas Workforce Commission estimates that there are over 100,000 child care providers caring for more than 760,000 children under the age of 13 in licensed or regulated child care facilities in the state of Texas (Texas Workforce Commission, 2003). Having a well-trained child care workforce is essential to providing the high quality child care that children need to develop physically, socially, emotionally, and cognitively.

Texas Cooperative Extension's Family Development and Resource Management Unit is committed to providing educational programs to support and strengthen Texas families. In the areas of parenting, child care, and dependent care, Texas Cooperative Extension offers a wide range of programs and resources to citizens across the state. Programs and resources include train-the-trainer workshops for professionals and volunteers, multi-session parent education workshops, 1-2 hour lectures, distance education workshops, self-study child care training guides, internet resources (e.g., online child care courses, fact sheets, research briefs, trend data, links to juried websites), and newsletters. In addition, over 300 programs related to parenting,

child care, and dependent care can be accessed through Extension's Educational Resource Library at Texas A&M University.

B. Impact of Programs

Performance Goal 5.2.1: To annually increase the incidence of caring communities resulting from non-formal education programs in which CSREES partners and cooperators play an active research, education, or extension role.

Child Care Worker Training Programs. In the state of Texas, there are over 23,000 licensed or regulated child care facilities (child care centers, family day care). Child care is the 16th largest industry in the state, generating over 145,000 jobs and \$2.3 billion in wages for Texans (Texas Workforce Commission, 2003). Current and/or prospective child care providers, managers, and early childhood educators can enhance their knowledge and skills related to the care and education of children through regional child care conferences, county workshops, online courses, newsletters, and self-study courses. Providers completing the above programs can acquire the necessary annual training hours and continuing education units determined by the Texas Department of Family and Protective Services (TDFPS).

Dependent Care Programs. Texas has the fourth largest population of older adults in the United States. Texas Cooperative Extension has developed numerous programs and resources to assist professionals, family members, and older adults in making decisions about quality dependent care. Eleven conferences on aging were held in various regions of Texas for which Texas Cooperative Extension provided primary coordination or speaker support. These conferences reached professionals, from nurses to social workers to long-term care administrators and activity directors. The conferences provided more than 2,000 hours of continuing education through various professional accrediting boards. All of these conferences were one-day events, some with concurrent sessions offered, providing information on topics ranging from fall prevention to Alzheimer's Disease to accessing health services and preventive health screenings. All told, these conferences provided almost 7,100 educational contact hours.

Many of the trainings for professionals conducted by Texas Cooperative Extension occurred outside a conference setting – specific trainings targeting specific audiences. While many of these trainings were scheduled by TCE, several of them were requests from various groups to provide trainings to their members. Topics for these nine targeted trainings ranged from memory improvement to fall prevention to health literacy. These trainings professionals, including, but not limited to, activity directors, dietitians, licensed professional counselors and County Extension Agents for Family and Consumer Sciences. The trainings provided more than 450 contact hours to these professionals.

In response to the need for emergency preparedness for older adults and residential facilities, especially to terrorist threats, Texas Cooperative Extension was instrumental in the development and implementation of a training entitled "Recognizing and Managing Bioterrorism and Natural Infectious Disease Situations in Nursing Homes and Assisted Living Settings." These workshops reached professionals, nurses and long-term care administrators. Two hours of Type-1 Continuing Nursing Education credit were offered for each of these events, fulfilling the State of Texas requirement that all nurses have two hours of said credit prior to September 2007. Additionally, in partnership with a local community college, Texas Cooperative Extension has developed an on-line course in bioterrorism preparedness using the aforementioned curriculum

to provide the two hours of Type-1 Continuing Nursing Education credit through the college’s virtual campus computer network.

Texas Cooperative Extension’s programs to non-professionals in communities ranged in topics from Alzheimer’s Disease to memory improvement to identity theft to Medicare Part “D,” to name a few. These programs were delivered by specialist faculty and County Extension Agents to help aging clientele within Texas’ 254 counties.

Indicator 5.2.1d: The total number of child care/dependent care providers completing non-formal education programs.

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

	Child Care	Dependent Care
Providers attending classes conducted by TCE faculty (alone)	2,736	568
Providers attending classes conducted by TCE trained volunteers (alone)	351	283
Providers attending classes conducted collaboratively by TCE faculty and volunteers	2,560	9,267
Individual TCE faculty contacts	21,294	5,655
Individual contacts by TCE trained volunteers	1,395	1,192
Totals	28,336	16,965
Combined Total	45,301	

Indicator 5.2.1e: The total number of dependent care providers completing non-formal education programs who plan to adopt one or more new principles, behaviors, or practices after completing one or more of these programs. (See below)

Indicator 5.2.1f: The total number of dependent care providers completing non-formal education programs who actually adopt one or more new principles, behaviors, or practices within six months after completing one or more of these programs. (See below)

Selected Highlights

Dependent Care. Texas Cooperative Extension, in partnership with the Texas Department of Aging and Disability Services, the Texas Legal Services Center, the Area Agencies on Aging of Texas and the Texas Kinicare Taskforce, continues to provide education

and support to grandparents rearing their grandchildren. Extension sponsored or helped coordinate conferences and workshops on a variety of topics (e.g., establishment of support groups; legal, social, health, nutrition, education, and child care issues) in multiple Texas counties. In addition to the support that Extension offers through the Grandparents Raising Grandkids internet site (<http://grandparentsraisinggrandkids.tamu.edu>), County Extension Agents were responsible for the formation of support groups in counties around the state.

Child Care. In 2006, Texas Cooperative Extension conducted 160 face-to-face educational events (e.g., small and large-scale conferences) reaching over 5,600 child care professionals from 84 counties. Providers at these events received over 17,000 clock hours of credit, helping them fulfill state-mandated training requirements.

In addition to the face-to-face conferences, early childhood educators have enrolled in and/or completed over 1,800 online courses for a total of 2,319 clock hour credits since the program was launched in 2006.

Performance Goal 5.2.2: To annually increase the incidence of strong families resulting from non-formal education programs in which CSREES partners and cooperators play an active research, education, or extension role.

Parent Education Programs. Texas Cooperative Extension offers a wide range of programs and resources to support parents, and professionals and volunteers who work closely with parents. County Extension agents, in collaboration with local partners, led multi-session parent education workshops, 1-2 hour training seminars, and disseminated a wide variety of parenting information via fact sheets and newsletter articles. Topics include fathering, teen parenting, grandparents raising grandchildren, teasing & bullying prevention, discipline, early childhood education, self-esteem, early brain development, and nutrition for infants, toddlers, and school-age children. In addition to agent delivered programs, resources are made available to parents and professionals on the Family and Consumer Sciences website.

Indicator 5.2.2a: The total number of people completing non-formal education programs on parenting.

Parenting Education Contacts	
Participants attending parenting classes/programs conducted by TCE faculty (alone)	9,417
Participants attending parenting classes/programs conducted by TCE trained volunteers (alone)	2,103
Participants attending classes conducted collaboratively by TCE faculty and volunteers	9,929
Individual TCE faculty contacts	36,245
Individual contacts by TCE trained volunteers	7,730
Total Contacts	65,424

Indicator 5.2.2b: The total number of people completing non-formal education programs on parenting who plan to adopt one or more parenting principles, behaviors, or practices after completing one or more of these programs. (See below)

Indicator 5.2.2c: The total number of people completing non-formal education programs on parenting who actually adopt one or more parenting principles, behaviors, or practices within six months after completing one or more of these programs.

Selected Highlights

Fathers Reading Every Day. In 2006, over 140 Fathers Reading Every Day (FRED) educational sessions were conducted by Texas Cooperative Extension educators and volunteers resulting in more than 3,000 educational contacts with fathers/father figures and children from 19 Texas counties. Results from a 2006 evaluation study of 140 adult program participants revealed significant improvement from pre to post in a number of areas, including the amount of time fathers spent reading to their children, number of books read during a typical week, and level of involvement in their children's education. When given a chance to express their agreement or disagreement with a series of statements related to the program, fathers reported the following:

- 62.1% reported that FRED “Increased the time I spent with my child.”
- 58.6% reported that FRED “Improved the quality of the time I spent with my child.”
- 55.0% reported that FRED “Helped me become more involved in my child’s education.”
- 52.9% reported that FRED “Led to improvements in my child’s vocabulary.”
- 35.7% reported that FRED “Helped my child learn to read.”
- 49.3% reported that FRED “Increased my satisfaction level as a parent.”
- 58.6% reported that FRED “Improved my relationship with my child.”

In open-ended responses, many fathers indicated that they noted improvements in their children's vocabulary, reading ability, and interest in books as a result of participating in FRED. Some fathers even noted improvements in their own literacy skills. A few representative quotes are listed below:

[Participating in the FRED program] “helped [me] understand that reading is important and helps a child learn and focus.”

[The thing I liked most about FRED was] “it encourage me to be more involved.”

[The FRED program] “helped them learn about books.”

[The FRED Program] “helped us to get closer by giving us some quality time for just the two of us. Have fun together. Made me feel like a better parent.”

[The FRED program] “encouraged me to find more time to spend reading.”

[FRED] “gave my granddaughter and I that special time each day for just [the two of us]. We laughed, used our imaginations and had fun. It challenged me to find more books,

and different subjects that [my granddaughter] was interested in. It expanded my knowledge of children’s books. The time with [my granddaughter] is outstanding.”

Parenting Along the Border (El Paso County). One-hundred and twenty-three parents from El Paso County participated in multi-session parent education classes in 2006. An analysis of completed pre- and post-test surveys revealed that the parenting classes had a very positive effect on specific parenting practices. Paired t-tests indicated significant improvement from pre to post in a number of parenting behaviors, particularly in the areas of parent-child communication, parental self-efficacy (i.e., parental self-confidence), parental involvement, and use of positive disciplinary practices.

Content covered included: child development, nutrition for the young child, communication, discipline, self-esteem, and health and safety issues.

Parents who attended parenting classes:

- Were more confident in their parenting skills
- Complimented, encouraged, & praised their children more frequently
- Criticized their children less often
- Made a greater effort to listen carefully to their children
- Set and enforced limits more consistently with their children
- Became more involved in their children’s child care and/or school-related activities
- Relied more on positive disciplinary/guidance techniques (e.g., reason with child, redirecting children’s behavior)

The following table includes the percentages of parents reporting “frequently” or “almost always” from pre to post on select items.

Parenting Behavior	Pre	Post
Compliment child	21.1%(26)	69.9%(86)
Encourage child	11.4%(14)	70.8%(87)
Listen carefully to child	17.8%(22)	67.5%(83)
Criticize child	53.7%(66)	22.8%(28)
Confident in parenting skills	27.7%(34)	62.6%(77)
Feel helpless as parent	46.3%(57)	34.1%(42)
Educational involvement	16.3%(20)	70.7%(87)
Read to children	33.4%(41)	59.3%(73)
Participate in child care or school activities	13.8%(17)	69.9%(86)
Reason with child	18.7%(23)	60.1%(74)
Redirect child	16.2%(20)	66.7%(82)
Yell or scream at child	37.4%(46)	25.2%(31)
Spank child	82.1%(101)	21.2%(26)

Texas Agricultural Experiment Station

The Texas Agricultural Experiment Station did not have research programs that complimented or supported TCE in its State Plan of Work Program 10, Parenting and Child Care.

C. Source of Federal Funds

TCE: Smith-Lever and State Matching

TAES: None

D. Scope of Impact

TCE: State Specific

TAES: None

Integrated research and Extension - This integrative program combines staff from TCE (Extension), the Texas Department of Family and Protective Services, and numerous county level collaborations. Extension staff include: five specialists and numerous agents working in Food and Nutrition as well as Family Development and Resource Management. Staff from support agencies include: licensed nurse, county nurses, caseworkers, licensing agents, and faculty.

State TCE Plan of Work Program 11: Life Skills Education Development
Key Theme: Youth Development

A. Description of Activity

Youth issues were identified by Texas residents as a high priority for Extension programming. Nationally, youth related issues include Weight Management, Harmful Substance Abuse, Teen Sexuality, Accepting and Respecting Others, Youth Violence, Unsupervised Time, Youth Literacy, and Death by Accident. During 2004, Texas Counties identified a number of youth related issues which strongly parallel national concerns. These issues continued as areas of focus for 2006.

Texas 4-H offers nine areas of program delivery to meet the needs of a diverse state with complex issues. A comprehensive urban plan includes faculty from the 20 most populated Texas counties who work cooperatively toward a consistent program directed to serve the needs of urban youth. Furthermore, focused efforts are directed toward traditionally under-served clientele and accommodations were made to meet the needs of the disadvantaged.

Texans Building Character, 4-H Leadership Development, Workforce Development and Entrepreneurship, Conflict Resolution, Technology Education, Building Community Inclusion through Diversity and 4-H Curriculum Development through Texas 4-H Project Teams were addressed. Curriculum was aligned to meet the Texas Essential Knowledge and Skills (TEKS) as identified by the Texas Education Agency (TEA). During 2006, TEKS components continued to be valued within 4-H curricula as TEA has moved toward requirements for Texas schools to assess the knowledge and skills (TAKS) gained by youth. Additionally, 4-H has formed an alliance with public schools through a group known as TSHAC. TSHAC ensures that all schools are utilizing curriculum that offers accurate information related to nutritional needs of adolescents and provides coordination of general school health issues, including pandemic issues. Internal and external linkages were formed with numerous agencies, including: Civic and Community Organizations, Extension Program Council, Family and Community Education Groups, Juvenile Probation System, Parks and Recreation Departments, Universities, Schools, Corporations, Philanthropy Foundation, and other youth serving agencies as appropriate to this performance goal. Two grants were secured, involving 17 county sites, which focused on the development of youth/adult partnerships. One grant was secured that targeted six Texas counties which focused on developing collaborations by forming community youth boards. Texas Cooperative Extension will draw on the experience in these targeted sites to develop a best practice approach for all 254 Texas counties.

B. Impact of Programs

Character education may begin in the home environment, but it is reinforced by schools, communities and the larger environment. Our agency is poised to reach youth and has the opportunity to shape ethical young people who will have values as contributing adults.

The shift in society's expectation of young people has changed and youth often see negative examples of ethical behavior in their own communities, families, or from some poor role models in professional athletics, music and movie industries. This problem is wide spread among all youth in Texas.

At the state level, thirty county extension agents participated in a training workshop that provided new methods to incorporate character education at the local level. Character education training was provided, during the last year, for a group of junior and high school students in Bexar County. These students then taught the same character education pillars to kindergarten, 1st and 2nd grade students. 64% of the participants surveyed showed an increase in setting goals for themselves. Also, there was a 55% increase in having a positive attitude towards others. Middle school youth displayed having a harder time resolving conflict, with only 18% showing a positive increase.

During past Extension efforts, Fisher County's character education program reported a 75% increase of youth in each of the areas of Respect, positive Attitude, and importance of Honesty. The Baird ISD guidance counselor, in Callahan County, reported that 4-H character education makes a difference, especially in grades 1-6 with a decrease in code of conduct violations at their school. In Harris County, post instruction results indicated 90%, of the participating youth, learned the best way to solve conflicts or problems is to put aside the differences, listen to each other, and solve the issue.

Eighty Texas counties implemented at least one educational effort on "Quality Counts - A Texas Character Education Curriculum for Youth Livestock Participants". Over 22,000 attended in group methods resulting in over 55,000 contact hours in group methods. Forty-one counties implemented Quality Counts as an Outcome Program. Nueces County reports from their Quality Counts educational efforts that their youth gained knowledge about their project, the food chain, quality assurance, further understanding of the purpose of 4-H and 4-H livestock projects. Even more important was the participants knowledge and personal character increased. Parents, educators, and youth leaders agree: we need to help youth understand that their character counts

Strengthening Our Capacity to Care (SOCC) is a program designed to be a prevention and intervention program for first time juvenile offenders. In 2005 over 1400 hours of programming were offered in this program area. As a collaborative effort between TCE and the Juvenile Services Department, this programs goals focus is to reduce the rate of recidivism among first time offenders. Typically, first time offenders, repeat youthful offenders, and youth-at-risk have been involved. Referred offenders parents are required to be involved in Parent Enhancement Classes. The resource "Things Teenagers Need to Succeed" from the SEARCH Institute's work on 40 developmental assets was used to provide the parents the necessary skills to build assets and raise confident, caring young people. Summative evaluation results from the past two years of the county based SOCC projects indicates that only 26% of participating youth have re-offended on any level, compared to the state recidivism rate of 52% for youth. Involvement by both parents and youth increased the youth's participation in positive activities, such as 4-H and workforce preparation. The program also increased the youth's knowledge of specific 4-H projects by applying skills gained to self and family. By participating in these projects, the youth acquired better nutritional attitudes, academic achievement and life skill development (i.e. leadership, volunteerism, and character education). During 2006, a highlight was Tyler County who began a new SOCC program and included partnerships with The Family Violence Task Force and the Deep East Texas Council of Governments. Programming emphasis included nutrition workshops, bullying, cultural diversity, and drug/tobacco education. Additionally, leadership education was an area of focus.

During 2006, 8984 youth participated in Workforce Preparedness project work. During 2005, Texas 4-H and the Family Development Resource Management Unit partnered to secure a

grant through the Children, Youth and Families at Risk Program. The Texas CYFAR project is titled: Kidz with Biz Ideaz. The project focuses on the development of job readiness skills and creating an ever mindful climate of entrepreneurship for youth. Over 1000 youth have been involved with the project in the four county sites. Youth have developed concepts for home based business and participated in Entrepreneurship Fairs where they are able to display their wares. An entrepreneurship tour was held during the summer of 2006 where youth toured around Texas and visit unique business to give them a practical sense of the opportunity to start a business in their home town. Many small Texas communities are experiencing negative population growth, thus increasing the importance for youth to feel they can create a future for themselves. During Brown counties entrepreneurship and workforce preparedness concluding project youth were asked to give their perspective on the experience. Highlights include: Name one thing you learned about entrepreneurship or yourself.

- Jordan P: working with a partner is like a roller coaster ride, with lots of ups and downs, but working with a partner is really good because you have your ideas but then so do they...
- Layne: it's really hard
- Kyle: It takes a lot of money.
- David: working with a partner made it easier
- Nicholas: working alone was easier
- Jordan C: being single was not as much fun as working with someone
- Katie: having a business is risky
- Andrew: having a partner made it easier to get everything done
- Andrew: I learned I'm bossy and a perfectionist
- Daniel: you need a plan before you start the work

During 2004, a grant was secured focused toward building a climate of inclusiveness in communities. The program includes seven county sites that are focused toward teaching community groups to be more accepting and inviting to youth with disabilities. The project titled: Building Community Inclusion, was directed to address Texas 4-H's focus on diversity. As a result of the 2004 effort, a new camp in 2005 was started at the Texas 4-H Camping and Conference Center and continued in 2006. The camp, called Mission Possible, was focused toward the joint participation of youth with and without disabilities. As a result 38 disabled youth, who otherwise more likely would have never had a positive camping experience, were exposed to 4-H. Furthermore, training of camp counselors and summer staff related to working with disabled youth has become a staple of the training program.

Texas 4-H also created a state wide Technology team who partners with state faculty to offer more educational opportunities for youth via the web and distance learning. As a result of this effort, over \$50,000 in computer equipment has been secured in the form of mobile technology labs for youths use. The youth team has conducted statewide educational workshop for senior adults, as well as their peers. This group also conducted educational workshops during the 2006 Entrepreneurship Camp and will serve as the technology support for the 2007 Children, Youth, and Families At Risk Project. With the societal acceptance of technological use, Texas 4-H launched a web-based advisory system called 4-H VOICE. Thirty-two youth and adult volunteers, as well as Extension employees have been solicited to serve on the advisory think tank. All meetings and correspondence are web-based thus significantly reducing the amount of travel cost and financial commitment from all parties involved.

A leading concern in the nation and Texas is Childhood Obesity. Texas 4-H initiated a program titled: Fun, Fit and Fabulous - Healthy Lifestyle Education. One hundred fifty high school aged youth were intensively trained in the subject matter area with the expectation they would start healthy lifestyle focused project activities in their communities across Texas. During 2006, Extension faculty members became members of a school based advisory groups called School Health Advisory Council or, SHAC. The positive opportunity to provide youth educational programming through 4-H has not been missed by schools across the state of Texas.

A base of 4-H project work is the development of leadership life skills. Some highlights of county efforts include a total of 224 sessions reaching 18,744 youth. The total contact hours were 34,297.

472 youth answered questions pertaining to their knowledge or intentions to change based on the programs implemented. The results include:

- **96.2%** increased their ability to coordinate a leadership event.
- **95.7%** increased their understanding of their role as a leader.
- **97.1%** increased their ability to cooperate with others.
- **94.2%** increased their ability to serve in leadership roles.
- **96.8%** increased their ability to listen to others.
- **93.6%** increased their ability to show respect for others.
- **94.5%** increased their ability to appreciate the differences in others.
- **93.0%** increased their ability to set goals for themselves to achieve more.

During 2006, a base program was added to Texas Cooperative Extension work which focuses on Disaster Preparedness and Mitigation. The youth component included work in educational activities associated with “Patriotism through Preparedness” including a total of 554 sessions reaching 135,827 contacts with 73,000 being youth.

Notable highlights include:

Fisher county’s evaluation results from 51 participants indicated that 98% of the youth participants had shared their new knowledge of what to do during a disaster with their parents, which had resulted in the family developing a disaster plan. 80% of the families had initiated putting together a disaster preparedness kit.

Lipscomb county’s partnered with local fire departments to conduct disaster preparedness training in schools, including disaster drills.

Significant program emphasis was conducted in the area of Agriculture Literacy. During 2006 a total of 191 sessions reaching 376,942 contacts with 357,287 being made by volunteers. Some highlights from Texas urban counties include, 1,558 youth completed a self-reporting evaluation instrument. Results are as follows:

- 75% learned more about the origination of agriculture products.
- 78% learned more about milk and dairy cows.
- 77% learned more about vegetables and how they grow and what parts we eat.
- 71% learned more about meat animals.
- 83% learned more about the close relationship between food and fiber and human health.

The Junior Master Gardener program grows good kids through igniting a passion for learning, success, and service and continues to expand to be one of the most popular 4-H projects offered in Texas.

Recent evaluation studies featured in the January 2006 issue of the National Science Teachers Association magazine highlighted the positive attributes of the Junior Master Gardening program. Evaluation studies conducted through both Texas A&M University and Louisiana State University found similar results in that “improved science achievement scores for those students who gardened through the JMG program.” (Klemmer, Waliczek, & Zajicek. HortTechnology, July-Sept. 2005 and Smith, Motsenbocker. HortTechnology, July-Sept. 2005)

Additional studies indicated that “students participating in the JMG program increased their overall life skills as well as improved teamwork skills and self-understanding.” (Robinson, Zajicek. HortTechnology, July-Sept. 2005) Finally, children participating in the JMG program “showed significant improvement in their knowledge of fruits and vegetables and reported eating healthier snacks after participation in the program.” (Koch, Waliczek, and Zajicek. HortTechnology, October-December. 2006)

The JMG program represents approximately 25% of the Texas 4-H enrollment reaching children in both urban and rural settings. As a recognized Texas Education Agency (TEA) training workshop, the JMG program offers extensive training for teachers and volunteers teaching over 450 teachers and volunteers yearly through educational programs offered through the TEA Regional Service Education Centers.

Texas Agricultural Experiment Station

The Texas Agricultural Experiment Station did not have research programs that complimented or supported TCE in its State Plan of Work Program 11, Life Skills Education Development.

C. Source of TCE-TAES Federal Funds

TCE: Smith-Lever and State Matching
TAES: None

D. Scope of Impact

Multi-State Extension – FL, VI, LA, and WS

Multi-State Research – None

Integrated Research and Extension: Texas 4-H has a focused effort of youth research. During 2001, two grants were solicited through the National Science Foundation to enhance research and establish a pattern of funding to enable the creation of a Center for Youth Research. Texas 4-H Faculty is actively involved in University based committees which focus toward building partnerships between Teaching, Research, and Extension. One committee meets monthly to discuss funding opportunities and areas where Extension and Research can partner on projects.

State TCE Plan of Work Program 12: Volunteer Development

Key Theme: Program Development, Youth Development, Community Development

A. Description of Activity

Mobilizing and organizing a strong volunteer base is essential to the mission of Texas Cooperative Extension. TCE has the largest volunteer program of any agency in Texas. But with increasing competition for resources, funding, staff and time, sound decisions regarding volunteer recruitment and management will be crucial to sustaining current programs, partnerships and developing new opportunities.

All research concerning agencies of the future leads us to know that expanding the outreach and programming components through all volunteer efforts is essential. Volunteers are the real heart and hands of many different Extension programs, extending the reach into every community and every neighborhood in Texas. Extension volunteers help people to gain knowledge and skills that will benefit them for life. And, in return, volunteers have the satisfaction of knowing they're making a difference for their friends and neighbors. Much of the work Extension volunteers do grows out of their interests and experiences, but they also receive training from educators from various disciplines. Thus volunteers improve their own skills while helping others.

INVEST: Invest in Volunteers: Extension's Superior Team. Volunteers are one of the most important commodities to Texas Extension. They are important in ensuring that Texas Extension maintains relevance, they help the agency deliver programs, and provide interpretation support to name a few.

County Youth Boards. County Youth Boards were launched in Texas Cooperative Extension in 2006. All 254 counties have begun the process for the establishment of Youth Boards. These Boards will be composed of youth representing all geographic areas of the county, schools, youth organizations, faith based groups, and other youth affiliations. Since the formation is in 2006, results will be reported in 2007.

Youth Protection Standards. The Volunteer Qualification Task Force in Texas was developed in May of 1997 to review the policies and procedures for recruiting training and maintaining volunteers. The committee included volunteers, County Extension Agents, Specialists and an Administrator. Special focus was placed on the safety of the youth involved in the Texas 4-H Program. In 1990, Myron Johnsrud, Administrator of Extension Service of USDA, encouraged each state to have a policy which defines management practices related to prevention of child abuse and the management of volunteers. Additionally, he asked for screening procedures for salaried and volunteer staff which includes background checks; training on child abuse identification and reporting; and written guidelines for all salaried and volunteer staff who work directly with youth. In 2004, Texas Cooperative Extension completed the three year phase in of all Extension program volunteer working directly with youth. The program continues to qualify new volunteers. To date over 16,709 volunteers have been screened. All criminal background checks are completed through the Volunteer Center of North Texas.

INVEST Professional Faculty Development. Four regional trainings on ISOTURE model of volunteer management, Leadership Advisory Board development, Youth Protection Standards, Program Area Committees and Youth Boards, Enabling Volunteers as Teachers, Situational Leadership, and Master Volunteer Program Development and Implementation.

Publications that were developed during 2005-2006 to support INVEST are as follows:

C. T. Boleman and A. Burkham. 2006. "Youth Boards: Adults and Youth Partnering for Success." Texas Association of Extension 4-H Agents Annual Conference Proceedings. p. 15.

C. T. Boleman, L. K. Pavelka, and A. Burkham. 2006. Volunteer Administration in the 21st Century: Find Your Pot of Gold: Leadership Styles for Any Situation. Texas Cooperative Extension. Publication: E-413.

C. T. Boleman and A. Burkham. 2006. Volunteer Administration in the 21st Century: Bylaw Development for Leadership Advisory Boards, Program Area Committees and Youth Boards. Texas Cooperative Extension. Publication: E-417.

Lori Halfmann, C. T. Boleman and A. Burkham. 2006. Volunteer Administration in the 21st Century: A Little Recognition Goes a Long Way. Texas Cooperative Extension. Publication: E-416.

Lori Halfmann, C. T. Boleman and A. Burkham. 2006. Volunteer Administration in the 21st Century: Teaching Volunteers to Teach: Learning Styles. Texas Cooperative Extension. Publication: D-1457.

Lori Halfmann, C. T. Boleman and A. Burkham. 2006. Volunteer Administration in the 21st Century: Teaching Volunteers to Teach: Delivery Methods. Texas Cooperative Extension. Publication: D-1458.

C. T. Boleman, and A. Burkham. 2005. Volunteer Administration in the 21st Century: Roles Volunteers Play in Extension. Texas Cooperative Extension. Publication: D-1451

C. T. Boleman, and A. Burkham. 2005. Volunteer Administration in the 21st Century: Leadership Advisory Boards. Texas Cooperative Extension. Publication: D-1452

C. T. Boleman, and A. Burkham. 2005. Volunteer Administration in the 21st Century: Program Area Committees/Youth Boards. Texas Cooperative Extension. Publication: D-1453

A. Burkham and C. T. Boleman. 2005. Volunteer Administration in the 21st Century: Volunteer Associations and Groups. Texas Cooperative Extension. Publication: D-1454

A. Burkham and C. T. Boleman. 2005. Volunteer Administration in the 21st Century: Understanding and Managing Direct and Episodic Volunteers. Texas Cooperative Extension. Publication: D- 1455

A. Burkham and C. T. Boleman. 2005. Volunteer Administration in the 21st Century: Managing the Risk Associated with Volunteer Services. Texas Cooperative Extension. Publication: D-1456

Strengthening Extension Advisory Leaders (SEAL) The third SEAL Conference was held in Atlanta, GA on October 24-26, 2005. Fifty-five participants representing seven states in the south region participated in the 2005 conference. This conference was targeted toward advisory group members and Extension educators that are heavily involved in developing and sustaining successful county and or statewide advisory groups. The overall conference objectives are noted below:

- Reveal effective strategies for advocacy;
- Building advocacy groups that work; and
- Embracing the differences in ourselves and each other.

Sewing Master Volunteer. The 2006 effort was concentrated in counties along the border with Mexico. Rather than a three day training as in the past, statewide efforts were focused on a one day training in utilizing waste textiles in re-fabrication projects. An online Master Sewing

Volunteer Training course was developed with one module piloted during the year. The Master Sewing Volunteer (MSV) program involves individuals with sewing expertise who enthusiastically want to learn how to teach others to sew. The program covers 10 topics in pattern and fabric selection, interfacing, sewing equipment, pattern fitting and alteration, cutting, marking, construction and pressing, as well as how to start a home-based sewing business or develop job skills for employment. Volunteers receive training in teaching others and individualized assistance through 24 hours of instruction and then contribute 50 hours of service through the local county Extension office. The program targets individuals with little or no sewing experience and helps the individual develop skills for constructing and evaluating apparel and home interiors products.

4-H Master Volunteer. 4-H Master Volunteer programs empower adult volunteers and have increased the impact through a broadening of available human resources. The key to a successful master volunteer program is primarily centered around a strong volunteer project base. The purpose of the 4-H Master Volunteer program is to (1) teach 4-H project subject matter to members and volunteers in the county, (2) provide support to 4-H members and volunteers, and (3) to give leadership to learning opportunities for members, parents, and volunteers in the county. These master volunteers help 4-H members realize the benefits of developing a sound well-rounded project.

Texas Master Gardener. This program has developed over the last two decades. Master Gardeners are committed to providing high quality educational programs about horticulture and the environment in Texas communities and neighborhoods. A love of gardening and search for knowledge are the catalysts by which Texans from every walk of life enter the program. Master Gardeners are now navigating the worldwide web to extend information delivery and problem solving to Extension clientele. Through web based programs they are assisting in answering thousands of home gardening questions each year. Master Gardeners are certified every two years by fulfilling 6 hours of training and 12 hours of volunteer service.

Urban Plant Detectives The goal of this new and innovative program is to train Master Gardeners to successfully execute and perform simple applied research demonstrations. This program aims to educate the participant in scientific design and methodology and to provide an opportunity to experience the benefits, challenges and joys of performing a research demonstration. Plant detectives are trained for 10-15 hours in basic knowledge of the research subject matter, data collection, mid duration follow up and review and a final debriefing at the end of the project. All data is collected and analyzed statistically. Participants are shown how to interpret the results. The local county Extension agent works with the “detective” to write the research demonstration report and contribute it to the goldmine system.

Projects that have been completed included studies in backyard composting methods, and efficacy of fungicides on foliar disease of roses and crape myrtles. This program relies on donations for the projects which has received over \$2500 in materials for the execution of various projects around the Dallas-Fort Worth metroplex area.

Texas Master Naturalist. The mission of this program is to develop a corps of well-informed volunteers to provide education, outreach, and service dedicated to the beneficial management of natural resources and natural areas within their communities. Texas Master Naturalist volunteers receive 40 hours of in-depth training in wildlife and natural resource management, customized to focus on their local ecosystems. In return, volunteers provide at least 40 hours of service in the form of community education and demonstration projects, while pursuing a minimum of 8 hours of advanced training in areas of special interest. Texas Master

Naturalist training is provided by educators and specialists from universities, agencies, nature centers, museums, and other organizations that donate their services. The Texas Master Naturalist curriculum is developed by experts and provides a standardized base of knowledge and skills for all volunteers across the state. The Texas Master Naturalist volunteer program is sponsored by the Texas Cooperative Extension and the Texas Parks and Wildlife Department and supported by more than 256 local organizations.

Master Marketer. This program combines three successful concepts –intensive education, master volunteers and leadership of marketing clubs. Producers are trained in advanced risk management and marketing techniques during an intensive program and then extend that knowledge to other producers and may provide leadership for marketing clubs in their home counties. Eight hundred and forty-nine producers have now graduated from the Master Marketer Program through 2006.

B. Impact of Programs

INVEST: Invest in Volunteers: Extension's Superior Team. Texas Cooperative Extension's volunteer management initiative was revamped under the Volunteer Steering Committee. The steering committee met in the fall of 2004 to evaluate current volunteer roles, review volunteer models to adopt agency wide, and start to develop a volunteer system more acceptable to today's clientele. Beginning in the fall of 2005, Extension was trained all staff on a new curriculum designed to assist them in managing volunteers. This new approach systematically identifies the County Extension Agent as a volunteer administrator and changes the way that local planning groups are organized. Some of the highlights or changes in volunteer management at the county level are listed below:

- Adoption of the **ISOTURE** model for Texas Extension. This volunteer model helps to support volunteer management because it connects the components of individual volunteer development to an effective management model.
- Defining **volunteer groups**. As the committee reviewed volunteer management models, the first step was to define volunteer groups the agency manages. These included: Leadership Advisory Committees, Program Area Committees, Youth Boards, Associations / Groups, and Episodic Volunteers.
- One major change was the development of a county **Leadership Advisory Board (LAB)**. The LABs roles are to provide long term vision for the county program, serve as advocates for the county program by assisting with interpretation of the program throughout the county, and provide support to develop resources for the county program.
- Another change was the implementation a **Youth Board** in the place of the 4-H and Youth Program Area Committee. The Youth Board is designed to be more representative of the total youth development profession at the county level. It will be comprised of other professionals as well as a majority of youth members that will support the county in developing youth programmatic efforts.

Economic Value of Volunteerism in Texas Cooperative Extension.

- Texas Cooperative Extension utilized over 71,000 volunteers across all program areas.
- These volunteers worked an average of 4.5 hours annually for a total of 321,880 hours volunteered.

- The economic value of volunteerism was estimated in terms of the opportunity cost of volunteers' time, e.g., the compensation that is foregone because an individual chooses to volunteer rather than work for compensation.
 - An after-tax hourly wage rate of \$13.56 was derived to value the time contributed by volunteers.
 - Using the adjusted hourly wage and the number of volunteer hours contributed by Extension volunteers, the value of volunteers was an estimated \$4.3 million in 2004.
- Results of evaluations of the Regional INVEST training for Extension faculty are as follows:

Intentions to adopt based on information and resources from the West Region INVEST Training. Training held November 1, 2006. 78 participants were trained.

Practices related to . . .	Definitely Will	Probably Will	Total ¹
Develop skills of the Leadership Advisory Board so that they can properly advocate for Texas Cooperative Extension	11	33	44 of 45 (97.8%)
Orient Leadership Advisory Boards so that they understand the involvement of Texas Cooperative Extension	5	37	42 of 43 (97.7%)
Evaluating issues and prioritizing issues with your Program Area Committees and / or Youth Boards	13	23	36 of 39 (92.3%)
Use information learned to train volunteers to be more effective teachers	17	28	45 of 49 (91.8%)
Implementing the ISOTURE Model with new volunteers	20	17	37 of 47 (78.7%)
Further research tools to try to use technology or distance learning with volunteers	14	15	29 of 45 (64.4%)

¹ – Blue indicates percents of 80-100% and green indicates percents of 60 – 79.9%.

Satisfaction data from the West Region INVEST Training.

Satisfaction	Mostly	Completely	Total ¹
Information being <u>accurate</u>	19	29	48 of 49 (98.0%)
<u>Quality</u> of course materials	26	20	46 of 48 (95.8%)
<u>Knowledge level</u> of presenters on the subject	17	30	47 of 49 (95.9%)
Information being easy to understand	20	23	46 of 49 (93.9%)
<u>Completeness</u> of information given on each topic	22	21	43 of 49 (87.8%)
<u>Range</u> of topics covered	23	18	41 of 49 (83.7%)
<u>Timeliness</u> of information (in time to be useful)	18	19	37 of 49 (75.5%)
<u>Helpfulness</u> of the information in decisions about your own situation	16	20	36 of 49 (73.5%)
Information being <u>new</u> to you	14	7	21 of 50 (42.0%)

¹ – Blue indicates percents of 80-100%, green indicates percents of 60 – 79.9%, and yellow indicates percents of 59.9% or less.

Intentions to adopt based on information and resources from the North Region INVEST Training. Training held November 14, 2006. 23 participants were trained.

Practices related to . . .	Definitely Will	Probably Will	Total ¹
Orient Leadership Advisory Boards so that they understand the involvement of Texas Cooperative Extension	7	8	15 of 16 (93.8%)
Use situational leadership strategies to manage volunteers	9	6	15 of 16 (93.8%)
Evaluating issues and prioritizing issues with your Program Area	5	5	10 of 11

Practices related to . . .	Definitely Will	Probably Will	Total ¹
Committees and / or Youth Boards			(90.9%)
Develop skills of the Leadership Advisory Board so that they can properly advocate for Texas Cooperative Extension	10	5	15 of 17 (88.2%)
Implementing strategies taught concerning youth boards	8	6	14 of 16 (87.5%)
Develop 4-H Program Task Forces for traditional 4-H Projects	5	5	10 of 12 (83.3%)
Implementing the ISOTURE Model with new volunteers	9	5	14 of 17 (82.4%)

¹ – Blue indicates percents of 80-100% and green indicates percents of 60 – 79.9%.

Satisfaction data from the North Region INVEST Training.

Satisfaction	Mostly	Completely	Total ¹
Quality of course materials	8	10	18 of 18 (100%)
Information being accurate	6	12	18 of 18 (100%)
Helpfulness of the information in decisions about your own situation	10	8	18 of 18 (100%)
Knowledge level of presenters on the subject	3	15	18 of 18 (100%)
Range of topics covered	13	4	17 of 18 (94.4%)
Completeness of information given on each topic	8	9	17 of 18 (94.4%)
Information being easy to understand	7	9	16 of 18 (88.9%)
Information being new to you	6	9	15 of 18 (83.3%)
Timeliness of information (in time to be useful)	8	6	14 of 18 (77.8%)

¹ – Blue indicates percents of 80-100%, green indicates percents of 60 – 79.9%, and yellow indicates percents of 59.9% or less.

Intentions to adopt based on information and resources from the East Region INVEST Training. Training held November 29, 2006. 48 participants attended.

Practices related to . . .	Definitely Will	Probably Will	Total ¹
Develop skills of the Leadership Advisory Board so that they can properly advocate for Texas Cooperative Extension	24	5	29 of 31 (93.5%)
Use situational leadership strategies to manage volunteers	17	11	28 of 31 (90.3%)
Use information learned to train volunteers to be more effective teachers	28	5	33 of 37 (89.2%)
Implementing the Wellness in Texas Master Volunteer Program	6	5	11 of 13 (84.6%)
Orient Leadership Advisory Boards so that they understand the evolution of Texas Cooperative Extension	13	19	32 of 38 (84.2%)
Evaluating issues and prioritizing issues with your Program Area Committees and / or Youth Boards	14	14	28 of 35 (80.0%)
Market Master Volunteer programs to appropriate volunteers and utilize them more effectively based on information taught today	15	12	27 of 34 (79.4%)
Implementing the ISOTURE Model with new volunteers	16	13	29 of 37 (78.4%)

¹ – Blue indicates percents of 80-100% and green indicates percents of 60 – 79.9%.

Satisfaction data from the East Region INVEST Training.

Satisfaction	Mostly	Completely	Total ¹
Information being <u>accurate</u>	17	22	39 of 44 (88.6%)
<u>Quality</u> of course materials	27	11	38 of 44 (86.4%)
Information being easy to understand	15	21	36 of 43 (83.7%)
<u>Knowledge level</u> of presenters on the subject	12	24	36 of 41 (83.7%)
<u>Completeness</u> of information given on each topic	20	15	35 of 44 (79.5%)
<u>Range</u> of topics covered	21	13	34 of 44 (77.3%)
<u>Timeliness</u> of information (in time to be useful)	19	12	31 of 44 (70.5%)
<u>Helpfulness</u> of the information in decisions about your own situation	20	10	30 of 43 (69.8%)

¹ – Blue indicates percents of 80-100% and green indicates percents of 60 – 79.9%.

Intentions to adopt based on information and resources from the South Region INVEST Training. Training held on December 14, 2006. 68 participants attended this training.

Practices related to . . .	Definitely Will	Probably Will	Total ¹
Develop skills of the Leadership Advisory Board so that they can properly advocate for Texas Cooperative Extension	28	12	40 of 43 (93.0%)
Use information learned to train volunteers to be more effective teachers	24	14	38 of 41 (92.7%)
Implementing strategies taught concerning youth boards	11	13	24 of 26 (92.3%)
Orient Leadership Advisory Boards so that they understand the evolvement of Texas Cooperative Extension	23	9	32 of 35 (91.4%)
Implement resources provided at the 4-H Club Managers Session	16	7	23 of 26 (88.5%)
Use situational leadership strategies to manage volunteers	22	22	44 of 50 (88.0%)
Implementing the ISOTURE Model with new volunteers	16	28	44 of 55 (80.0%)
Market Master Volunteer programs to appropriate volunteers and utilize them more effectively based on information taught today	13	21	34 of 47 (72.3%)
Develop 4-H Program Task Forces for traditional 4-H Projects	8	7	15 of 24 (62.5%)

¹ – Blue indicates percents of 80-100% and green indicates percents of 60 – 79.9%.

Satisfaction data from the South Region INVEST Training.

Satisfaction	Completely	Mostly	Total ¹
<u>Knowledge level</u> of presenters on the subject	44	13	57 of 58 (98.3%)
Information being <u>accurate</u>	34	21	55 of 58 (94.8%)
Information being easy to understand	30	22	52 of 58 (89.7%)
<u>Completeness</u> of information given on each topic	25	27	52 of 58 (89.7%)
<u>Quality</u> of course materials	25	25	50 of 58 (86.2%)
<u>Helpfulness</u> of the information in decisions about your own situation	18	28	46 of 58 (79.3%)
<u>Range</u> of topics covered	18	28	46 of 58 (79.3%)
<u>Timeliness</u> of information (in time to be useful)	17	14	31 of 58 (53.4%)
Information being <u>new</u> to you	6	16	22 of 58 (37.9%)

¹ – Blue indicates percents of 80-100%, green indicates percents of 60 – 79.9%, and yellow indicates percents of 59.9% or less.

Youth Protection Standards. All TCE employees are receiving training in the area of volunteer qualifications, child abuse prevention, and risk management. Clientele have received

this program in a very positive manner. Many volunteers involved in Extension programming have previously been screened by employers, churches and youth organizations.

Master Sewing Volunteer. MSVs are involved in women's prisons teaching skills for personal success with quilting, team work, planning, organization, and providing needed clothing and accessories to single parents, the elderly, and contributing to community heritage. MSVs teach youth and 4-H'ers, serve as leaders, assist in schools, and collaborate with a variety of organizations and agencies, such as housing authorities, community action groups, and Head Start. They conduct sewing camps, demonstrations, and recruit other individuals to contribute to the social value of the community. In addition to knowledge and sewing skills, the Master Clothing Volunteer program gives clients self-confidence and a sense of worth that they can complete a worthwhile project. The Texas MSV program serves as a resource to other state's Extension organizations through its innovative use of sewing, textile and consumer skills and community partnering to reach committed volunteer. In 2006, the 525,252 citizens were contacted in 595 sessions. The concentration of contacts were in Rio Grande Valley counties of Cameron and Hidalgo

Texas 4-H Clothing Board. This project team has shown that sewing stimulates creative expression and self esteem for kids. 4-Her's develop required skills, patience and learn to make something by hand that carries a great meaning when made and given away. In addition, youth learn to teach sewing skills to others. In 2004, this team sponsored 4-H Hope Totes. Members sewed 3,418 tote bags and filled the totes with toiletries, books, crayons and other needed items. Totes were given to shelters, children's homes, nursing homes and to adults in need. The value of youth volunteer contributions is over \$17,000.

Texas 4-H Livestock Master Volunteers. A total of 114 4-H Swine Master Volunteers have been trained. These individuals have provided over 7,394 hours to the program and reached 17,811 people. Their payback hours included such activities as validation committees, educational programs, project supervision, project selection, record keeping, facility upkeep, artificial insemination, breeding and farrowing, Ag. boosters, showmanship clinics, assisting new families, club manager work, judging project shows, and elementary school programs. The certified master volunteers revealed a significant increase in their subject matter knowledge of the swine industry, their ability to carry out leadership responsibilities, and in their ability to effectively plan 4-H swine project activities.

In 2006, there is a new five year plan to implement master volunteer training and certification programs in the large animal areas of beef, sheep, swine, goats and horse. These five areas will be hosted across the four regions of the state each year on a rotational basis. These certification programs will build the knowledge base of 4-H volunteers, assist with expanding current project work, extend the resources of the agency and enhance the youth development opportunities of the program statewide.

Texas Master Gardener. This volunteer development program contributes \$5.3 million in volunteer service to the State of Texas through its 5,550 Master Gardeners in 110 counties. The economic value of Master Gardener's service expands the human capacity of Texas Extension by 17 percent through educational projects in youth gardening, community beautification, environmental quality, and consumer horticulture.

Texas Master Naturalist. The Texas Master Naturalist program is a partnership between TCE and Texas Parks & Wildlife -- 2006 was the 8th year of this partnership. This award winning program continues to build on its previous efforts. Project expansion and enhancement continue as a major focus of this program.

Master Marketer. The annual benefit for all graduates was approximately \$17.8 million in 2006, with the cumulative increase in net returns topping \$116 million since 1996.

Outputs/Outcomes

Texas Cooperative Extension - 2006 Volunteer Development

- 196,716 Volunteers Trained
- 2,006,906 Individual Contacts by Volunteers
- 436,621 Attendance at Group Methods Conducted by Volunteers

- **\$682,561,242 million Value of Volunteer Time**
Source: Bureau of Labor Statistics, Independent Sector, 2005 Data.

Youth Protection Standards. Many resources have been created to support this program those include: reference guide, electronic presentations, videos, and Spanish translation of enrollment forms and information. This program has screened and qualified 17,670 volunteers to date. These individuals are involved in all Extension disciplines and programs in a direct volunteer role. A 6.65 % red flag rate has occurred as a result of the criminal background checks. This is slightly higher than the state average for red flags regarding volunteer background checks.

Master Sewing Volunteers. In its 13th year, the program continues to attract volunteer interest both in and out of Texas. Within 23 Texas counties implementing the MSV program 2005, 313 group trainings were held. These individuals have made over 6,273 contacts while repaying their 50 volunteer hours. MSV's conducted meetings reaching 7,802 volunteers through group and individual sessions.

Individuals are taught how to sew, mend, alter, or purchase quality family clothing. Some have taught quilting—a heritage art. Some volunteers and clients have started their own businesses or obtained jobs related to apparel construction because of the MSV program. Innovations in fiber and textile production, engineering, computer technology, machine embroidery equipment and computer-assisted design (CAD) are creating a plethora of opportunities for skilled individuals to achieve business success with sewing knowledge.

Texas 4-H Project Teams. The Texas 4-H Clothing Board (project team) has 49 members, 27 adults (7 of these are college students who were on the board as teens and elected to stay on as adult members) and 22 4-Hers ages 14-18. For many years they have been an exemplary project team setting the standard for other.

The Tech Team is a newer 4-H and youth project team. The goal of this group is to create and promote a diversity of youth program opportunities. In addition the make up of this volunteer driven team is one of collaboration among the military, corporate executives and University of Texas at San Antonio. Early involvement has created several volunteer advantages including HP computers being donated to the Texas 4-H Center and statewide marketing through the revamping of the Texas 4-H web site. In 2005, additional donations of \$40,000 in computers, cameras and software were made, piloted a new 4-H Roundup contest and conducted educational sessions at seniors' events and Ambassadors training.

Texas 4-H Clothing and Textiles Project: *Lorina sewed on Saturday and nearly finished the shirt to her outfit. I was so proud of her as she showed patience I have not ever known her to have. She did very well.*” Mother of 9 year old member

The Texas 4-H Livestock Master Volunteers. Three key groups support the education of youth and adults in the swine, beef, sheep and goats. These project teams give direction to youth

leadership tours, master volunteer trainings and support and other learning strategies. These groups are comprised of youth and adult volunteers, Extension faculty, commodity groups and key donors. The certified swine and goat master volunteers revealed a significant increase in their subject matter knowledge of the industry, their ability to carry out leadership responsibilities, and in their ability to effectively plan 4-H swine project activities.

4-H Swine Master Volunteers.

- 50% change in knowledge of swine industry
- 48% increase in ability to carry out leadership responsibilities as a volunteer
- 54% increase in ability to better plan 4-H Swine Project activities.
- 32% increase in ability to lead others
- 36% increase in ability to adjust to new situations.
- 22% increase in ability to work well with others.
- 20% increase in ability to work independently.
- 22% increase in conflict resolution.
- 44% increase in knowledge level that the 4-H Swine Project provides a safe, wholesome product for consumers.
- 36% increase in the understanding of how to follow labels carefully for feed additives, and drug or chemicals used in the swine project.

Master Marketer. Seven hundred and five producers have now graduated the Master Marketer Program through 2006. Currently, 37 marketing clubs are still active. Recent surveys of mature marketing clubs revealed producers are not only gaining knowledge through their participation in marketing club activities, but are also improving their bottom line. More than 400 producers responded to the survey and indicated they had increased their returns an average of \$12,399 annually based on the knowledge they had gained through participation in a marketing club.

"Since attending the program, we have achieved a much higher price for each commodity... We have been able to lock in cost of production while benefiting from upside potential through the use of cash, futures, options and basis management." Glen Rod, El Campo, Texas.

"...using the knowledge of price protection through hedging opportunities in our operations, I've been able to increase our profits by an average of \$70,000 a year over a six-year period." Dale Hughes, Vernon, Texas.

"Because of the Master Marketer Program, I now look at the market every day and not just when I have a crop in the bin to sell." Bob Thorton, East Bernard, Texas.

"I am no longer 'reacting' to the market's ups and downs but 'acting' in a controlled manner based upon market signals at the time, while using the proper tools to accomplish my goals." Keith and Michele Orsak, Edna, Texas.

"Overall, I anticipate the skills developed in the Master Marketer Program to increase my profit by 25 percent." Leo Holloway, Abilene, Texas.

"The Master Marketer class gave us the confidence to take advantage of marketing opportunities as they occur. In one particular year, we were able to increase our farm income from grain sorghum by \$10,000 by the use of put options." Brian and Natalie Borchardt, Tulia, Texas.

Texas Agricultural Experiment Station

The Texas Agricultural Experiment Station did not have research programs that complimented or supported TCE in its State Plan of Work Program 12, Volunteer Development.

C. Sources of TCE-TAES Federal Funding

TCE: Smith-Lever and State Matching

TAES: None

D. Scope of Impact

Multi-State Extension - OK, AK, LA, MS, AL, TN, KY, VI, WV, NC, SC, GA, FL

Multi-State Research – None

Integrated Research and Extension

State TCE Plan of Work Program 13: Partnerships and Collaborations
Key Theme: Community Development

A. Description of Activity

During 2006, Texas Cooperative Extension conducted many successful educational programs which were expanded via partnerships and collaborations. Historically, these partnerships and collaborations have been with citizen groups, other universities, other agencies and key stakeholders. The Texas Community Futures Forums were conducted in 2004 in all 254 counties with key input from many of these partners.

Emphasis is being given to groups with interest in community, youth and family concerns. Special attention will be devoted to traditionally under served sectors. Care was given to meet the needs of the disadvantaged.

269,960 Number of Participants Reached

*25 % of Participants Under served

*This is an estimate based upon the lack of a specific date in this particular area.

Extension activities (focused on Youth, Volunteers and Community Leaders) worked to learn how to form successful partnerships. Extension, communities and school developed opportunities for collaborations.

18,898 Number of Participants Served by Group Methods

62,551 Number of Participants Served by Individual Methods

70,061 Number of Contacts by Volunteers

Of the collaborations, 1309 were Independent School Districts, 373 were Head Start Program, 2997 were Private – Commercial, 4467 were Private – Non-commercial, 8231 were State/Federal/Local. 1090 were University/Community Collages.

Linkages were made with numerous organizations including Volunteer Leader Organization of Texas, National Guard, Texas Education Agency, U. S. Department of Energy, Coalition of Valley Families, Texas Department of Transportation, Child Protective Services, Boys and Girls Clubs, YMCA, Junior Achievement, Texas Home Buyers, Chamber of Commerce, Farm Bureau, Habit for Humanities, Food Bank, Promotoras Collaboration, Fort Hood, African American and Hispanic Service Organizations, African American and Hispanic Business Organizations, African American and Hispanic Faith-based Organizations, Historically Black and Hispanic Colleges and Universities, Communities in School, American Cancer Council, U. S. Fish and Wildlife Services, Workforce Commission, Majority Minority Public Schools, Civic Organizations, Parent - Teacher Organizations, County Tax Appraisal Offices, Master Gardeners and Clients, Texas Junior Simmental Simbrah Association, Girls Clubs, State Farm Insurance, Texas Cancer Council, Texas State Troopers, Health Education and Research, Inc., North Central Texas College, County Community College District, Texas Nursery and Landscape Association (TNLA), s Home and Garden Show, Bayless-Selby House, Flower Mound Library, Financial Literacy Coalition of Central Texas, Graham Regional Medical Center, Upper Trinity Regional Water District, USDA Natural Resource Conservation Service,

South Texas College of Law, Career and Recovery Resources, Accolade Home Health, Northwest Home Builders Association, The Colony Parks Board, North Texas Tree Specialists, Flower Mound Environmental Services Department, Heard Natural Sciences Museum, Bob Jones Nature Center, Clear Creek Natural Heritage Center, City of Denton Parks and Recreation Department, LBJ National Grasslands, New Mexico State University, Hospital Districts, Extension Program Councils, Family and Community Education Groups, Army volunteers and other youth serving agencies as appropriate to this performance goal.

B. Impact of Programs

As funding becomes scarcer it is more and more important to combine efforts in order to meet the needs of the citizens, and make the efficient use of the dollars given to us by stakeholders, the legislature, and grantees or benefactors.

Examples include:

Passenger Safety. The proper use of child safety seats reduces the risk of injury and death, leading to reduced medical costs, avoidance of lost future earnings, and improved quality of life. These economic benefits were an estimated \$1,820 per child age 0 to 4 and \$2,130 per child age 4 to 7 for new seats distributed, and \$505 per child for seat misuse. In 2005, an estimated 420 children under the age of 5 were saved as a result of child restraint use. If all child passengers ages 14 and under were restrained properly, an estimated 7,500 lives would be saved by child restraints.

Data from the Passenger Safety project indicates that 1,234 child safety seats were inspected, and parents were instructed how to correctly install their child safety seats. 801 new child safety seats were distributed by project members and project-trained agent/technicians. Passenger Safety conducted two 4-Day National Child Passenger Safety Technician Trainings; a total of 34 technicians were trained. 27,960 Texans attended events where they viewed the three Rollover Convincers to increase their awareness of the importance of using safety belts consistently. The project distributed 65,611 educational resources to support occupant protection. For the 1,234 safety seats inspected in 2006, the economic benefit is an estimated \$1.3 million.

Collaborations are with other agencies, both in-state and out-of-state. Included in collaborations are the following agencies: Texas Department of Transportation (TX-DOT); National Highway Traffic Safety Administration (NHTSA Region 6); Texas Department of State Health Services (TDSHS); Texas Department of Public Safety (DPS); Texas Transportation Institute (TTI); Texas Engineering Extension (TEEX); Texas Municipal Police Association (TMPA); Regional Advisory Councils (RAC); Local and Statewide Law Enforcement; Local and Statewide Fire Departments; Local and Statewide EMS Professionals; Statewide Health Professionals; and Texas Department of Regulatory Services, Child Protective Services, College Station Medical Center Hospital, State Farm Insurance, Brazos Valley Injury Prevention Coalition, and Safe Kids Coalition.

Texas Cooperative Extension Military Programs. Texas Cooperative and the U.S. military have worked hand-in-hand to meet the needs of Texas families since 1987. Extension staff assistants are employed at both Fort Bliss and Fort Hood to provide vital single point-of-contact service to the military community. The following is a list of programmatic areas of importance to the military program:

- Family Advocacy Program
- Army Substance Abuse Program
- Financial Readiness.
- Exceptional Family Member Program
- Mobilization and Deployment
- New Parent Support Program
- Victim Advocacy
- Prevention Extension
- Family Member Employment
- Child/Spouse Abuse
- Parenting
- Relocation Readiness
- Employment Readiness
- Domestic Violence Awareness
- Information and Referral

Operation Military Kids - On-going 4-H clubs exist on six military bases in Texas with more than 4,000 members. “Purple Camps” or Texas 4-H Military 4-H Stars and Stripes Camp was held with 142 youth of deployed soldiers from all branches of service. Also, a state-side military conference was held with 32 participants representing Army, Air Force and Extension. Speak Out Military Kids Leadership workshop/lock-in was conducted to promote successful joint programming with County Extension Offices and Military Installations and Guard and Reserve. There were 84 different reported program efforts, reaching 21,402. There were 58 Speak Out Military Kids (14 of which were 4-H members. 932 letters of support to people in the military were written by 4-H groups. There were 1986 huggables collected by 18 different groups. Three hundred and seventy-five HERO Packs were compiled and distributed.

Financial Literacy - Financial literacy programs, such as Texas Jump\$tart, Real World, Money Smart, All My Money, and Kidz with Biz Ideas reached youth, parents, senior citizens, prison inmates, and underserved citizens. 223 volunteers were trained. These volunteers reached 4,899 people. County Extension Agents conducted 265 group meetings reaching 255,013. A specific example in Travis County was 827 people were taught financial literacy by 166 trained volunteers in 95 literacy classes.

Ag. Literacy - more than 200 counties held Agricultural Literacy programs in collaborations with schools and youth centers. These programs are known as “Pizza Ranch”, “Burger Farm”, “Kids Kows and More”, “Egg to Chick”, “Farm Day”, Farm Safety Day and many other local names. Teachers and other adults are trained to provide these educational experiences. More than 350,000 youth are reached with this important topic, since agriculture is extremely important to the future of Texas.

Collaborators for Agricultural Literacy include school districts, Chambers of Commerce, Ag. Product and Equipment dealers, Commissioners Courts, master volunteers and agriculture producers.

Texans Building Character. Extension initiated the Texans Building Character (TBC) program based on needs identified in 209 counties in the Texas Community Futures Forum. This program addresses character issues through educational programming based on seven learning models: 4-H, school, youth at risk, livestock, workforce, sports, and community. Since 1999,

over 600 county Extension agents have participated in training to implement the TBC programs in their communities.

As Texas communities have recognized the need for character building programs in their communities, over 7,596 volunteers have joined Extension agents to deliver character education programs to over 124,368 individuals during 2313 educational sessions..

Sixty-eight counties reported efforts and training in Quality Counts! - project that emphasizes quality assurance and ethical behavior in the 4-H livestock projects

Do Well, Be Well with DiabetesSM. There are 920,000 Texans diagnosed with diabetes, 137,197 of whom are uninsured. An additional estimated 440,512 Texans have diabetes, but they have not yet been diagnosed. *Do Well, Be Well with DiabetesSM* is an educational program to help people with type 2 diabetes learn the skills they need to understand and manage their diabetes, to reduce their risk of complications and to attain their highest possible level of wellness.

People with diabetes must learn how to manage their blood glucose because failure to do so results in a higher risk for complications, and is costly for the individuals, their families, employers, the health care system, and the state. Because of poor access to health care, medications, supplies, and self-care education, people without health insurance are more likely to have complications.

Fathers Reading Everyday (FRED). FRED has been implemented in Texas counties with a resulting 454 educational sessions reaching 232,645 contacts. Over 600 fathers, grandfathers, and male mentors and nearly 700 children from Head Start, Early Head Start, Even Start, elementary schools, and churches have participated in the FRED program. Results from counties that have implemented and evaluated FRED using the pre and post instrument show that participants spent an average of 9.2 hours reading with their children and averaged 39.6 books over the four-week period

Walk Across Texas. Walk Across Texas is a Texas banner program that promotes health and fitness by challenging and organizing teams to “Walk Across Texas.” Contacts in Texas reached 78,582. Partnerships and collaborations include local faith-based groups, local and county libraries, hospitals, health clubs, school districts, civic groups, commissioners courts, Extension education groups, 4-H clubs, and other youth groups.

Better Living for Texans (BLT). Better Living for Texans is a contract from the Texas Department of Human Services to teach food stamp and WIC recipient’s nutrition. In 2006, there were 304,434 direct teaching contacts made on this partnership. Collaborations and partnerships with this program include, but are not limited to, Texas Department of Human Services, WIC, local school districts, local civic groups, local media, American Dietetic Association, faith-based groups, community centers, health fairs, Vista, and county commissioners’ courts.

4-H After School - 4-H after school clubs were started in more than 30 counties involving more than 11,546 youth as new 4-H members. Partnership efforts were with Junior Achievement, YMCA, Boys and Girls Clubs, and JC Penney. Private sector grants totaled more than \$40,000. Teams of volunteers, after school providers, Extension agents and Extension specialist were trained in Extension all 12 districts. A 180 lesson educational curriculum was designed and introduced called “Yea 4-H”. Regional training were also held to implement this curriculum.

Besides more than 11,000 new 4-H members, 40,622 volunteers, parents, teachers, and youth professionals were reached in group meetings. Another 21,272 were involved in

individual contacts. 1,520 volunteers were trained. These volunteers reached an additional 19,343 Texans.

Texas Rural Development Leadership Program. Partnerships with over 20 state and local organizations and agencies resulted in the development of the highly successful Texas Rural Leadership Development Program. This program has been implemented in over 63 counties throughout the state in a collaborative effort with the local service providers such as investor-owned utilities, cooperative utilities, USDA-Natural Resource Conservation Service-Resource Conservation and Development boards, local governments and economic development organizations resulting in more local residents becoming more knowledgeable, effective leaders in elected/appointed and unofficial capacities generating and guiding initiatives that create more economic opportunities for rural Texans.

Partnership with the Lower Colorado River Authority in the Texas Leadership Institute has provided over 1000 local leaders from over 40 counties comprising their service area with enhanced training in economic development, grant acquisition and management, infrastructure development, strategic planning and service provision.

Texas Agricultural Experiment Station

The Texas Agricultural Experiment Station did not have research programs that complimented or supported TCE in its State Plan of Work Program 13, Partnerships and Collaborations.

C. Source of TCE-TAES Federal Funds

TCE: Smith-Lever and State Matching
TAES: None

D. Scope of Impact

TCE: State Specific

State TCE-TAES Plan of Work Program 14: Community Development
Key Theme: Community Development

A. Description of Activity

Stakeholder input provided by over 10,000 Texans in all 254 counties of the state through the Texas Community Futures Forum indicate that issues associated with development of their communities are pervasive and a very high priority. Specific issues include concerns about individual, community and regional economic viability and maintenance of a high quality of life.

B. Impact of Programs

Programs are basically designed to increase the capacity of targeted Texans to respond to rapidly changing socio-economic forces that affect their community economy and quality of life through increasing understanding of these forces and potential responses. Specific programs targeted at engendering and fostering home-based and micro-enterprises, support for identification and realization of entrepreneurial opportunities in agriculture, forest and other natural resource industries; development of tourism and recreational opportunities for local economic benefit; and community leadership training. Target audiences for the program consist of residents, elected and appointed officials, leaders and potential leaders, existing and potential business owner/managers in and around the over 1200 communities in all 254 counties of the state.

Coordination and cooperation with the following greatly facilitates implementation of educational programs on a state and local basis: Texas Rural Development Council, Office of Rural Community Affairs, Texas Department of Agriculture; Texas Department of Economic Development, Councils of Government, USDA-FS, RD, NRCS; Small Business Administration, Lower Colorado River Authority; Investor-owned utilities; Community Colleges; regional universities within and without the Texas A&M University System and many more.

Significant progress has been made in providing education and information to the target audience primarily by enhancing skills, capabilities and capacities of the agency in collaboration and cooperation with others to extend and enhance benefits of the land grant university system to communities throughout the state.

Previous efforts to enhance staff capacity and capability in this critical area are showing results through increased implementation of existing programs with community development county plans of working increasing by 72% from 2005, and perhaps more critically identification of areas for expanded efforts. One such is economic development particularly that emphasizing business development.

Training in starting businesses is critical to stimulating smaller economies. Extension educational programs in this area involved over 1,000 potential businesses in 60 group method educational events resulting in over 3,600 contact hours of effort. There were also over 10,000 supporting individual contacts addressing various aspects of this key element in community economic development.

However, just as important to communities trying to insure the viability of their economies is the retention of existing businesses. Extension educational programs targeting this area encompassed over 12,000 contacts hours with almost 2,000 community and business leaders.

Specific types of business activity are also supported by Extension education. For example, child care providers not only represent a business in and of itself but also support employment and other business indirectly due to the criticality of adequate child care in today's society. Extension Child Care Provider training included over 17,000 contact hours in 166 group method events. Follow-up and specific supporting information was accomplished with over 22,000 individual contacts.

Several programs have been developed and implemented to expand and supplement existing efforts with a particular focus on entrepreneurship. Examples include resources represented by the Texas Center for Rural Entrepreneurship prominent among which is development of a series of 3 focused curricula in association with rural community colleges: 'Community Support of Entrepreneurship', 'Entrepreneurs and Emerging Business Opportunities' and 'Assisting Entrepreneurs with Growth Opportunities'. Delivery of these has been initiated statewide with 6 regional workshops being held to date.

As this indicates, resources for addressing critical issues such as these are expanded considerably through partnerships such as that with the Texas Network of Rural Community Colleges. Texas Cooperative Extension leadership and community planning efforts with these under the auspices of the Rural Community College Initiative is receiving national recognition as well as establishing platforms for implementation of locally-focused economic development education. Memoranda of Agreement have been completed with almost half of the community colleges in Texas. This supports not only broad statewide development and delivery of programs but implementation of specific initiatives also. For example, an in-depth entrepreneurial business development program series was conducted in association with one community college bringing in exceptional Extension resources from around the country via the distance technologies associated with the community college.

Concrete results from Extension educational programs in community development tend to reinforce success and expansion of effort. Examples include:

- Extension nature tourism educational programs in one Panhandle county resulted in over 7,000 additional acres being made available for wildlife viewing. Estimates are this may generate over \$70,000 additional income to landowners.
- One county in the South Plains was able to acquire over a third of a million dollars in resources for implementing an enterprise facilitation project, highly leveraging the over \$100,000 in local support raised.
- Alternative energy industries offer considerable potential for economic development in agriculturally based communities with Extension educational program support on these technologies and their implementation. One county judge indicated wind farming has doubled the county tax base enhancing revenues commensurately.
- Master Gardener training applied to business development in one county resulted in the establishment of one new business and better trained employees associated with greater profitability in another. Other participants are now considering small business possibilities.

- Participants in a home-based business educational program in South Texas report pursuing self-employment opportunities and increased profitability for one existing business.

These specific illustrations demonstrate potential outcomes that derive from linking broad-based community planning and support research and education with specific, targeted assistance enhancing high probability economic development strategies.

Emergency Management Initiative

Over six-hundred 626 county Extension agents and 15 Extension specialists engaged in professional development training for Texas Cooperative Extension Emergency Management during April and May 2006. Following this training county Extension agents serving all 254 counties were guided by their immediate supervisors to create be a part of statewide blue ribbon plans and educational tasks to perform before December 31, 2006. Among these plans and tasks were 1) plan and implement EM programs in 254 counties during National Emergency Preparedness Week in September, 2) assist the county Judge and county emergency management coordinator to establish an Animal Issues Committee and Animal Issues Plan in support of the State Emergency Management Plan, 3) write and endorse a county Extension office emergency preparedness plan, 4) complete with certification the National Incident Management System IS 700 course. Animal Issues has been a major emphasis of Texas Cooperative Extension because these enterprises comprise a significant portion of the critical agricultural infrastructure including economic and food security. 221 county Extension agents participated in Foreign Animal and Zoonotic Disease Defense training in 2006 and reached 253,195 during livestock and poultry educational programs following this training. A very important accomplishment was that Texas Cooperative Extension became a member of the State Emergency Management Council establishing a presence for the agency at the State Operation Center.

B. STAKEHOLDER INPUT

Texas Cooperative Extension

Texas Cooperative Extension gathers stakeholder input from numerous sources. These sources include, but are not limited to, local clientele, commodity/special interest groups, elected officials, trend data monitored by Extension Specialists, and local advisory boards and committees. Data are analyzed in order to determine priorities in educational programming to help local communities and the State of Texas address important issues.

One specific process for gaining stakeholder input within the TCE has been the use of the Texas Community Futures Forum (TCFF). This process was described in detail in the CSREES State Plan of Work submitted in July 1999. As of this date, information obtained in this process is being used to guide Texas Cooperative Extension in the design and delivery of educational services and programs to address issues raised during this process.

During 2004, all counties in Texas participated in an effort to implement the second formal TCFF process. All 254 counties conducted a grassroots process to identify issues at the local level. In addition, a state-wide electronic survey was implemented as an additional option for local citizens to identify issues. Approximately 6,400 citizens participated in the forums and raised over 2,200 issues.

In the summer of 2004, faculty from TCE came together to study issues from the TCFF process as well as issues raised by other stakeholder groups. To accomplish this 12 regional data summits were held across the state. The purpose of these summits was to understand issues facing our state and develop action plans to address issues of importance. Over 110 action plans were developed during and since the summits. These action plans were used extensively by agents and specialists for the purpose of local, regional, and statewide program planning.

In the spring of 2005, administration and faculty in Texas Cooperative Extension developed a comprehensive strategic plan and roadmap to guide our efforts. Development of the strategic plan was based on feedback received in the various stakeholder input processes and from the information developed in the data summits.

Each year, the strategic plan will be updated based on feedback from the various stakeholder sources listed above. During the spring of 2006, data was provided by subject matter groups on educational efforts delivered in 2005 and suggested changes for the 2006 plan. Texas Cooperative Extension is in year 03 of our strategic planning efforts. Reports to the 2006 plan and changes for 2007 are currently underway.

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. One specific function of the Leadership Advisory Boards is to identify and validate issues important to the local community. The Leadership Advisory Boards are charged with assessing the community's needs and guiding the development of educational programs to meet those needs. Identification and validation of local issues will be an annual process directed by the Leadership Advisory Boards. 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.

Customer Satisfaction Measures

Another indicator of stakeholder involvement is customer satisfaction. Customer satisfaction results are obtained from counties across the state. Educators administer a standardized evaluation instrument to participants in group educational activities. Data is entered and analyzed at the state level.

Five specific indicators are calculated and reported for customer satisfaction. First, a customer satisfaction index (CSI), is comprised of seven questions that ask participants to disagree or agree with statements about the relevance, timeliness, accuracy, understandability, and helpfulness of the information provided. Using a scale of 1 (strongly disagree) to 5 (strongly agree), ratings are summed and averaged to create a score. Overall, the CSI for FY 2006 was 4.56 or at the 91st percentile. The second indicator is a single question about the overall value of the information and programs provided by Extension. The 1-to-5 rating for this question ranges from not at all valuable to very valuable. The overall value score is 4.34 or the 87th percentile. The next two indicators are referrals to others and intent to adopt practices. Referral to others relates to whether a participant would recommend an educational opportunity to others. Overall, given a yes/no choice, 98 percent of participants in FY 2006 would recommend the programs they attended to others. Participants also are asked if they plan to make any changes based on the information they received. Given a yes/no choice, 72 percent of participants statewide plan to make changes based on the information received. The final customer satisfaction indicator is an instructor index, which was introduced in late 2005. The index reflects participant perceptions of the instructor's knowledge, preparedness, presentation skills, and responsiveness to questions. FY 2006 data rated the instructors at 4.71 on a scale of 1 to 5.

Texas Agricultural Experiment Station

The TAES Administration, Department Heads and Resident Directors variously met with industry leaders over the course of FY 2004. Groups met with included the Cactus Feeders Association, Inc., National Cotton Council, Plains Cotton Growers, Rio Grande Valley Sugar Growers, Texas Arabian Breeders' Association, Texas Beekeepers Association, Texas Cattle Feeders Association, Texas Citrus Mutual, Texas Citrus & Vegetable Association, Texas Corn Producers Board, Texas Cotton Breeders Association, Texas Cotton Ginners Association, Texas Cotton Producers Association, Texas Grain Sorghum Board, Texas Nursery & Landscape Association, Texas Paint Horse Breeders' Association, Texas Peanut Producers Board, Texas Quarter Horse Association, Texas Rice Improvement Association, Texas Rice Producers Board, Texas Rice Research Foundation, Texas Seed Trade Association, Texas Sheep & Goat Raisers Association, Texas & Southwestern Cattle Raisers Association, Texas Soybean Board, Texas Thoroughbred Association, and the Texas Wheat Producers Board among others.

A special effort was implemented in 2003 and continued referred to as the Texas Beef Industry Round Table. Four regional meetings and a state wide meeting were conducted to determine industry needs, establish priorities, and provide an action plan for TAES and TCE.

TAES has encouraged the public to participate in helping TAES 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 TAES participants, and in some cases was published for further public use. Stakeholder input has always been critical to

TAES processes and programs, and listed events and organizations continue as essential partners in setting the TAES 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.

C. PROGRAM REVIEW PROCESS

Texas Cooperative Extension

TCE Administrative Leaders and TAES 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 leadership team is responsible for the oversight and management of all programs conducted by Extension and research faculty.

This process was described in the CSREES TCE State Plan of Work and the CSREES TAES State Plan of Work, both submitted July 1999. There are no significant changes in the process since that submission.

Texas Agricultural Experiment Station

Significant changes have not been made in the program review process.

D. EVALUATION OF THE SUCCESS OF MULTI AND JOINT ACTIVITIES

Texas Cooperative Extension

Programs in this report were identified and addressed in the Plan of Work submitted in July 1999. Issues of importance were identified in the TCE and TAES strategic plans for 2000-2004 and 2005-2008. These plans for 2000-2004 and 2005-2008 are based upon issues identified by stakeholders and citizens during the Texas Community Futures Forum held in 1999 and 2004. This process is described in the Federal Plan of Work and is again discussed in this document in the stakeholder input section.

An integral part of educational programming efforts to meet the needs of the citizens of Texas includes serving under-served and under-represented populations. Various programs including those under Goal 3 and Goal 5 address these populations as a major emphasis of the programming. Examples include the Better Living For Texans program, building fiscally fit families, partnership and collaboration efforts, and community development efforts.

Outcome and impact accomplishments are described for many of the planned programs reported on in this report. Accomplishments range from clientele gaining knowledge of specific subject matter areas to increased revenues and the saving of income. TCE outcomes for Year 2006 are expected to be built on for many of the ongoing programs in this report. These efforts, in many cases, are part of ongoing efforts to resolve issues identified in the strategic planning strategy which resulted in the issues identified in the Texas Community Futures Forum

Texas Agricultural Experiment Station

The Projects listed under Part A (Planned Programs) are evidence of the TAES participation and productivity in multi-state, multi-institutional, multi-disciplinary, and joint research-extension projects. Each program addressed the critical issues identified as strategically important by stakeholder input. They also addressed the reporting areas including food security, safety and nutrition. Program progress varied among programs due to the major adjustments required to conform to the federal plan, and to adjust to levels of appropriated funding available and to grants and contracts secured by faculty. The planned programs improved focus, and this

should improve further as TAES moves to more fully engage all faculty who work in the program areas.

TAES scientist participated in the following multi-state, multi-institutional, multi-disciplinary, and joint research-education programs in 2006:

Project Number and Title		Dates	Stations
NRSP001	Research Planning Using the Current Research Information System (CRIS)	Start: Oct 2004 Revision/End: 2009	ALL Are Members
NRSP003	The National Atmospheric Deposition Program (NADP)	Start: Oct 2003 Revision/End: 2008	CA-D, CO, CTS, FL, GA, IL, IN, KY, LA, MA, MD, MI, NC, NE, NYC, OH, OR, PA, TX, UT
NRSP004	High Value Specialty Crop Pest Management	Start: Oct 2004 Revision/End: 2009	AL, AR, CA-D, CO, IA, ID, IL, ME, MI, MN, ND, NE, OH, PR, SC, SD, TX, UT, VA, WA, WI, Kentucky Cooperative Extension
NRSP006	Inter-Regional Potato Introduction Project: Acquisition, classification, preservation, evaluation and distribution of potato (<i>Solanum</i>) germplasm	Start: Oct 2005 Revision/End: 2010	MI, MN, NYC, TX
NRSP007	A National Agricultural Program for Minor Use Animal Drugs	Start: Oct 2004 Revision/End: 2009	CA-D, FL, IA, NYC - Dr. Garry Adams – Adm Adv.
NRSP008	National Animal Genome Research Program	Start: Oct 2003 Revision/End: 2008	AL, AR, CA-D, DE, HI, IA, IN, KY, LA, MD, MI, MN, MS, NC, NE, NH, NJ, NM, NV, NYC, OK, RI, SC, TX, UT, WA, WI
NC007	Conservation, Management, Enhancement and Utilization of Plant Genetic Resources	Start: Oct 2002 Revision/End: 2007	CA-D, CTS, DE, IA, IL, IN, KS, MI, MN, MO, ND, NE, OH, SD, TX, WI
NC170	Mediating Exposure to Environmental Hazards Through Textile Systems	Start: Oct 2002 Revision/End: 2007	CA-D, CO, IL, MN, MO, NYC, OK, TX,

			University of Maryland-Eastern Shore
NC205	Ecology and Management of European Corn Borer and Other Lepidopteran Pests of Corn (new project)	Start: Sep 2005 Revision/End: 2010	AZ, DE, GA, IA, IL, IN, KS, KY, LA, MI, MN, ND, NE, NYC, NYG, PA, TX, WI
NC213	Management of Grain Quality and Security for World Markets	Start: Oct 2003 Revision/End: 2008	IA, IL, IN, KS, KY, MI, MN, MT, ND, NE, OK, TX, WA, WI
NC1008	Advanced Technologies for the Genetic Improvement of Poultry (was NC-168)	Start: Oct 2003 Revision/End: 2008	AR, CA-D, DE, GA, IA, IL, IN, MD, MI, MN, MS, NC, TX, VA, WI
NC1010	Interpreting Cattle Genomic Data: Biology, Applications and Outreach (NC-209)	Start: Oct 2002 Revision/End: 2007	AR, AZ, CA-D, IA, IL, KY, MA, MI, MN, MS, NC, OH, SD, TN, TX, VT, WI
NC1014	Agricultural and Rural Finance Markets in Transition (NC221, NCT-194)	Start: Oct 2004 Revision/End: 2009	AL, AR, FL, GA, IA, IL, IN, KS, MI, MN, ND, NV, NYC, OH, OK, PA, SC, SD, TX
NC1015	Managing Karnal Bunt of Wheat	Start: Apr 2004 Revision/End: 2009	AR, KS, MO, OK, SD, TX
NC1018	Impact of Climate and Soils on Crop Selection and Management (NC094 Renewal)	Start: Oct 2004 Revision/End: 2009	FL, GA, IL, IN, KS, LA, MI, MN, ND, NE, NYC, NYG, OH, SD, TX
NC1019	Control of Emerging and Re-emerging Poultry Respiratory Diseases in the United States (was NC-228)	Start: Oct 2004 Revision/End: 2009	AL, AR, CTS, DE, IA, IL, IN, MD, MN, NYC, OH, TX
NC1022	The Chemical and Physical Nature of Particulate Matter Affecting Air, Water and Soil Quality. (NCR174)	Start: Oct 2004 Revision/End: 2009	Alabama A&M University, DE, GA, ID, IL, IN, MI, MN, MO, NC, NE, NJ, NYC, SC, TX, WA, WI

NC1023	Improvement of Thermal and Alternative Processes for Foods (NC136)	Start: Oct 2005 Revision/End: 2010	CA-D, DE, FL, GA, GU, IA, IL, IN, KY, LA, MD, MI, MN, MO, NC, ND, NE, NJ, NYC, NYG, OH, OR, PA, SD, TN, TX, VA, WA, WI
NC1025	Mycotoxins:Biosecurity and Food Safety (NC129)	Start: Sep 2005 Revision/End: 2010	IA, IL, IN, KS, MI, MN, MO, ND, NE, PA, TN, TX, UT, WI
NC1027	An integrated approach to control of bovine respiratory diseases (NC107)	Start: Oct 2006 Revision/End: 2011	AZ, CA-D, FL, GA, IA, KS, LA, MI, MN, MS, NE, OK, SD, TX, WI
NC1029	Applied Animal Behavior and Welfare (NCR131)	Start: Oct 2006 Revision/End: 2011	CA-D, GA, IA, IN, KS, MD, MI, MN, MS, NE, NJ, OH, OR, TX, WA
NC1033	Local food choices, eating patterns, and population health (NC1001)	Start: Oct 2006 Revision/End: 2011	HI, IA, MI, MN, NYC, OH, PA, TX, WA, WVA, Pennsylvania Cooperative Extension
NC1034	Impact Analyses and Decision Strategies for Agricultural Research (NC1003)	Start: Oct 2006 Revision/End: 2011	AL, AZ, CA-B, CA-D, CO, IA, ID, IL, IN, KS, ME, MI, MN, ND, NE, NJ, NYC, TX, VA, WA, WI
NC1119	Management Systems to Improve the Economic and Environmental Sustainability of Dairy Enterprises (Rev. NC-119)	Start: Oct 2002 Revision/End: 2007	AZ, CA-D, FL, GA, IA, IN, KS, LA, MD, MI, MN, NE, NH, NYC, OH, PA, SD, TX, UT, VA, VT, WI, New Mexico Cooperative Extension
NC1142	Regulation of Photosynthetic Processes (Rev. NC-142)	Start: Oct 2002 Revision/End: 2007	FL, GU, IA, IL, KS, KY, ME, MI, MN, MO, ND, NE, NV, OH,

			OR, PA, SC, TX, VA, WA, WI
NC1167	N-3 Polyunsaturated Fatty Acids and Human Health and Disease (NC167)	Start: Oct 2002 Revision/End: 2007	CO, KS, MI, MN, MO, NE, NJ, PA, TN, TX, WY
NE1016	Genetic Bases for Resistance and Immunity to Avian Diseases	Start: Oct 2003 Revision/End: 2008	AL, AR, CA-D, DE, IA, MD, MS, NC, NH, NYC, SC, TX
NE1017	Developing and Integrating Components for Commercial Greenhouse Production System	Start: Oct 2003 Revision/End: 2008	AK, AZ, CTH, GA, KY, ME, NE, NJ, NYC, OH, PA, TX
NE1020	Multi-state Evaluation of Winegrape Cultivars and Clones	Start: Oct 2004 Revision/End: 2017	CA-D, CO, CTH, IA, IN, KY, MA, MD, MI, MN, MO, NE, NV, NYG, OH, OK, OR, PA, SD, TX, VA, VT, WA, California Cooperative Extension, Cornell Cooperative Extension, New Mexico Cooperative Extension
NE1022	Poultry Production Systems: Optimization of Production and Welfare Using Physiological, Behavioral and Physical Assessments	Start: Oct 2004 Revision/End: 2009	AR, CA-D, CTS, DE, GA, IA, IL, MD, MN, NE, PA, TX
S009	Plant Genetic Resources Conservation and Utilization (S-009)	Start: Oct 2003 Revision/End: 2013	AL, AR, FL, GU, HI, KY, LA, MS, NC, OK, PR, SC, TN, TX, VA, VI
S065	Multistate Research Coordination, Southern Region	Start: Oct 1999 Revision/End: 2029	All are members
S294	Postharvest Quality and Safety in Fresh-cut Vegetables and Fruits	Start: Feb 2006 Revision/End: 2010	AL, AZ, CA-D, FL, GA, HI, IA, IL, LA, MI, NYG, OR, TN, TX
S1000	Animal Manure and Waste Utilization, Treatment and Nuisance Avoidance for a Sustainable	Start: Oct 2001 Revision/End: 2007	AL, AR, CA-D, CO, FL, GA,

	Agriculture (S275)		GU, HI, IA, ID, IL, IN, KY, LA, MI, MN, NC, NE, OH, SC, TX, VA, WI
S1004	Development and Evaluation of TMDL Planning and Assessment Tools and Processes (S273)	Start: Oct 2001 Revision/End: 2007	AL, AR, Alabama A&M University, FL, GA, IA, IL, IN, KS, KY, LA, MD, MI, MN, NC, NJ, North Carolina A&T University, OK, OR, SC, TN, TX, VA, WVA
S1007	The Science and Engineering for a Biobased Industry and Economy	Start: Oct 2002 Revision/End: 2007	AR, AZ, CA-D, FL, HI, IA, IL, IN, KS, KY, LA, MI, MN, MS, MT, NC, ND, NE, OK, OR, SC, SD, TN, TX, VA, WA, WI, WVA
S1010	Dynamic Soybean Pest Management for Evolving Agricultural Technologies and Cropping Systems (S-281)	Start: Oct 2002 Revision/End: 2007	AR, GA, IA, IL, IN, KS, KY, LA, ME, MI, MN, MO, MS, ND, NE, OH, SD, TN, TX, VA, WI, Arkansas Cooperative Extension
S1011	Water Quality Methodology for Crop Protection Chemicals (S271)	Start: Oct 2003 Revision/End: 2008	AR, Kentucky State University, MS, PR, SC, TN, TX, VA, Virginia State University
S1012	Nutritional Systems for Swine to Increase Reproductive Efficiency (S-288)	Start: Oct 2003 Revision/End: 2008	AL, AR, FL, GA, IN, KY, LA, MN, NC, North Carolina A&T University, OK, TX, VA
S1013	Genetic (Co)Variance of Parasite Resistance, Temperament, and Production Traits of Traditional and Non- <i>Bos indicus</i> Tropically Adapted Breeds (S-277)	Start: Oct 2003 Revision/End: 2008	AR, FL, GA, KY, LA, MS, TX, VI
S1014	Mineral Controls on P Retention and Release in	Start: Oct 2003	FL, GA, KY, LA,

	Soils and Soil Amendments (S280)	Revision/End: 2008	MO, MS, NC, OR, TN, TX, VA
S1015	Host Resistance as the Cornerstone for Managing Plant-Parasitic Nematodes in Sustainable Agroecosystems (S-282)	Start: Oct 2003 Revision/End: 2008	AL, AR, LA, MN, MS, NC, SC, TN, TX, VA
S1016	Impacts of Trade and Domestic Policies on the Competitiveness and Performance of Southern Agriculture (S-287)	Start: Oct 2003 Revision/End: 2008	AL, AR, FL, GA, KY, LA, MS, ND, OK, TX, WVA
S1017	Improved Systems for Management of Economically-Important Arthropod Pests Attacking Pecan	Start: Oct 2004 Revision/End: 2009	FL, GA, KS, LA, OK, TX
S1018	Irrigation Management for Humid and Sub-Humid Areas	Start: Oct 2004 Revision/End: 2009	AL, AR, DE, FL, GA, LA, MO, MS, NC, PR, SC, TN, TX, VI, Alabama Cooperative Extension, North Carolina Cooperative Extension
S1021	Managing and Marketing Environmental Plants for Improved Production, Profitability, and Efficiency	Start: Oct 2005 Revision/End: 2009	AL, AR, AZ, DE, FL, IL, IN, KY, LA, MI, MN, MS, NJ, NYC, North Carolina A&T University, OH, PA, RI, TN, TX, WI
S1022	Basic and Applied Aspects of Bacterial Source Tracking	Start: Oct 2005 Revision/End: 2010	AL, AR, DE, GA, IN, MI, MN, NC, NYC, OK, TX, VA, WVA
S1025	Systems for Controlling Air Pollutant Emissions and Indoor Environments of Poultry, Swine, and Dairy Facilities	Start: Feb 2006 Revision/End: 2011	AL, AR, DE, GA, IA, IL, KY, MI, MN, NC, NYC, OH, PA, SD, TX, Kentucky Cooperative Extension
S1027	The Poultry Food System: A Farm to Table Model	Start: Oct 2006 Revision/End: 2011	AL, AR, CA-D, FL, GA, IA, MS, NC, NYC, SC, TX, WI
S1029	Improved Methods to Combat Mosquitoes and Crop Pests in Rice Fields	Start: Oct 2006 Revision/End: 2011	AR, CA-D, CA- R, KY, LA, MS, TX

W1005	An Integrated Approach to Prevention of Obesity in High Risk Families	Start: Oct 2006 Revision/End: 2011	CA-B, DC, IA, IN, KY, MA, MI, MN, MS, NE, NJ, NYC, OH, OR, PA, TX, UT, WA, WY, Arizona Cooperative Extension, California Cooperative Extension, Colorado Cooperative Extension, Illinois Cooperative Extension, Kentucky Cooperative Extension, Nevada Cooperative Extension, New Mexico Cooperative Extension, Utah Cooperative Extension
W1082	Evaluating the Physical and Biological Availability of Pesticides and Pharmaceuticals in Agricultural Contexts	Start: Oct 2005 Revision/End: 2010	AL, AR, CA-B, CA-D, CA-R, CO, CTH, DE, GA, HI, IA, IL, IN, KY, MI, MN, MT, NE, PA, SD, TN, TX, WI
W1112	Reproductive Performance in Domestic Ruminants	Start: Oct 2006 Revision/End: 2011	AK, AZ, CA-D, CO, HI, IA, KS, ME, MI, MN, MT, ND, NE, NM, OH, OR, PA, TN, TX, WA, WY
W1122	Beneficial and Adverse Effects of Natural, Bioactive Dietary Chemicals on Human Health and Food Safety	Start: Oct 2002 Revision/End: 2007	AZ, CA-B, CA-D, CO, HI, ID, IL, MD, MI, OR, TX, UT
W1128	Reducing Barriers to Adoption of Microirrigation	Start: Oct 2004 Revision/End: 2009	AZ, CA-D, CO, FL, GU, HI, IA, ID, KS, LA, NM, NYC, NYG,

			OR, PR, TX, VI, WY
W1133	Benefits and Costs of Natural Resources Policies Affecting Public and Private Lands	Start: Oct 2002 Revision/End: 2007	AL, CA-A, CA-B, CA-D, CO, CTS, DE, GA, IA, IL, KY, LA, MA, MD, ME, MI, NC, ND, NH, NYC, OH, OR, PA, RI, TX, UT, WA, WVA, WY
W1168	Environmental and Genetic Determinants of Seed Quality and Performance	Start: Oct 2003 Revision/End: 2008	CA-A, CA-B, CA-D, CO, DE, FL, IA, KY, LA, MI, NC, NYC, NYG, OH, OR, SD, TN, TX, VA, Cornell Cooperative Extension
W1170	Chemistry, Bioavailability, And Toxicity Of Constituents In Residuals And Residual-Treated Soils	Start: Oct 2004 Revision/End: 2009	AR, CA-R, CO, DE, FL, HI, IA, IN, KS, MI, OH, OK, OR, PA, TX, VA, WA
W1173	Stress Factors of Farm Animals and Their Effects on Performance	Start: Oct 2006 Revision/End: 2011	AR, AZ, CO, FL, HI, IA, IL, KS, KY, MN, MO, MS, ND, NE, NYC, TN, TX
W1177	Enhancing the Competitiveness of U.S. Meats	Start: Oct 2002 Revision/End: 2007	CA-D, CO, IA, KS, ND, NE, OR, SD, TX, UT, WA, WY, South Dakota Cooperative Extension
W1188	Characterizing Mass and Energy Transport at Different Scales	Start: Oct 2004 Revision/End: 2009	AZ, CA-D, CA-R, CO, CTS, DE, IA, IL, KS, KY, MN, MT, ND, NJ, NV, OR, PA, TN, TX, UT, WA, WY, California Cooperative Extension
W1190	Interfacing technological, economic, and institutional principles for managing inter-sector	Start: Oct 2004 Revision/End: 2009	AZ, CA-D, CO, HI, ID, IL, IN,

	mobilization of water		KS, ND, NE, NM, OR, TX, UT, WA
--	-----------------------	--	--------------------------------------

E. MULTI STATE EXTENSION AND RESEARCH ACTIVITIES

See Attached - CSREES-REPT (2/00) for Multi-State Extension Activities

F. INTEGRATED ACTIVITIES

See Attached - CSREES-REPT (2/00) for Integrated Extension Activities.

See Attached - CSREES-REPT (2/00) for Integrated Research Activities.

Contact Information:

Texas Cooperative Extension

Dr. Margaret R. Hale
Executive Associate Director
Texas Cooperative Extension
105A Jack K. Williams Administration Building
7101 TAMU
College Station, TX 77843-7101
(979) 845-7907
(979) 845-9542 (fax)
m-hale@tamu.edu

Dr. Scott R. Cummings
Associate Department Head & Program Leader
Extension Education
Texas Cooperative Extension
117A Scoates Hall
2116 TAMU
College Station, TX 77843-2116
(979) 847-9388
(979) 862-7190 (fax)
s-cummings@tamu.edu

Texas Agricultural Experiment Station

Dr. Mark Hussey
Associate Director
Texas Agricultural Experiment Station
113 Jack K. Williams Administration Building
College Station, Texas 77843-2142
(979) 845-7980
(979) 458-4765 (fax)
mhussey@tamu.edu

Certification:

Edward G. Smith
Director & Associate Vice Chancellor
Texas Cooperative Extension

Date

Dr. Elsa Murano
Vice Chancellor for Agriculture
and Life Sciences
Director, Texas Agricultural Experiment Station

Date