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BRIDGING THE GAP: COMMUNITY GARDENS AS A SUPPLEMENT TO
SENIOR ADULT FOOD ASSISTANCE PROGRAMS

By

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MS in Horticulture, Texas Tech University, 2012

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Abstract

Food insecurity and access to nutrition-rich food for senior adults receiving food assistance is an ever-growing concern in the United States. For households that lack accessible food, the availability of alternative sources of nutrition such as community gardens could be critically important to maintaining a stable level of food security. The purpose of this study was to explore the feasibility of using a community garden as a supplemental food assistance tool for congregate meals sites and food pantries. This study encompassed the following three phases: 1) surveying the trends in Shelby County, Texas senior adults receiving food assistance to determine if there were differences between life satisfaction or food security by age or level of education, 2) interviewing food site directors to discern if they face challenges or limitations in storing or providing fresh vegetables to clientele, and 3) reviewing four successful Texas community gardens to assess their annual vegetable yields and community service hours while examining the use of Texas A&M AgriLife Extension Service county agents to provide oversight of project and volunteers.

An explanatory sequential methodology which entailed administering a questionnaire to 83 senior adults and interviews with four nutrition site directors was employed. The responses reflected that the senior adults surveyed

indicated that they experienced food security issues, and the nutrition site directors had challenges and limitations in providing fresh vegetables to clients. However, the results indicated that there were no significant differences between life satisfaction and food security by age or level of education. Associations between life satisfaction and food security; life satisfaction and have grown a vegetable garden; and life satisfaction and number of times per day vegetables were consumed existed which were determined through analysis of this data.

Future research should continue to be undertaken to identify how community gardens could be sustainable at the state level through Cooperative Extension System oversight, local government support, and volunteerism while addressing the limitations faced by nutrition site directors in providing clients with fresh produce. In addition, future research should also examine how gardens could be used as a low-cost supplemental food assistance tool in providing a more resilient and food-secure system for rural senior adults through the direct integration of food production and food consumption.

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Chapter 1: Introduction

Food insecurity and access to nutrition-rich food for senior adults receiving food assistance is an ever-growing concern in the United States. A large percentage of senior adults rely on local charitable food programs and government subsidized food assistance programs for their nutritional needs (Borden et al., 2015). Oftentimes, these food assistance programs depend upon donations, may be poorly subsidized, or have inconsistencies in funding; therefore, there can be nutritional gaps in the quality and types of foods received by senior adults. Having access to food is just as important as having healthy, culturally-appropriate, and desirable food. For households that lack accessible food, the availability of alternative sources of food – from community gardens, for example – could be critically important to maintaining a stable level of food security. Use of a community garden may be a possible low-cost option to increase food security and bridge the gap between food assistance programs and nutrition.

Background

According to a study conducted by Feeding America in 2014, the number of food insecure seniors more than doubled between 2001 and 2011. In 2011, 4.8 million seniors, 8.4 percent of the senior population, faced food insecurity.

This data reflects that nearly 1 in 12 seniors living in the United States had limited or uncertain access to enough food to sustain a healthy lifestyle. The increase in senior food insecurity is particularly concerning given the growing proportion of the population that is comprised of seniors; an estimated 10,000 Baby Boomers will turn 65 every day until 2030, as reported by the U.S. Census Bureau. Food insecure seniors consume less calories and lower quantities of all 10 key nutrients than their food secure counterparts as reported by Feeding America (2014). According to a study by Drewnowski and Evans (2001), health is viewed as not only the absence of infirmity and disease but also as a state of physical, mental, and social well-being. Much progress has been made in establishing a broader conceptual framework of health status for older adults. Indices of health-related quality of life (HRQL), a relatively new concept, expand the morbidity and mortality-based definition of health to include a personal sense of physical and mental health, social functioning, and emotional well-being. Other and more global measures of quality of life were even more inclusive, taking overall life satisfaction and happiness into account. Quality of life measures permit researchers to compare the status of different groups over time and assess the effectiveness of public health interventions and programs (Drewnowski & Evans, 2001).

The distribution of food by charitable food assistance network offers critical nutritional support of individuals in need. Increased distribution of

nutrient-rich foods would ensure that food insecure seniors receive more access to nutrients vital to their health. Similarly, nutrition education efforts focused on the senior population could provide increased information about how to address the specific nutritional needs of seniors (Feeding America, 2014).

As grocery stores close and food costs increase, the popularity of community gardens continues to rise (Zimmerman & Doiron, 2008). Though their popularity is currently on the upsurge, community gardens have had an extensive past in the U.S. Community gardens created easily accessible food supplies during World Wars I and II and provided affordable food to the poor and unemployed during the Great Depression. Indeed, even into the 1950s and 1960s, backyard and community vegetable gardens were ubiquitous in many American small towns. In addition, as food prices rose and healthy foods became less affordable, individuals began seeking alternatives to purchasing foods at grocery stores and looked to community gardens as a means of gaining access to the food necessary for a healthy diet (Hanson, 2012).

Community gardening in the U.S. has gained significant exposure in recent decades. Buoyed by a long history in American cities, community gardening is currently gaining legitimacy and interest due to its diverse range of benefits and outcomes. Today, it is no longer just an urban activity or something found only in major metropolitan regions. Community gardens were found in all

50 states, from large cities to suburbs, small towns, and even rural areas (American Community Gardening Association [ACGA], 2008).

Collaborating with local and state government agencies such as the Texas A&M AgriLife Extension Service in planning and managing community garden programs could be a way to build stronger and more meaningful relationships with volunteers and community organizations. By hosting educational gardening and nutrition workshops along with working within the community garden on a regular basis, the public could understand how extension knowledge intersects with garden dynamics. Conducting vegetable trials in community gardens could also bring clarity to the effectiveness of various techniques and use of vegetable varieties in specific regions, while recommending vegetable gardening as a way to access fresh, healthy foods at relatively low costs (Langellotto, 2014). In addition, partnerships could be established in which people participate directly in food production and community development as relevant to extension professionals in the urban, suburban, and rural areas across the U.S. Through recreation and exercise, access to fresh produce, and increased gardening knowledge and civic engagement, community gardening could touch people's lives in a number of ways (Drake & Lawson, 2015).

Community gardens were becoming an important part of the urban and suburban fabric around the world not only in relation to low cost food production, but to the social connections developed. Blake and Cloutier-Fisher (2009) state

that community gardens can build health for the individuals who use them and for the communities in which they exist by building social connections and sense of community among the gardeners. Individual benefits of community gardening may include improved nutrition, physical activity, and social and psychological well-being. Broader benefits of community gardens may include improved social networks and enhanced community capital. Finally, community gardens create spin-off benefits whereby participants become empowered to make more health-promoting changes in their own lives and also in their community by becoming more active in other aspects of a community life beyond the garden gates (Blake & Cloutier-Fisher, 2009).

Goals of Research Study

Although use of community gardens to supplement food assistance programs for adults that were food insecure and the issues of poor nutritional health and life satisfaction in senior adults have been previously studied, there is a lack of research that connects the three areas. According to Birky (2009), existing research suggests that community gardens in the U.S. have the potential to enhance the quality of life of all participants. To explore this possible connection, the following questions were addressed in one-on-one, face-to-face interviews with Shelby County, Texas food nutrition site directors:

1. What were the goals of the food assistance program/site?
2. What were the demographics of food assistance participants?

3. Were there criteria for receiving food assistance from site? If so, what were the criteria?
4. What types of food products/groups were provided or served at each nutrition site?
5. Were there any limitations or challenges site directors faced in providing fresh vegetables to food assistance recipients? If so, what were the limitations or challenges?
6. Did food assistance participants desire educational programming on gardening, nutrition, or food preparation at site?
7. Did the site desire to receive fresh vegetables from a community garden to provide food assistance participants?

From this exploration with food site directors, the following hypotheses were developed and analyzed through use of a food security survey instrument with a sample of senior adults that receive food assistance from congregate meal sites in Shelby County, Texas:

- H₁: There are differences in life satisfaction among different age groups for the 2018 congregate meal participants.
- H₂: There are differences in life satisfaction among different levels of education for the 2018 congregate meal participants.
- H₃: There are differences in food security among different age groups for the 2018 congregate meal participants.
- H₄: There are differences in food security among different levels of education for the 2018 congregate meal participants.

H₅: There is an association between life satisfaction and food security for the 2018 congregate meal participants.

H₆: There is an association between life satisfaction and have grown a vegetable garden for the 2018 congregate meal participants.

H₇: There is an association between life satisfaction and times per day vegetables were consumed for the 2018 congregate meal participants.

Based upon these research questions and hypotheses, the following objectives in this study were established:

1. Survey the trends in food assistance received by senior adults in a rural environment.
2. Compare and contrast the differences between food assistance, satisfaction of congregate meals, life satisfaction of senior adults, food insecurity, vegetable consumption, and gardening knowledge as experienced by congregate meal participants and perceived by food site directors.
3. Deliberate possible limitations or challenges food site directors face in providing fresh vegetables to food assistance recipients.
4. Determine if community gardens have the potential for sustainability by exploring the successes and limitations of models in urban, suburban, semi-suburban, and rural areas through the

collaboration between Texas A&M AgriLife Extension Service, local government, and volunteers.

The purpose of this mixed method study was to determine the feasibility of using a community garden as a supplemental food assistance tool for congregate meals sites and food pantries. This possibility was explored from gaining a better understanding of food aid programs in the county, probing the perceptions and reality of food security by site directors and senior adults, and examining the possible limitations or challenges site directors face in either storing or providing fresh vegetables. In addition, case studies of Texas community garden models in an urban, suburban, semi-suburban, and rural environment were reviewed in order to provide the framework of program goals, implementation, and results of these food assistance projects for sustainability while assessing how AgriLife Extension plays a role. The establishment of partnerships between AgriLife Extension county agents, adult and youth volunteers, and local civic organizations were gauged in these case studies as to how best utilize a designated community space to benefit food insecure individuals. Lastly, the health outcomes, social connections, and psychosocial benefits of employing these collaborations were presented.

Through this study and future research, it may be conceivable that community gardens in Texas could be sustainable through AgriLife Extension management, local government support, and volunteerism. In turn, community

gardens may possibly be used as a low-cost supplemental food assistance tool in providing a more resilient and food-secure system for rural senior adults through the direct integration of food production and food consumption.

In conclusion, and in order to adequately quantify and qualify the hypotheses and research questions, a mixture of historical data and documents, current articles and research, surveys of food assistance recipients, and interviews with food nutrition site directors were utilized in this study. All materials were thoroughly reviewed, analyzed, and described in Chapters 2 and 3 of this dissertation. The dissertation begins with a thorough review of the literature as it pertains to food insecurity among senior adults, the nutritional and quality of life needs of senior adults, food assistance programs in the U.S., models of population-based community gardens, and collaboration between AgriLife Extension, local government and volunteerism. Research methods and results were reported followed by a discussion of how these findings both support and recommend additional questions concerning the hypotheses. This dissertation concluded with a discussion of recommendations and study limitations followed by a look towards future research.

Chapter 2: Literature Review

Literature Search Strategy

To collect and analyze recent research concerning nutrition in rural senior adults, the use of community gardens, food insecurity, and U.S. food assistance programs, multiple sources were accessed. Peer-reviewed journals, books, established research organizations, and various Internet sites provided valuable research and survey data in order to accomplish this task. Online research included search engines available from the Stephen F. Austin State University Ralph Steen Library and the following public sources: EBSCO Host, Education Research Complete, Google Scholar, and ProQuest Central. Keyword and Boolean phrases were as follows: *senior adult, community garden, nutrition, food desert, psychosocial benefits, food assistance programs, gardening, Extension, 4-H, volunteerism, elderly, and well-being.*

In this chapter, pertinent literature was reviewed with a focus on the following five aspects: 1) food insecurity among senior adults, 2) nutritional and quality of life needs of senior adults, 3) food assistance programs in the U.S., 4) community gardens and finally, 5) collaboration between local government and Texas A&M AgriLife Extension Service. The review began with a background on the food insecurity issue among senior adults in the U.S. and Texas, then the

impact food insecurity has on rural communities and how this issue has been addressed was examined. Information on the nutritional needs and changes in health experienced by an aging population in conjunction with the psychosocial benefits of senior adults was presented. Next, food assistance programs in the U.S. were reviewed as to purpose and target audience goals. Following, literature on the benefits and perceptions of community gardening, potential collaborators and use of volunteers in building a successful model was included. The conclusion provided discussion on the gaps and limitations of present literature regarding community gardens and food security.

Food Security among Senior Adults

The Collins Dictionary (2011) defines *senior citizen* as an older person who has retired or receives social security benefits. According to the U.S. Census Bureau (2011), the definition of a senior adult or elderly in the U.S. was one that is age 65 or older. By contrast, Feeding America (2014) in their study of food security in the U.S. ranks senior adults as one that was age 60 or above. For the purpose of this study, researcher will be using the Feeding America definition of senior adult as an individual age 60 or above.

Defining food security was a difficult task. Food security can describe whether a country, state, community, household, or individual has enough access to food in order to meet the assigned dietary requirements (whether they eat as many calories as they burn). However, food security generally represents

a community-based framework that focuses on the prevention of hunger through the availability of accessible and affordable food (Gottlieb & Fisher, 1996).

Food accessibility also takes into account how far one must travel to get food, how safe the environment was for accessing food, and whether it was possible to get to food using different modes of transportation. In general, services, goods, or gardens that were closer to recipients' homes and was better connected to infrastructure, influence mode of travel (Saelens, Sallis, & Frank, 2003).

According to the U.S. Department of Health and Human Services (2015, Chapter 3, section 2, para. 2), food insecurity was described as “a household-level economic and social condition of limited or uncertain access to adequate food.” Although food insecurity, the inability to meet basic food needs (Schattman, Berlin, Finch-Bochner, & Lawrence, 2015; Wolfe, Olson, Kendall, & Frongillo, 1996), remains inversely related to age, the older population has experienced heightened rates of food insecurity in recent years.

Between 2001 and 2012, the percentage of adults age 60 and older who were food insecure increased by 63% (Feeding America, 2014). Since the start of the recession in 2007, the percentage of seniors experiencing poverty (Whitley, 2013) and food insecurity rose by 40%. Although official measures suggested the recession ended in 2009, the consequences of this downturn were still apparent (Whitley, 2013) (Figure 1).

Insecurity on the Increase

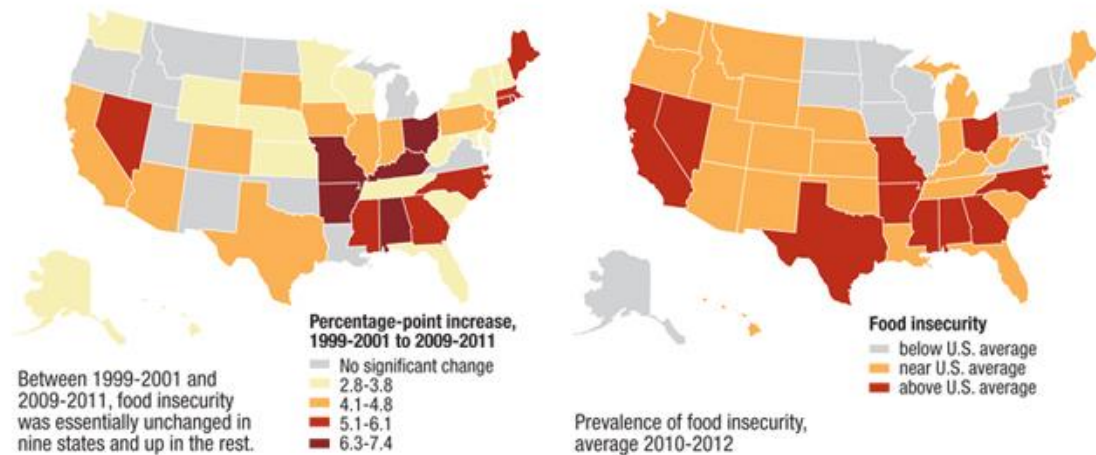


Figure 1. Percentage-point increase in U.S. food insecurity from 1999 to 2001 and 2009 to 2011. Adapted from Feeding America, 2014.

Food pricing also affect individuals' food intake patterns because healthful foods were reported to cost more than less nutrient-dense food, and price was a strong determinant of food choice (Fitzgerald & Spaccarotella, 2009). In the study by Schattman, Berlin, Finch-Bochner, & Lawrence (2015), many people were forced to choose between food and other basic necessities such as heat/air conditioning, transportation, or medicine.

According to the USDA (2018), *food security* for a household means access by all members at all times to enough food for an active, healthy life. Food security included at a minimum:

- The ready availability of nutritionally adequate and safe foods.

- Assured ability to acquire acceptable foods in socially acceptable ways (that is, without resorting to emergency food supplies, scavenging, stealing, or other coping strategies).

On the opposite end of the USDA (2018) definition, *food insecurity* was the limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways.

The USDA does not have a measure of hunger or the number of hungry people. Prior to 2006, USDA described households with very low food security as "food insecure with hunger" and characterized them as households in which one or more people were hungry at times during the year because they could not afford enough food. "Hunger" in that description referred to "the uneasy or painful sensation caused by lack of food." In 2006, USDA introduced the new description "very low food security" to replace "food insecurity with hunger," recognizing more explicitly that, although hunger is related to food insecurity, it is a different phenomenon (USDA, 2018).

Food insecurity was described by the USDA (2018) as a household-level economic and social condition of limited access to food, while hunger was an individual-level physiological condition that may result from food insecurity. Information about the incidence of hunger was of considerable interest and potential value for policy and program design. But providing precise and useful

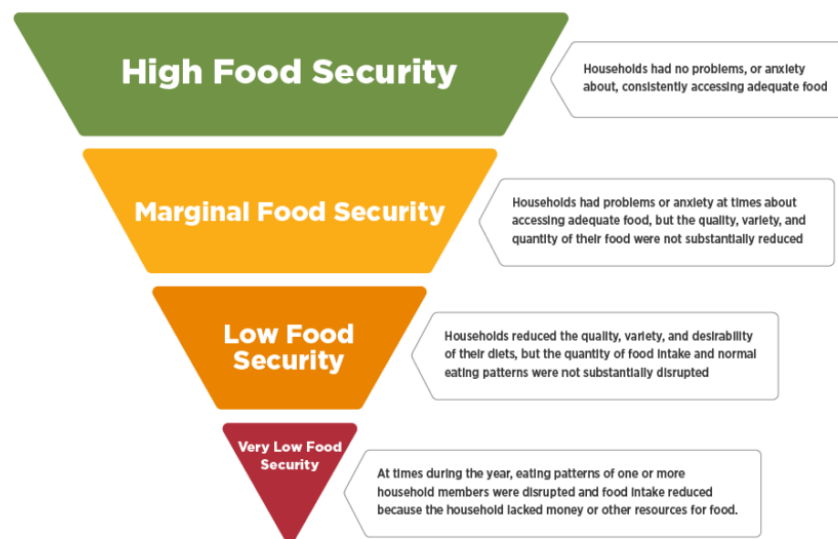
information about hunger was hampered by the lack of a consistent meaning of the word. "Hunger" was understood variously by different people to refer to conditions across a broad range of severity, from rather mild food insecurity to prolonged clinical undernutrition (USDA, 2018).

Validated methods have not yet been developed to measure resource-constrained hunger in this sense, in the context of U.S. conditions. Such measurement would require the collection of more detailed and extensive information on physiological experiences of individual household members than could be accomplished effectively in the context of USDA's annual household food security survey. USDA's measurement of food insecurity, then, provides some information about the economic and social contexts that may lead to hunger but does not assess the extent to which hunger actually ensues (USDA, 2018).

The USDA (2018) described the food security status of each household as lying somewhere along a continuum (Figure 2) extending from high food security to very low food security. This continuum was divided into four ranges, characterized as follows:

1. **High food security**—Households had no problems, or anxiety about, consistently accessing adequate food.

2. **Marginal food security**—Households had problems at times, or anxiety about, accessing adequate food, but the quality, variety, and quantity of their food intake were not substantially reduced.
3. **Low food security**—Households reduced the quality, variety, and desirability of their diets, but the quantity of food intake and normal eating patterns were not substantially disrupted.
4. **Very low food security**—At times during the year, eating patterns of one or more household members were disrupted and food intake reduced because the household lacked money and other resources for food.



Source: Adapted from the USDA Economic Research Service.

Figure 2. Definitions of food insecurity and security. Adapted from Feeding America, 2014.

For most reporting purposes, USDA (2018) described households with high or marginal food security as food secure and those with low or very low food security as food insecure. Placement on this continuum was determined by the household's responses to a series of questions about behaviors and experiences associated with difficulty in meeting food needs. The following questions covered a wide range of severity of food insecurity.

- **Least severe:** Was this statement often, sometimes, or never true for you in the last 12 months? "We worried whether our food would run out before we got money to buy more."
- **Somewhat more severe:** Was this statement often, sometimes, or never true for you in the last 12 months? "We couldn't afford to eat balanced meals."
- **Midrange severity:** In the last 12 months, did you ever cut the size of your meals or skip meals because there wasn't enough money for food?
- **Most severe:** In the last 12 months, did you ever not eat for a whole day because there wasn't enough money for food?

Every question identified the period (last 12 months) and specified lack of resources as the reason for the behavior or experience ("we couldn't afford more food," "there was not enough money for food") (USDA, 2018).

Households that reported three or more conditions that indicated food insecurity were classified as "food insecure." In other words, they were at times unable to acquire adequate food for one or more household members because they had insufficient money and other resources for food. The three least severe conditions that would result in a household being classified as food insecure were:

- They worried whether their food would run out before they got money to buy more.
- The food they bought didn't last, and they didn't have money to get more.
- They couldn't afford to eat balanced meals.

Households were also classified as food insecure if they reported any combination of three or more conditions, including any more severe conditions.

Households having "very low food security" were food insecure to the extent that eating patterns of one or more household members were disrupted and their food intake reduced, at least some time during the year, because they could not afford enough food. To be classified as having "very low food security," households with no children present must have reported at least the three conditions listed above and also that:

- Adults ate less than they felt they should.

- Adults cut the size of meals or skipped meals and did so in three or more months.

USDA's (2018) food security statistics were based on a national food security survey conducted as an annual supplement to the monthly Current Population Survey (CPS). The CPS is a nationally representative survey conducted by the Census Bureau for the Bureau of Labor Statistics. The CPS provides data for the Nation's monthly unemployment statistics and annual income and poverty statistics. In December of each year, after completing the labor force interview, about 45,000 households responded to the food security questions and to inquiries about food spending and about the use of Federal and community food assistance programs. The households interviewed in the CPS were selected to be representative of all civilian households at state and national levels (USDA, 2018).

Accurately measuring food security was difficult. Households with limited financial resources were more likely to struggle with food insecurity than households that were more affluent, but using income or poverty to access security was an inaccurate way to assess food security. For example, many households that were not in poverty were still food insecure (Rose, 1999). Measures of poverty do not incorporate access to food or the price of food. Even the USDA relies on self-reported data in their food security survey assessment.

Food Deserts. Community food security approaches were necessary for cities and nations to adequately address an inherent right to food. As agriculture industrialized, the distance between producers and consumers widened – and thus, access to local food decreased (Allen, 1999). In food deserts where most often low income populations have reduced fresh food options, community gardening was a viable option as a community food security approach because community food security prioritizes “the needs of low income people” (Allen, 1999). McCullum, Desjardines, Kraak, Ladipo, and Costello (2005) discussed evidence-based strategies for communities to utilize in reducing food insecurity; within their research they cited community gardens as catalysts for institutionalized policy changes that adequately address community food security.

According to Morton and Blanchard (2007), food insecurity was most often linked with poverty, yet increasing amounts of research were connecting food insecurity with a person’s inability to access grocery stores. The term ‘food desert’ has been given to these areas where most residents struggle to access grocery stores. Though the definition or even existence of food deserts was still largely debated, there were communities in both rural and urban America that struggle to physically and economically access supermarkets (Mead, 2008; Shaw, 2006; Cummins & Macintyre, 2002). Food desert residents, like those that were food insecure, were less likely to have adequate amounts of fresh fruits and

vegetables as well as dairy and protein in their diet putting them at risk for serious health issues (e.g. obesity, diabetes and high blood pressure) (Morton & Blanchard, 2007). Research in Schafft, Jensen, and Hinrichs 2009 study reflected that areas which were considered food deserts were often lower income neighborhoods where grocery stores have found it no longer profitable to operate. Once grocery stores were not readily accessible, residents were required to travel several miles to grocery stores in more affluent neighborhoods to purchase healthy foods, like fresh fruits and vegetables. Traveling this distance was often physically and economically undesirable because residents may not have their own vehicle or the extra income to purchase the additional gas and pricey fresh produce. This leaves food desert residents constrained to purchase processed, pre-made, generally unhealthy foods from fast food restaurants and convenience stores that still operate in their area (Schafft, Jensen & Hinrichs, 2009).

Anti-Hunger Concepts. Because measuring food security was difficult, rather than create policies that allow for alternative agricultural economies, policymakers tended to put more effort into programs that alleviated hunger including charities and volunteerism (Allen, 1999). Such policies and actions often did not improve food security; because people must be able to obtain enough nutrition from their diet without the assistance of non-emergency sources in order to be truly food secure (Meenar & Hoover, 2012).

Contrary to their originally-intended purpose, hunger relief efforts such as food banks tend to serve chronic cases of hunger rather than providing short-term help to individuals and families. People who use food pantries generally have trouble feeding their family and lack enough resources to consistently have access to food (Daponte, Lewis, Sanders & Taylor, 1998; Nord, Coleman-Jensen, Andrews, & Carlson, 2009). Food pantries were adequate anti-hunger strategies, but may not help increase food security for those who use them.

Anti-hunger movements and community food security movements differ in both theory and methodology (Table 1). Anti-hunger movements seek to immediately address hunger, using whatever appropriate and available means were necessary. Those who participate in community food security movements take a longer-term approach, address underlying economic, social, and environmental determinates to hunger, and develop comprehensive strategies to involve the broader community in effective programs and policies that were location specific (Winne, Joseph & Fisher, 1997).

Table 1

Comparison of Various Aspects of Both Anti-hunger Concepts and Community Food Security Concepts (adapted from Winne, Joseph, & Fisher (1997))

	Anti-Hunger Concepts	Community Food Security Concepts
Model	Treatment, Social Welfare	Prevention, Community Development
Unit of Analysis	Individual/Household	Community
Time Frame	Short Term	Long Term
Goals	Reduce Societal Costs, Individual Health, Social Equity	Build Community Resources, Individual Empowerment
Conduit System	Emergency Food, Federal Food Programs	Marketplace, Self-Production, Local/Regional Food
Actors	USDA, HHS, Social Services Agencies, Charitable Institutions	Community Organizations, Multi-Sector Partnerships
Agriculture Relationship	Commodities	Support Local Agriculture
Policy	Sustain Food Resources	Community Planning

According to Bellows and Hamm (2002), communities were beginning to recognize the danger of relying on anti-hunger programs that receive federal assistance because the programs lack predictable funding and in no way address food accessibility. As a result, food security activists promoted greater self-reliance and have begun to rethink food production and consumption patterns. Community food security strategists tend to lean more towards “autonomous” food security that would phase out emergency hunger response mechanisms (Bellows & Hamm, 2002).

An Aging Population. According to Feeding America (2014), the U.S. population is experiencing substantial changes to its size and composition. Overall, it is expected to grow from 319 million in 2014 to nearly 400 million by 2050. With fertility rates declining, the cause of such growth will be attributable largely to longer life expectancies and an aging Baby Boomer population. During the next two decades, approximately 10,000 individuals will turn 65 each day. By 2050, the population age 65 and older is expected to reach 84 million, almost doubling from its current size. During that time, the proportion that this older population represents is also expected to grow, representing more than 20% of the total population by 2050, compared to approximately 15% in 2014 (U.S. Census Bureau, 2011) (Figure 3).

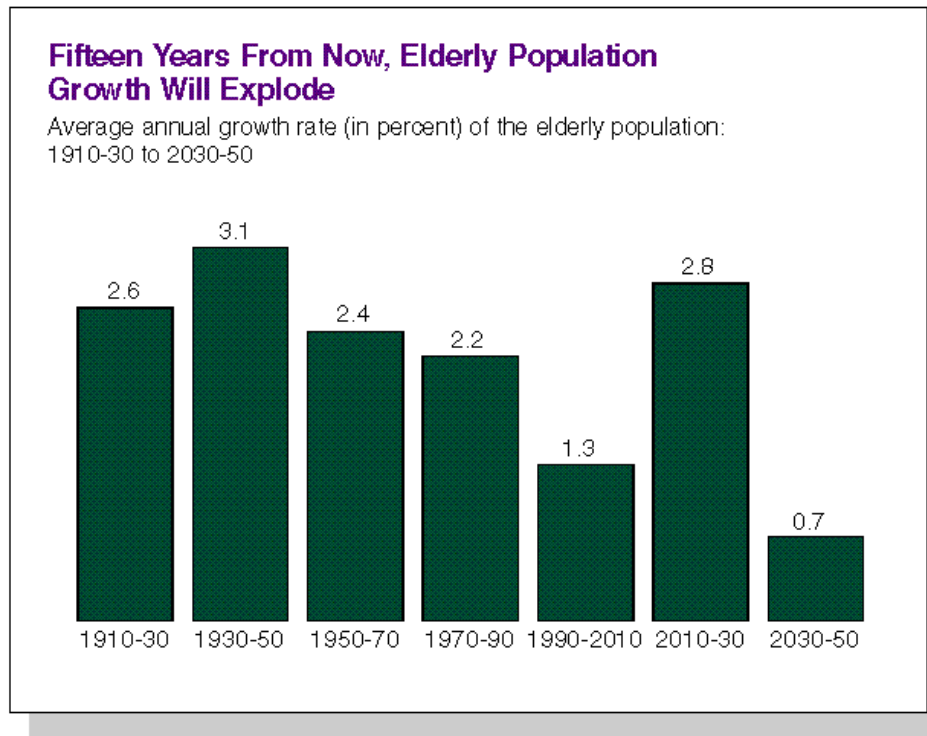


Figure 3. Bar graph of the elderly population growth from 1910 to 2050. Adapted from “Sixty-five plus in the United States,” by U.S. Census Bureau, 2011.

The average life expectancy of persons who have reached age 65 years has increased by an additional 19.1 years (Brewer, Dickens, Humphrey & Stephenson, 2016). This growing cohort faced many challenges such as increased health issues, limited earning potential and heightened nutrition needs (Feeding America, 2014). The generation entering older adulthood was one that welcomed fast food and meal replacement foods allowing them to adapt to a more sedentary lifestyle and to need preventative health programs (Sommerfeld, McFarland, Waliczek & Zajicek, 2010).

Environmental barriers, geographic isolation, lower income, and lower education levels were common to the rural elderly and may compromise health. Limited access to a nutritious diet or a diet of poor quality has the potential for inadequate energy and essential nutrient intake leading to malnutrition and dehydration and may be a factor in the development of a number of chronic and debilitating diseases (Gerritor & Crocoll, 2008). As seniors experienced economic distress and hunger, the ones who were poor looked to community programs such as food pantries for additional and needed services (Whitley, 2012).

In addition, a sedentary lifestyle was a significant health risk to aging individuals. Regular physical activity was associated with many physical and mental health benefits, but older people were often discouraged from doing physical activity, and regular leisure physical activity decreases with advancing age. Poorer adults were less likely to engage in physical activity than those with higher incomes. Also, older rural residents, especially women, faced a number of barriers to being physically active, including lack of family support, the fear of injury, caregiving duties, and unsafe or isolated physical environments (Gerritor & Crocoll, 2008).

A relatively new study conducted by Andre et al. (2017) identified the need for additional research on the extent dietary choices correlated with quality of life and survival. While aging earlier has been described as a process of progressive and irreversible biological changes resulting in an increased risk of chronic

diseases and cognitive and functional impairment, there has been a shift in focus towards older adults' own resources and their own ability to impact and improve their quality of life. As people age, their food and energy intake tended to decrease, but not for physiological and practical reasons. They do not feel as hungry as when they were younger and food preparation becomes a hassle. This may be a potential health risk because, although food intake was reduced with aging, the need for most nutrients was not reduced (Andre et al., 2017).

United States and Texas Seniors Feel the Effects. According to Ziliak and Gundersen (2015), seniors in the United States continue to face increasing challenges despite the end of the Great Recession. Specifically, their findings in 2013 concluded the following:

- 15.5% of seniors face the threat of hunger, 8.7% face the risk of hunger, and 3.3% were facing hunger.
- Those living in the states in the South and Southwest, those who were racial or ethnic minorities, those with lower incomes, and those who are younger (ages 60-69) were most likely to be food insecure.
- Out of those seniors who face the threat of hunger, the majority has incomes above the poverty line and were white.
- From 2001 to 2013, the fraction of seniors experiencing the threat of hunger, the risk of hunger, and hunger has increased by 45%, 66%, and 133%, respectively. The number of seniors in each group rose

106%, 136%, and 232% which also reflects the growing population of seniors.

- Since the onset of recession in 2007 until 2013, the number of seniors experiencing the threat of hunger, the risk of hunger, and hunger has increased by 56%, 68%, and 63%, respectively.

Wagner (2016) sums the report by Ziliak and Gundersen (2015) by stating that nationally, one in six seniors over age 60 were threatened by hunger. In addition, 20.26% of seniors in Texas were ranked at threat of hunger, 13.05% at risk for hunger, and 4.43% were actually facing hunger. Texas ranks 5th in the nation of the percentage of seniors facing the threat of hunger; 4th for risk of hunger, and 7th for seniors facing hunger by state.

Impact on Rural Communities. The aging of America is a major public concern and has far reaching implications for the nation and for rural communities. With one-quarter of Americans living in rural settings (Towne, Smith, Pulczynski, Lee & Ory, 2015), rural communities generally have a higher proportion of older persons in their total population than urban areas. This is largely due to aging-in-place, out-migration of young adults, and in-migration of older persons from metro areas and other regions of the world. Younger residents frequently leave rural settings after high school, a trend referred to as the rural “brain drain” (Whitley, 2012). Additionally, older Americans living in these communities face a greater likelihood of poverty and food insecurity,

geographic isolation, inadequate housing, transportation issues, increasing food prices (Whitley, 2012) and often inaccessible or costly health and social services (Gerrior & Crocoll, 2008).

Rural, low-income families and aging-in-place seniors experience the food environment differently than those living in high-population-density urban and suburban places. Although food is abundant in the U.S., as indicated by escalating obesity rates and increasing diabetes diagnoses, uneven food distribution and access differ depending on where you live and who you were (Smith & Morton, 2009).

In rural populations, where distance and transportation were critical factors, this especially hits hard for the poor, disabled, or elderly (Sharkey, 2009). In contrast, older adults living in rural areas of the U.S. faced unique challenges in accessing fruits and vegetables. If unable to drive, rural elders have limited transportation options to food stores, and greater distance to such stores has been found to result in lower fruit and vegetable intake among rural elders. Further, government programs that provide food to older adults (such as Meals on Wheels) have less reach in some rural areas due to lower tax bases and demanding transportation requirements for community volunteers. Therefore, older adults living in urban and rural settings confront unique, and different, barriers to fruit and vegetable consumption.

In addition, Nord (2003) stated that food insecurity was known to be associated with poor nutrition and health outcomes for senior adults, and age aggravated the negative effects of poor nutrition on the elderly. Risks were especially high for senior adults, particularly if they had existing health problems that may make it difficult to purchase, prepare, and eat nutritious foods (Nord & Kantor, 2006). A study of older (age 65-93) rural adults reported that most failed to meet the recommended nutrition guidelines based on the food guide pyramid (Towne, Smith, Pulczynski, Lee & Ory, 2015). Another study of older rural adults identified high levels of obesity and overweight among participants, and most of these adults had inadequate dietary intake and were at nutritional risk (Lutfiyya, 2012). Results from a nationally representative study confirmed these findings in that older rural adults failed to meet recommendations for daily fruit and vegetable consumption (Towne, Smith, Pulczynski, Lee & Ory, 2015). Lastly, non-farm rural elderly account for the majority of rural elderly and suffer from a disproportionate number of chronic health conditions and health problems and have more restrictions on their lives than any other group of older people (Gerrion & Crocoll, 2008).

Despite the importance of physical activity and healthy eating for successful aging, rural residents were less likely to engage in these health promoting behaviors. Rural older adults have been shown to be less likely to meet the recommended physical activity guidelines when compared to their

urban peers. Furthermore, rural minority elders may have limited physical activity, and a large proportion may not engage in any physical activity at all. Rural adult females (aged 40 and older) were more likely to be sedentary than their urban counter parts according to Towne, Smith, Pulczinski, Lee and Ory (2015).

Social Isolation and Food Insecurity. Social integration or connections to and involvement with community organizations and leadership were important (Whitley, 2012), not only to food security, but also overall satisfaction with living in a particular community. Not all community members have the ability to fit into the close rural community relationship, and this affects household food security negatively. Membership in a rural community often develops over time. New members were seldom invited into the community's inner circle initially (Whitley, 2012). In a study of independently living older adults aged 60 to 94 years it was reported that when living situations produced social isolation and perceived loneliness, dietary adequacy was negatively related to degree of loneliness. Social isolation may be a major contributor to emotional depression; this can result in deterioration of health, accelerated by decreased interest in food, which eventually results in loss of ability to manage self-care (Kronl, Coleman & Lau, 2008).

Research that has examined the social correlates of fruit and vegetable intake among older adults generally agrees that social isolation was a strong risk

factor for fruit and vegetable intake, and social interaction and support were associated with higher levels of fruit and vegetable intake, with some exceptions (Nicklett & Kadell, 2013). The benefits of social engagement on fruit and vegetable intake were multifactorial; socialization and companionship were key predictors particularly since many social gatherings involve food. Social interaction itself provides a motivation for older adults to go to congregate eating sites for meals. Older adults with functional limitations experience restricted life-space, which is associated with nutritional risk. As social support and social interaction were strong predictors of fruit and vegetable intake, further research should examine the specific kinds of support that protect against inadequate intake in older adulthood, and how this varies by race/ethnicity, functional status, and gender (Nicklett & Kadell, 2013).

When food resources, income, and transportation were limited, community food assistance and emergency food programs, or the food system safety net, have the potential to moderate some of the stress associated with food insecurity. However, communities differ considerably in their provision of food resources to their citizens (Smith & Morton, 2009).

Bridging the Gap: Community Gardens and Senior Adult Nutrition. It was important to research community gardening in Texas, but it was especially important to research community gardens' effect on food insecurity in senior adults. In the past, home-delivered meals services for senior adults were

provided on the assumption that the warm meals, as well as contact with the meal deliverer, might improve the quality of the recipients' lives. A sense of need to alleviate distress and the food insecurity of the disabled was voiced in the 1960s and the early 1970s at the time when the federal home-delivered meals program came into being. Estimates of need for meal services have been based on demographic data including the percentage of the population over 65 years of age and living alone, or the percentage of elderly discharged from the hospital with disabilities that could interfere with their ability to obtain or prepare food (Roe, 1999).

Very seldom, however, has any attempt been made to measure the prevalence of hunger among senior adults with disabilities that were likely to reduce their ability to get their own food. Further, there has been very little effort expended in examining the prevalence of malnutrition in this population or to make estimates of the prevalence of uncontrolled chronic diseases for which control could be provided by therapeutic diets. Thus, the major goal of providing meals for the frail senior adults has been to satisfy a vague type of compassion for those who cannot fend for themselves or a priority for home-delivered meals has alternately been based on an ill-defined assessment of nutritional risk. The major assumption has been made that by providing hot meals to seniors in their homes, the quality of their diets would automatically be improved and that by

giving the frail elderly access to better food, they would become less depressed (Roe, 1999).

Nutritional and Quality of Life Needs of Senior Adults Examined

According to Nicklett and Kadell (2013), there was a consensus among researchers and the general public that eating fruits and vegetables leads to life-long health benefits. They went on to state that improved population nutrition was one of the key factors underlying increased longevity in the past century. Fruits and vegetables were often identified in this study as the most important part of a diet in preventing age-related disease. Throughout decades of nutritional guideline transitions from food groups to pyramids to plates, fruits and vegetables have maintained a prominent place in the daily nutritional guidelines set by departments and ministries of health worldwide. Because of the recognized health benefits of eating fruits and vegetables, there were widespread policy and program initiatives to increase the availability were consumption of these foods, particularly among children. The older adult population, however, had unique nutritional needs and barriers (Nicklett & Kadell, 2013).

Nutritional Needs. In a 2009 study by Sharkey, the author stated that the consumption of nutritious foods was essential to achieve and maintain good health, and to prevent and manage nutrition-related health conditions such as obesity, type 2-diabetes, and cardiovascular disease. Sharkey goes on to state, that it is generally accepted that personal, structural, and neighborhood

characteristics serve as barriers or enhancements to healthful eating, in particular, recognition has grown that in order for individuals to make health-promoting food choices, low-calorie, nutrient-dense food resources need to be accessible, available, and affordable.

As a primary prevention strategy, nutrition helps to promote health and functionality; millions of older Americans would benefit from nutritional services if they were broadly available (Kronl, Coleman & Lau, 2008). Independent-living older adults vary in nutritional status and functional abilities; however, age was associated with increasing functional limitations, specifically in preparing meals and shopping, which may account for decreased nutritional status according to Kronl, Coleman, and Lau (2008). Adequate nutrition is essential for maintaining good health, improving weight (Radcliff, Kash, Ferdinand & Schulze, 2015), mitigating existing health problems, and maintaining optimal functional independence. Thus, improving the nutritional status and functional independence of older adults was an important element in promoting well-being (Coulston, Craig & Voss, 1996).

Most research studies offer support that a positive relationship exists between fruit and vegetable intake and health outcomes across the lifespan, including the prevention and management of chronic illnesses, disease-specific mortality, and general mortality. However, the extent to which eating fruit and vegetables in old age was associated with these health benefits has received

much less attention (Nicklett & Kadell, 2013). The majority of studies on the health benefits of fruits and vegetables were cross-sectional or do not include older adults in the sample. According to Nicklett and Kadell (2013), older adults have unique social and health circumstances and more research is needed in this area generally to provide necessary evidence for lifestyle-based interventions among older adults. In addition, this study points out that older adults were at heightened risk of functional limitations, disability, and chronic disease onset and complications. While fruit and vegetable intake protects against the development and exacerbation of these conditions, ironically, being affected by these conditions makes accessibility, preparation, and consumption of these important nutrients problematic. Old age was often accompanied by changes in appetite, and compromised oral health could reduce fruit and vegetable intake. Appetite loss was influenced by changes in perception of hunger, taste acuity, and sense of smell, concern about digestive problems, diminished pleasure associated with food, and everyday emotions. This study also reflected that at times, older adults suffered from gum disease, tooth loss, decay, and mouth infections and this compromised oral and dental health was associated with decreased consumption of fruits and vegetables. Another point in this study found that older adults typically ate fruit and vegetables in their whole form, and textures of these foods can become difficult to bite, chew, swallow, and prepare, particularly among older adults who were missing

posterior teeth and/or have dentures. In sum, older adults were particularly affected by certain physiological changes related to appetite and oral health, which in turn influenced nutrient intake (Nicklett & Kadell, 2013).

Another aspect of this study by Nicklett and Kadell (2013) addressed older adults who had functional limitations and disabilities confronted unique barriers in acquiring, preparing, and consuming foods. Mobility-impaired older adults, in particular, confronted challenges in accessing fresh fruits and vegetables, and home-bound older adults who must rely on home-delivered meals or other assistance were particularly vulnerable to under-nutrition. Physical health decline was typically accompanied by a subsequent deterioration in dietary quality. This association was explained by reduced access to fruits and vegetables as well as more difficulty in preparing and eating nutrient-rich foods. For example, older adults with severe arthritis were confronted by challenges in the physical requirements of cooking as well as the effort required to take part in food-related social activities. One possible exception was that adults—young and old—tend to increase fruit and vegetable intake after diagnosis of cancer. Studies found that fruit and vegetable intake increased after diagnosis of breast, prostate, and colorectal cancer and that these diet changes were often due to personal beliefs and preferences (such as having control over that aspect of their lives) rather than in response to a doctor or other provider's recommendation (Nicklett & Kadell, 2013).

The 2015-2020 Dietary Guidelines for Americans recommends that adults over the age of 51 consume between 1.5 - 2.0 cups of fruits and 2.5 - 3.0 cups of vegetables each day. The guidelines also place an emphasis on consuming a variety of fruits and vegetables. However, despite these recommendations, the mean consumption of fruit and vegetables among adults nationwide is only 1.1 and 1.6 servings per day of fruit and vegetables, respectively (Brewer, Dickens, Humphrey & Stephenson, 2016). In addition, the Dietary Guidelines for Americans, U.S. Department of Health and Human Services (2015) reported that fruits, vegetables, and legumes (dry beans and peas) may reduce the risk of several chronic diseases. Compared to people who eat few fruits, vegetables, and legumes, people who eat higher amounts as part of a healthy diet were likely to have reduced risk of chronic diseases, including stroke and perhaps other cardiovascular diseases, type 2-diabetes, and cancers in certain parts of the body (mouth, throat, lung, esophagus, stomach, and colon-rectum). Based upon these guidelines, a healthy diet was described as one that:

- Emphasizes a variety of fruits, vegetables, whole grains, and fat-free or low-fat milk and milk products,
- Includes lean meats, poultry, fish, legumes, eggs, nuts, and seeds,
- Balances calorie intake with caloric needs, and
- Is low in saturated fats, trans-fats, cholesterol, salt (sodium), and added sugars.

In addition, according to these guidelines, it is reported that the fiber in fruits, vegetables, and legumes were important. Diets rich in fiber-containing foods may reduce the risk of heart disease. Fiber was also important for regularity. Since constipation may be a problem for older adults, it was important for seniors to consume foods rich in fiber. It should be noted that all fruits, vegetables, and legumes contain dietary fiber (Dietary Guidelines for Americans, U.S. Department of Health and Human Services, 2015). However, the dietary fiber of fruits and vegetables was reduced by peeling and juicing, therefore, it was recommended for adults to eat the whole fruit and cut up vegetables. Vegetables and fruit that were recommended by these guidelines and based upon high level of nutrients were as follows:

Sources of vitamin A (carotenoids)

- Bright orange vegetables such as carrots, sweet potatoes, and pumpkin.
- Tomatoes and tomato products (sauce, paste, and puree), and red sweet pepper.
- Leafy greens such as spinach, collards, turnip greens, kale, beet and mustard greens, green leaf lettuce, and romaine lettuce.
- Orange fruits like mango, cantaloupe, apricots, and red or pink grapefruit.

Sources of vitamin C

- Citrus fruits and juices, kiwi, strawberries, guava, papaya, and cantaloupe.
- Broccoli, peppers, tomatoes, cabbage (especially Chinese cabbage), Brussels sprouts, and potatoes.
- Leafy greens such as romaine lettuce, turnip greens, and spinach.

Sources of folate

- Cooked dry beans and peas.
- Oranges and orange juice.
- Deep green leaves like spinach and mustard greens.

Sources of potassium

- Baked white or sweet potatoes, cooked greens (such as spinach), and winter (orange) squash.
- Bananas, plantains, many dried fruits, oranges and orange juice, cantaloupe, and honeydew melons.
- Cooked dry beans.
- Soybeans (green and mature).
- Tomato products.
- Beet greens.

According to Bartholomew (2016), studies had shown that less than half of Americans were eating the USDA recommended minimum of five servings of

fruits and vegetables a day. In Bartholomew's book, *High-Value Veggies*, he has ranked vegetables, based upon their nutritional value, into the following top ten:

1. Broccoli – high in phytonutrients that detox the body, abundant vitamin A and K that can help with vitamin D synthesis, and a flavonoid that acts as an anti-inflammatory.
2. Kale – contains alpha-lipoic acid, which studies have shown to reduce glucose levels and improve other factors contributing to diabetic damage in the body. Rich in a range of vitamins, fiber, and minerals such as potassium.
3. Spinach – contains carotenoids that play a role in eye health and preventing macular degeneration. Preliminary research suggests that glycolipids found in spinach may protect the digestive tract lining and reduce inflammation.
4. Cabbage – red and green varieties contain compounds associated with preventing cancer, they also include some that have been shown to moderate the effects of radiation therapy. Anthocyanins in red cabbage have been linked to inflammation reduction and may play a role in fighting heart disease.
5. Collard Greens – this vegetable is a key source of vitamin K and supply impressive amounts of minerals including folate, thiamin, niacin, pantothenic acid, choline, phosphorus, and potassium.

6. Brussels Sprouts – this vegetable has some of the highest levels of cancer preventing glucosinolates.
7. Beet – these roots are high in cancer-preventing antioxidants. They also contain lutein, a compound that aids eye health.
8. Sugar Snap Peas – a fiber-rich food that delivers high amounts of vitamins C and A, valuable antioxidants. They also contain good amounts of iron and manganese.
9. Pepper – sweet bell peppers contain a large amount of vitamin C and fiber. Hot peppers have higher levels of capsaicin, a compound that has been linked to lowering cholesterol, helping control diabetes, and reducing inflammation of the body.
10. Squash (summer and winter) – both varieties of squash are excellent sources of fiber, contain immune system-boosting and anti-inflammatory compounds, and are rich in nutrients such as alpha- and beta-carotenes, which keep eyes healthy.

Changes in Health with Aging and the Nutrition Connection.

According to Nicklett and Kadell (2013), nutrition was recognized as one of the major determinants of successful aging, defined as the ability to maintain three key behaviors: low risk of disease and disease-related disability, high mental and physical function, and active engagement of life. Inadequate access to food leads to depleted health for disadvantaged groups of people including the elderly.

Furthermore, food insecurity has been connected to lower cognitive functioning. This shows that food insecurity was not just a minor or temporary problem and has far reaching implications for future mental and physical health (Nicklett & Kadell, 2013).

Nutrition was linked to the function and quality of life for older adults with chronic disease. Fruit and vegetable consumption during older adulthood was associated with reduced likelihood of chronic disease. A number of studies offer support to the linkage between fruit and vegetable intake during older adulthood and cardiovascular health. Nicklett and Kadell (2013) identified a number of studies that found dietary characteristics were protective against hypertension, coronary heart disease, atherosclerosis, and stroke among older adults. This research also suggested fruit and vegetable intake in older adulthood was protective against the development or exacerbation of several kinds of cancer for men and women.

Evidence also emerged from this study regarding the relationship between diet and osteoporosis. Numerous studies have linked vitamin D and calcium consumption to improved bone mineral density. Additional research suggests that a diet rich in magnesium, potassium, vitamin C, and vitamin K (acquired from consuming a variety of fruits and vegetables) may also aid in the prevention of bone loss in both sexes (Nicklett & Kadell, 2013).

Nicklelt and Kadell (2013) also suggested that fruit and vegetable intake in older adulthood could prevent against the onset or exacerbation of cognitive impairment, falls/walking disability, and other geriatric-associated conditions. In addition, their research has begun to examine the role of fruit and vegetable consumption in the aging brain. Emerging evidence from this study indicated that fruit and vegetable intake was protective against cognitive decline and related conditions. Several prospective studies found that participants who consume greater levels of fruits and vegetables scored higher on cognitive and neuropsychological evaluations and showed improvements in verbal fluency, memory, and rate of learning from such dietary changes. In addition, a Mediterranean-style diet that is rich in nuts, oils, fruits, and vegetables has also been shown to be predictive of good heart health and of cognitive benefit for risk reduction of Alzheimer's disease and dementia (Nicklelt & Kadell, 2013).

Older adults who maintain physical function and avoid falls were less likely to be hospitalized or institutionalized and may have reduced risk of injury and mortality. While this field of research has only recently begun to emerge, studies have suggested that fruit and vegetable intake protects against physical decline and associated disability. Higher serum carotenoid levels predict improved muscle strength and bone density among older adults. Fruit and vegetable consumption has also been found to improve physical function and walking

speed while reducing walking disability and frailty among elders (Nicklett & Kadell, 2013).

There was evidence that fruit and vegetable consumption could protect against the onset or progression of other geriatric conditions. This was demonstrated by the discovery of a moderate association with a decrease in cataracts for older women. Increased intake has also been connected to increased vaccination antibody response and may be a risk reduction factor for inflammation with specific regard to fruit and vegetable intake variety, rather than quantity (Nicklett & Kadell, 2013). Associated health outcomes of a diet rich in fruits and vegetables appear to be largely positive, though further research might be conducted to determine the effects of different fruit and vegetables on elders of various social and cultural backgrounds as a foundation for appropriate intervention strategies (Nicklett & Kadell, 2013).

Compared with younger adults, older adults tend to eat fewer high-energy sweets and fast food and eat more grains, fruit, and vegetables (Nicklett & Kadell, 2013). On average, older adults eat more servings of fruits and vegetables, which might be nutritionally necessary given the change in metabolic processes that occurs in old age. Although the majority of adults incorporate at least one serving of fruits and vegetables into their daily diet (85 and 95%, respectively), less than half of older adults eat the recommended five servings of fruit and vegetables per day (Bartholomew, 2006). Major studies have estimated

that only 21 to 37% of men and 29 to 45% of women aged 65 and older achieve the recommended servings per day (depending on the study methodology) (Nicklett & Kadell, 2013). Older adults (aged 65 and older) tend to score well on the Healthy Eating Index in consumption of total fruit (whole fruit in particular) and total vegetables, but have low scores in consumption of dark green and orange vegetables and legumes (Nicklett & Kadell, 2013). There were also noticeable differences by age among the older adult population as well; elders aged 75 and older were more likely to eat fruit, while elders aged 65-74 tended to eat more vegetables (Nicklett & Kadell, 2013). It is particularly important for older adults to be aware of fruit and vegetable consumption because they tend to eat smaller quantities of food overall, which can lead to deficiency of important vitamins and minerals (Nicklett & Kadell, 2013).

Previous research suggests that diet quality can be poor among food pantry clients. Nutrient intake would possibly improve for seniors if the home-delivered meals policy were structured to allow for more individualized meals or if the standards for nutrient intake were based on the elderly population's special requirements (Stevens, Grivetti, & McDonald, 1992). However, food banks and pantries face significant challenges in trying to meet the nutritional needs of food insecure populations. They find that a lack of refrigeration and storage space is one of the key factors that limit pantries' ability to stock healthy foods, including fresh produce.

Nutrition Education for Senior Adults. Nutrition education may be one way of helping to mitigate food insecurity. Food insecure populations face significant challenges for consistent nutrition education, due to the effects of poverty on food insecure households. These challenges include a lack of reliable transportation, transient housing situations, and difficulties accessing affordable, healthy foods. These issues may be exacerbated for food pantry clients, who report high levels of poverty and recent housing transitions. Existing nutrition education programs with food pantry clients report promising early results. These programs typically provide clients with nutrition education and recipes that they can make using their food pantry items. Materials have been delivered through various formats, including personalized newsletters and cooking demonstrations at food pantry sites. Results suggest that food pantry clients who receive nutrition and cooking education consume more fruits and vegetables than those who do not. Evidence suggests that nutrition education was a promising strategy for improving diet among food insecure populations.

Results from a study conducted by Hardison-Moody et al. (2015) suggested that food pantry clients and homebound elders receiving Meals on Wheels (Lauritzen & Windham, 1994) and nutrition and cooking education consumed more fruits and vegetables than those who do not. Also, this study suggested that nutrition education was a promising strategy for improving diet among food insecure populations.

Quality of Life Needs of Senior Adults. Increasingly, according to Drewnowski and Evans (2001), health was viewed as not only the absence of infirmity and disease but also as a state of physical, mental, and social well-being. Quality of life measures permit researchers to compare the status of different groups over time and assess the effectiveness of public health interventions and programs. However, many of the existing quality of life indexes do not directly address contribution of diet. Very few studies have explored the interrelationships among dietary measures in older adults or the nature of intervening variables. According to a study in 2001 by Amarantos, Martinez and Dwyer, quality of life was a concept with multiple dimensions that included the subjective sense of physical and/or mental well-being. In its broadest and most inclusive sense, it was sometimes referred to as “life satisfaction” (Table 2).

Table 2

Age-Associated Nutritional Changes That May Affect Quality of Life, Adapted from E. Amarantos, A. Martinez, and J. Dwyer, "Nutrition and Quality of Life in Older Adults," *Journals of Gerontology*, 2001, A(56A), 54-64.

Change (Source)	Possible Consequences
Changes in body composition	Decreased muscle mass, strength, and ability to perform ADLs Increased adipose tissue, obesity, and risk of associated degenerative disease (osteoarthritis, diabetes, and high blood pressure) Lower body water with greater risk of dehydration and alcohol intoxication
Diminished thirst mechanism and decreased body water	Increased susceptibility to dehydration
Age-related changes in nutrient needs	Deficiency (e.g., vitamin B12) or toxicity (e.g., vitamin A due to decreased clearance)
Changes in taste, vision, and smell	Decreased enjoyment of food
Broken bones, edentulous, or missing or false teeth	Limited food choices due to inability to prepare food consistency restrictions
Increased disease incidence	Changes in nutritional requirements or failing to satisfy may lead to increased incidence of disease, (increased DRI's for B6 and vitamin D, decreased independence, and dietary restrictions)
Increased use of over-the-counter or prescription drugs	Changes in appetite, nutrient requirements (e.g., increased requirements for vitamin B6 and vitamin D), and increase in possible drug-nutrient interactions
Social changes: loss of family, friends, etc.	Depression, decreased intake Loneliness and isolation
Decreased income	Increased food insecurity, insufficient access to food, and undernutrition

Notes: For more complete descriptions of these and related problems see Amarantos, E., Martinez, A., and Dwyer, J. ADLs = activities of daily living; DRI = dietary reference intakes.

Food and nutrition were essential components of “the good life.” Good food was a sensory and psychological pleasure in its own right. Meals may also add a sense of security, meaning, order and structure to a senior adult’s day; imbue that person with feelings of independence, control, and sense of mastery over his or her environment; and provide opportunities for making food choices. The positive psychological and social aspects of eating were important pleasures of life, which can persist into old age. They have potent contributions to well-being that must not be forgotten (Amarantos, Martinez & Dwyer, 2001).

U.S. Food Assistance Programs Reviewed

A variety of charitable-funded and government subsidized food assistance programs have been established in the U.S. to help senior adults either living in a food desert area, homebound or have limited resources meeting their daily nutritional needs. The Elderly Nutrition Program (ENP), within the Older Americans Act, was the largest program to coordinate nutrition services to older adults. Its original intent was to provide nutritionally sound meals and promote physical and social well-being. The Elderly Nutrition Program, authorized under Title III, Grants for State and Community Program on Aging, was intended to improve the dietary intake of participants and to offer participants opportunities to form new friendships and to create informal support networks. The legislative intent was to make community-based services available to older adults who may be at risk of losing their independence (Administration on Aging Facts, 2017).

The Elderly Nutrition Program provides for congregate and home-delivered meals. These meals and other nutrition services were provided in a variety of group settings, such as senior centers, faith-based settings, schools, as well as in the homes of homebound older adults. Meals served under the program must provide at least one-third of the recommended dietary allowances established by the Food and Nutrition Board of the Institute of Medicine of the National Academy of Sciences, as well as the Dietary Guidelines for Americans, issued by the Secretaries of Departments of Health and Human Services and Agriculture. In practice, the Elderly Nutrition Program's three million senior adult participants received an estimated 40 to 50 percent of required nutrients from meals provided by the program (Administration on Aging Facts, 2017).

Meals on Wheels Program. In the 1970s, the U.S. federally funded home-delivered meals program, Meals on Wheels, was implemented. In 1973, Congress first appropriated monies to establish the feeding program for the elderly on a national basis. Initially the program was directed toward provision of food to community senior adults, whether or not they were disabled. In the early years of the federal food assistance program, meals were provided at congregate meal sites for senior adults who were mobile enough to get there. It was not until 1977 that Congress approved funding of the home-delivered meals program under the Title III-C of the Older Americans Act. However, by the early 1980s it became clear that there were insufficient funds available from Title III-C funds to

provide meals to homebound elderly in the community. This was the major reason why certain state legislators made the decision to provide state moneys that could be used to provide meals to those who could not be served by the federal program (Roe, 1999).

Today, the Home-Delivered Nutrition Services program of the Older Americans Act authorizes meals and related nutrition services for older individuals who were homebound. Home-delivered meals were often the first in-home service that an older adult receives, and the program was a primary access point for other home and community-based services. Recent data from the National Survey of Older Americans Act Participants (2017) illustrates how the Home-Delivered Nutrition programs were effectively targeting services:

- 69% of individuals served by this program were 75 years or older;
- The average age of a participant was 79 years old;
- More than 60% of participants indicated that the single home-delivered meal provides one-half or more of their total food for the day;
- 91% of participants indicated that the Home-Delivered Nutrition program helps them to stay in their own home; and
- More than half of all participants lived alone.

This program provided more than food. It provided a wholesome meal plus a safety check, and sometimes that only opportunity for face-to-face contact or conversation that day (Older Americans Act Section 336).

In 1984, a study was carried out by the Texas Department of Aging in response to a request by the Texas Senate Interim Committee on Hunger to determine both the extent of hunger and the geography number among the frail elderly living in different areas of the state. Findings were that dependence on the community meal was greater among the homebound than among those obtaining meals at congregate sites, greater in areas of poverty, and greatest among those in minority groups (Roe, 1999).

In 2004, Moran estimated that 7% of U.S. adults 60 years of age and older received home-delivered meals. In comparison with all adults in this age group, recipients were less likely to have completed high school, and more likely to be members of minority groups, to live below the poverty line, and to perceive their health to be fair or poor. The food services provided to older adults (such as Meals on Wheels) rely on community members and local volunteers. However, there was inadequate funding for such programs, as less than 10% of older adults at nutritional risk participate in the Elderly Nutrition Program (Nicklett & Kadell, 2013).

Congregate Nutrition Sites. The Congregate Nutrition Services section of the Older Americans Act (OAA) authorizes meals and related nutrition services

in congregate settings, which help to keep older Americans healthy and prevent the need for more costly medical interventions. In addition to serving healthy meals, the program presents opportunities for social engagement, information on healthy aging, and meaningful volunteer roles, all of which contribute to an older individual's overall health and well-being. The Congregate Nutrition program serves individuals age 60 and over, and in some cases, their caregivers, spouses, and/or person with disabilities. Services were targeted to those in greatest social and economic need with particular attention to:

- Low income individuals,
- Minority individuals,
- Older individuals in rural communities,
- Older individuals with limited English proficiency, and
- Older individuals at risk of institutional care.

Recent data from the National Survey of Older Americans Act Participants (2017) illustrated that Congregate Nutrition programs were effectively targeting their services, as evidenced by:

- More than half of participants were 75 years or older;
- The average age of a participant were 76 years old;
- 58% of participants indicated that one congregate meal provides one-half or more of their total food for the day;

- 77% of participants indicated that they eat healthier as a result of the meal programs; and
- 76% of participants indicated their health had improved as a result of eating at the lunch program (Administration on Aging, 2017).

Food Banks and Pantries. According to 7 USCS 7501 (Title 7, Agriculture; Chapter 102, Emergency Food Assistance), the term *food pantry* was defined as a public or private nonprofit organization that distributes food to low-income and unemployed households, including food from sources other than the Department of Agriculture, to relieve situations of emergency and distress.

Food provided for distribution to needy individuals in a community was typically received from a food bank. A food bank was defined as a non-profit organization that collects and distributes food to hunger relief charities and organizations. Food banks were typically operated out of large warehouses where they solicit, store and distribute millions of pounds of food. Most food housed in a food bank come from various sources in the food industry; including grocery stores and wholesalers that have thousands of pounds of food that need to be given away. Mislabeled, overproduced, test market items and products with short code dates were only a few of the reasons why these companies need to give the food away. Food banks also received salvageable products which were items such as dented cans and crumbled boxes that grocery stores tended to push aside.

After food has been collected at a food bank, it was sorted and distributed to non-profit organizations such as food pantries, soup kitchens, homeless shelters, senior care and emergency relief programs. All organizations must have a 501(c)(3) status from the Internal Revenue Service (IRS) to be eligible to become a partnering agency and receive food from a local food bank. The IRS defined a non-profit group as one that raises funds for charitable reasons without its directors and stockholders gaining any private income. Furthermore, the local organizations cannot charge the individuals for the food that is handed out or served.

A food pantry provides food directly to those in need. These facilities receive, buy, store and distribute food to low-income individuals in their community. Large amounts of food that were received by food pantries come from food banks only after they become an agency member. Once the food pantry receives its supply of food, it is then turned into nutritious, balanced meals that were then distributed to individuals and families at no cost. Unlike food banks, food pantries were typically operated out of churches or buildings that have adequate amount of freezers, refrigerators, and shelving to store food. Food banks would then monitor these agencies on a regular basis to assure that food was handled in a safe and sanitary manner.

A study was conducted in 2015 by Hardison-Moody et al. in which interviews were conducted with pantry directors to discuss the types of foods

they offered to clients, where they obtained these foods, and the challenges they faced in feeding food insecure populations in their communities to better understand the needs of senior adults receiving food assistance. Information from this study indicated that these challenges were very real and dynamic, changing with the audience, needs of the individual and demographics of the site.

Private and Community-Based Organizations. Private and community-based organizations have long recognized the benefit of providing locally available fruits and vegetables, particularly to socially disadvantaged populations. Increasingly, community-based approaches have been promoted to link locally grown food to segments of the population at risk of under-nutrition. The integration of community-based approaches with federal funding mechanisms can improve fruit and vegetable access and intake among older adults. Successful approaches include promoting the Supplemental Nutrition Assistance Program (SNAP) benefit use in farmers' markets and developing programs to promote Meals on Wheels delivery through drivers' education programs. Unfortunately, relatively few programs that aim to enhance the availability of fruits and vegetables were prospectively evaluated. Even fewer community-driven programs that specifically target seniors have been adequately evaluated. It is important for practitioners and researchers to engage in the evaluation process of promoting innovative strategies to meet the fruit and vegetable needs of

seniors alongside community-initiated strategies. Such strategies will enhance the evidence base and will assist stakeholders in promoting policies that promote fruit and vegetable access and intake among older adults (Nicklett & Kadell, 2013).

Community Gardens

Defining Community Gardens. Existing research from Birky (2009) suggested that community gardens in the U.S. have the potential to enhance the quality of life of all participants. Subsequently, community gardens could possibly result in a more resilient and food secure city through the direct integration of food production and food consumption. Because of the current awareness of environmental and sustainability issues that have begun to permeate American culture, it is no wonder that many new ideas have sprung forth and old, once mostly forgotten or unused, practices have been uncovered and revitalized. One such practice that has come back because of many new processes was that of community gardening within municipalities of all sizes. Although local farms, community supported agriculture, community gardens, etc. had never disappeared completely from the U.S. landscape since their last zenith in the mid-1940s; the frequency with which they were formed and sustained has been growing at a steady rate since the early 1970s. Research of community gardens and their effects on health and community has focused primarily on Northern and Midwestern states (Draper & Freedman, 2010). Researchers have

also examined community gardens in New York, where the popularity of community gardens began and has been a part of political discussion (Draper & Freedman, 2010). Research on community gardens in the south was minimal, including Texas, in which few studies have been conducted. The majority of Texas community gardens were able to operate year around with two different growing seasons (cool and warm seasons), while in the north, winter months were too cold for this type of seasonal gardening. Therefore, it was important to include Texas in community garden literature and research.

Before embarking on a discussion of community gardens and their place in history and culture, however, it is necessary to define what a community garden is within the context of this paper. The American Community Garden Association (ACGA) believes that a community garden can be urban, suburban, or rural. It can grow flowers, vegetables or community. It can be one community plot, or can be many individual plots. It can be at a school, hospital, or in a neighborhood. It can also be a series of plots dedicated to 'urban agriculture' where the produce is grown for a market (ACGA, 2008). What is obtained from this definition is that community gardens can take on any number of sizes, styles, locations and can be used for many different purposes.

Perceptions of Community Gardens. Throughout the history of the U.S. movements, many forms of community gardens have often been looked at as undesirable landforms necessary only in times of great disturbance or social

need; they were the refuge of only the poor, homeless and unemployed (Burchardt, 2002). These gardens have many times been a common reaction to a societal feeling of panic or desperation when it was believed that life within the city, or the nation, was being threatened (Burchardt, 2002). Yet once the war was over or the unemployment rate decreases, the “normal” faces of urban design took over and the gardens were once again lost until the next disaster arose (Burchardt, 2002). This pattern can be recognized by realizing that each spike of public or governmental interest in community or allotment gardens within the U.S. generally follows a crisis period (Burchardt, 2002). Although easily comparable quantitative data for each one of these spikes was not available, studies do suggest that as public and governmental interest in community and allotment gardening increases, so does the number of gardens (Burchardt, 2002; Lawson 2005; ACGA, 1998).

U.S. Community Garden History. Given this information, the histories of the U.S. and further anecdotal evidence, it can be concluded that there have been approximately eight major crises and seven major spikes (Birky, 2009). These crises and spikes included – reaction to poor conditions and unemployment in the 1890s; reaction to World War I; reaction to the great depression; reaction to World War II; and reaction to marginalization, oil shortages and environmental hazards in the 1970s spikes (Birky, 2009). The current movement has been steadily growing since the 1970s (ACGA, 1998) with

slight reductions during the 1980s due to pulled government funding and support (ACGA, 1984).

Another important aspect of the historical views concerning community gardens that directly influence current perspectives, were the beliefs that gardens were not desirable urban landscapes and that they connote poverty and desperation. Many historians explained that in 19th century England, allotment gardens were seen as functional but very visually displeasing, and therefore best kept hidden or at least not actively represented (Crouch, 2000). These gardens were viewed as a necessity of poor rural culture and thus, had no place within urban “working” environment (even though the conditions and wages within that working environment were far from satisfactory). Even at the height of the allotment movement, a majority of the 300,000 allotment gardens across the country were primarily in poor rural areas (Burchardt, 2002).

This sort of value structure can also be seen during the decline of the second English allotment movement. In this period of time it was shown that the central metropolitan areas were of more concern than those of the surrounding periphery, which contained many of the gardens, by the shift of government focus from allotments to urban housing (Burchardt, 2002). This shift once again shows the engrained values which represent typical urban areas with housing projects and industrialized businesses as being more valuable than the surrounding rural areas with gardens and agriculture. It is also an example of

the stark division that Victorian society placed between the city and any form of agriculture. It is important to note, however, that those who took part in the allotment garden movement of the mid 1800s, and those who worked near them, did not view these landforms as undesirable or aesthetically displeasing. Those who worked within the garden viewed them as a source of livelihood and thus, as a welcomed space (Burchardt, 2002). Yet, these citizens only represented a segment of English society; and a very politically impotent one at that. It is most likely a result of this lack of political and societal influence that the idea of community gardening as an acceptable practice that could be implemented within Victorian cities was never accepted or proposed. This stigma was not permanent, however, and by the late 1880s the allotment movement was viewed by many as a way to combat poor living standards and rural poverty. Although this societal shift did prove to usher in a new vision of the value of allotment gardening it did not change the idea that gardening was to be kept outside of the city. This was not to say that there were not cases by 1914 of allotments within urban areas (Burchardt, 2002) but on the whole the allotment movement was still predominately a rural phenomenon. Even the “garden city” idea proposed by Howard (was eventually corrupted so that instead of cities which combined the best aspects of the country magnet (pristine nature, sustainable agriculture, ascetically pleasing land, etc.) and the town magnet (jobs, community, culture, etc.); residents got suburban areas outside of town that provided the worst

aspects of both magnets (Birky, 2002). This failed combination of town and country would prove to be a very detrimental setback, especially in America where the town and country idea had also taken hold, to the idea that rural landforms could be successfully integrated into urban areas (Birky, 2009).

The societal views of allotment gardens within 19th century England offer a parallel to the ways community gardens were viewed in America in the 20th century (Birky, 2009). This is not surprising considering the connections in urban planning and societal views regarding nature and society (Birky, 2009). The multiple waves of community gardening in the U.S. were largely seen in their time as a necessity only spurred by the previously mentioned crises and thus, not part of a healthy functioning urban culture (Birky, 2009). Many of the community gardens that were formed on vacant lots during the late 19th century started out in urban areas but were quickly pushed to the outskirts of town as the other interior areas were developed or reclaimed to prepare for development once the economic troubles of the 1890s subsided (Birky, 2009).

The transplanting of community gardens from the urban core to the semi-urban/rural periphery was another indication of the place that community gardens held in the philosophies of many leaders and planners (Lawson, 2005). This separation of the gardener from the garden also caused increased transportation costs and sometimes discouraged the gardeners from working at all and thus, many gardens were abandoned or lost soon after the move (Lawson, 2005). An

example of how negative perceptions of community gardens in the late 19th century affected public policy and perception can be identified in the refusal of many wealthy citizens in Detroit to help fund charities that supported community gardens and also by the refusal of some merchants to sell vegetables produced by the gardeners. These actions came from the belief that community gardens only catered to the lazy and unintelligent and thus, charities believed it was a financially and morally poor investment while the merchants felt they would possibly be rejected by some of their affluent customers (Lawson, 2005). With the success of the gardens and the support of government, these feelings began to subside. Gradually, as the community gardens became more necessary, people began to see them as a moral form of charity. They were based more on self-help than on handouts and thus, in the minds of philanthropists and the affluent, separated the truly deserving hard laborers from those who simply wanted to take advantage of the system (Lawson, 2005).

Impact from World Wars. This pattern was also found during both world wars when the perception of gardens seemed to change from that of an urban landform which was suitable for all people as recreational and functional feature during the wars to that of an area only fit for the poor, homeless and unemployed after the wars (Basset, 1981). The fluctuation of societal and governmental views and actions directed at community gardens and community garden

organizations was a key contributor to the unsustainability of the community garden movement (Birky, 2009).

A specific case of the abandonment of community gardens after crisis periods can be seen in Columbus, Ohio during the early 20th century. Historical data showed that subsistence gardens held a significant role in the urban landscape of Columbus from 1900 – 1940, but afterwards were discontinued and replaced with other forms of more “modern” urban landscapes (Birky, 2009). The data stress that these gardens were viewed as very important due to their usefulness in aiding the relief effort of World War I and the depression; but once these historical periods ended the gardens were erased from the cities landscape because they were not viewed as “normal” parts of the urban environment (Moore, 2006). This process of eliminating and moving away from community gardens in Columbus becomes even more intriguing when the scale of the gardens at their height was considered. At one point the gardens covered over 600 acres within the Columbus metropolitan area (Moore, 2006). In addition, Moore argued that the perception and understanding of community gardens has been manipulated by certain aspects of academia and city planners so that they were viewed as a more rural type of landscape and thus, not suitable or necessary in the urban realm. This perception became so pervasive that many within Columbus were completely unaware of the city’s rich community gardening history because all traces of the gardens in the urban environment had been

practically erased (Moore, 2006). The narrative provided by Moore was a small snapshot of what was happening across the U.S. at the end of World War II.

Most cities which had some form of community gardening were experiencing a loss of funding, interest and participation as the government and many other organizations saw the end of the war, and the good economic times that followed, as an indication that the crisis was over and that community gardens were once again not necessary (Community Greening, ACGA, 2005). It was also interesting to note that although community gardens in the U.S. have gone through multiple fluctuations in popularity, a common trend throughout the years (excluding more recent years) was the presence of any community gardens in areas with a population consisting primarily of marginalized groups. From the many hundred community gardens present in Columbus, Ohio's primarily African American communities prior to 1940 (Moore, 2006) to the enormous amount of community gardens established in New York City in the 1970s in poor and ethnically diverse, areas (Smith & Kurtz, 2003), community gardens have served to empower groups that were traditionally marginalized. This was most substantial during non-crisis periods when the more affluent and socially accepted groups quickly drifted away from community gardens. Even though the participation of marginalized groups was very positive due to obvious overtones of social equity that these gardens were providing, the participation of marginalized groups (especially the financially poor) still functions as a

reinforcement of the historical belief that community gardens and their brethren were meant to be a refuge of the impoverished.

According to Birky (2009), many community gardens were located in areas with high populations of marginalized people, the power-elite who do not traditionally relate to these groups were more likely to see these landforms as less valuable than a typical urban landform which was organized, used and managed by people of their own social or financial class. There has been a gradual abatement of this trend over the past three decades, however, and the community garden movement as a whole has begun to become more diverse with regard to the social and financial status of the gardeners and to the locations of the gardens. It is still to be seen whether this is a permanent trend that can increase the sustainability of the movement or simply another fluctuation that will eventually subside.

When all of these events and examples across the U.S. were analyzed together a few key themes emerge. The societal and governmental perception that community gardens were not fit for the municipal core and instead belong on the fringes of cities, closer to rural areas, was a repeating trend in the States. In addition, planners and municipal officials have tended to view community gardens as less important than commercial, industrial and residential development and as result the land that community garden plots exist on has often been claimed for other uses. Many also held the mindset that community

gardens were the refuge of the poor, homeless, unemployed, lazy or unintelligent – except, that is, during times of crisis. This exemplifies the last major trend which was the continual fluctuation of societal and governmental perceptions about community gardens from the positive, during crisis periods, to the negative, between crisis periods. In the last three decades, however, we have seen a shift in this pattern (Birky, 2009).

Benefits of Community Gardens. According to AGCA (2005), there were many benefits of community gardens and green spaces in urban, suburban, and rural environments in general. This information was presented to set up a strong argument for the importance of community gardens and thus, the importance of embarking on community garden research. In addition to the positive aesthetic reasons for developing a community garden within a municipality there were also many compelling community, education, economic, environmental and health rationales (Community Greening, ACGA, 2005).

Green spaces in the urban environment have been proven to be key components in economic development. Much research has been done on the effects of green spaces on property value. Numerous studies have shown that an increase in the amount of urban green in an area has a significant impact on the property value of the adjacent and surrounding locations (Rodbell, 1991; Altunkasa, 2004; Irwin, 2002). More so, recent studies in New York City have indicated that small-scale agriculture specifically (in this case of community

gardens) has a positive effect on the property value of the surrounding community. This research indicated that community gardens had a statistically significant effect on property values within a 1,000-foot radius, and as a result each garden caused an average one million net tax benefit per garden over a 20-year period (Been & Voicu, 2008). In addition to these large scale economic benefits, community gardens have proven to be a successful tool for providing both food security and financial savings for individuals; especially the unemployed and those with low incomes (Community Greening, ACGA, 2005).

Along with the municipal and individual economic benefits, urban gardens also served to improve the environmental state of a city through ecological restoration and stabilization which improves the quality of soil, water and air and can prevent the possible costs associated with environmental degradation (Rodbell, 1991). Separate studies have also shown that urban green spaces can save money through storm water retention and purification, besides the ability for these gardens to potentially increase the biodiversity of an area (Colding, Lundberg & Folke, 2006). Though economic and environmental benefits were important byproducts of these gardens, some of the most essential benefits come from what these areas can do for the health of an individual and the community as a whole. For an individual, gardening offered a place to get extensive physical activity and thus, decreased the chance of many health problems. Along with this benefit green spaces in urban environments also offer

mitigation for Attention Deficit Disorder (Faber, Kuo & Sullivan, 2001), increases self-discipline in youth (Faber, Kuo & Sullivan, 2002), healthy mental development in children (Kuo, 2004), stress relief (Wells & Evans, 2003), and sustained health for the elderly (Takano, Nakamura & Watahabe, 2002). From these examples, one can see that the health benefits of green spaces were both universal, across all ages, and widespread both mental and physical.

Community gardens also promote community health by making neighborhoods safer and giving communities a center for activity and congregation. The enhanced amount of safety comes from the fact that areas of green in urban settings have been shown to reduce crime rates (Kuo & Sullivan, 2001a), and reduce the amount of aggression individuals exhibit through the abatement of mental fatigue (Kuo & Sullivan, 2001b). Community gardens can also act as a place, or context, through which societies can define themselves (Sullivan, 2004), and where communities can grow into vibrant healthy units (Coley, 1997). Also, research has shown that community gardens could mitigate “urban blight” in a number of capacities and act as a source of permanence for traditionally transient communities (Schukoske, 2000).

Meadow (2013), found that community gardens were generally intended to reduce energy use in food production and transportation, improve community relationships and social integration, increase use of sustainable agricultural practices, and increase access to fresh foods. In addition, community gardens

have the potential to foster health, quality of life, ecological sustainability, civic engagement, cultural preservation, and social capital within human communities (Loria, 2013). Vegetable gardens may be particularly advantageous for low-income groups, who don't identify fresh fruits or vegetables as a staple food, perhaps because of perceived costs, and where price was a strong determinant of food choice (Fitzgerald & Spaccarotella, 2009).

A study conducted in 2009 by the National Gardening Association found that in the U.S., 36 million households participated in food gardening and each household spent an average of \$70 per year on food gardening. The main reasons given by households for growing their own food included for better-tasting food (58%), to save money on food bills (54%), for better quality food (51%), and to grow food they know is safe (48%). Food gardening households spent an average of five hours per week in their gardens. Thirty-three million households have food gardens at home (91%); two million households have gardens at a friend, neighbor, or relative's home (5%), and one million household's garden in a community garden plot (3%).

According to this 2009 study, the median food garden size was 96 sq. ft. in area, and the average food garden size was 600 sq. ft. in area, and the most popular vegetables grown included tomatoes (86%), cucumbers (47%), sweet peppers (46%), beans (39%), onions (32%), hot peppers (31%), lettuce (28%), and peas (24%). An estimated five million households were extremely or very

interested in having a garden plot in a community garden located near their home.

Food insecurity can have serious health consequences and necessitate real solutions for senior adults. Community gardens offer a viable low cost option to increasing access to fresh produce in areas where residents struggle to acquire adequate amounts of fresh fruits and vegetables for a healthy diet. In a study conducted by Sommerfeld, McFarland, Waliczek, and Zajicek (2010) it was documented that gardening was a favorite leisure time physical activity among older adults. Adults participated in gardening for many reasons; including physical health and exercise, mental health, recreation, creativity, intellectual expansion, friendship, produce quality and nutrition, spiritual reasons, self-expression/self-fulfillment, and cost and convenience. In addition, gardening has been shown to influence dietary habits in programs as short as three months, including increasing fruit and vegetable consumption. Studies examining fruit and vegetable consumption of older adults reported that factors such as ownership of a garden at some point, experiences with foods eaten from a garden (past or present), early exposure to the taste of fresh fruit and vegetables, the availability of fresh produce, and eating with others can enhance fruit and vegetable consumption of this population (Sommerfeld, McFarland, Waliczek & Zajicek, 2010). However, to fully evaluate community gardens as a possible solution to food insecurity, it would be particularly important to investigate garden

benefits in known food deserts where many residents were affected by poverty and food insecurity. Though some community garden research has found food security and food production as both a motivation for and a benefit of community gardens, the literature has failed to address community gardens as a means to supplemental senior adult food assistance programs (Mead, 2008).

Psychosocial Benefits of Gardening. The act of community gardening represents active behavior change and provides participants with experience in producing and harvesting food, which could change the way communities perceive health, food, and the environment. Likewise, positive social and psychosocial changes will likely occur that may positively affect long-term health outcomes (Landry, Chittendon, Coker & Weiss, 2015). According to Blake and Cloutier-Fisher (2009), the psychosocial benefits from gardens appeared to increase in importance through the growing season with two main themes emerging: 1) positive personal and spiritual benefits from participating, and 2) enhanced confidence and independence among participants. Under the personal and spiritual umbrella, gardening facilitated connections with nature. Regarding the second psychosocial theme, the garden project fostered feelings of self-confidence, self-esteem, and independence.

Community gardens can build health for the individuals who use them and for the communities in which they exist by building social connections and sense of community among the gardeners. The most often-cited individual benefits of

community gardens for individuals include improved nutrition, physical activity, and social and psychological well-being. Broader benefits of community gardens include improved social networks, enhanced community capital, better neighborhood aesthetics, and reduced crime. Finally, community gardens create spin-off benefits whereby participants become empowered to make more health-promoting changes in their own lives and also in their community by becoming more active in other aspects of community life beyond the garden gates (Blake & Cloutier-Fisher, 2009).

Common Problems Faced by Community Gardens. Understanding the challenges associated with community gardens provides organizations the opportunity to be more successful in future garden establishment and development. Previous researchers found that generally, in order for community gardens to be successful, they must have strong bureaucratic support, access to space, available money and resources, steady participation among gardeners, and a strong and willing leader to organize (Armstrong, 2000). While challenges to gardening were naturally tied to site-specific characteristics, the primary themes of community garden troubles include: sustained interest and participation by gardeners, access to necessary materials, garden funding and support, garden design and access, and secured land tenure.

It is easy for a new gardener to begin a plot with vigor and excitement without fully realizing the true extent of work involved in the gardening process

that takes place through all seasons. Community gardens were based on volunteerism, so they were only successful when the volunteer members remained active and present. Drake and Lawson (2015) surveyed community gardeners across North America and asked gardeners to discuss issues they had with forming and maintaining their community gardens. In their study, gardeners cited declining volunteerism and participation as the number one problem they encountered in community gardening – which supports previous findings by Milburn and Vail (2010). However, lack of gardening interest was more often associated with smaller garden organizations than larger ones due to a combination of garden politics, disagreements, and poor leadership (Drake & Lawson, 2015).

A second feature of successful community gardens was access to appropriate and necessary building materials, including uncontaminated soil and water. Urban soils may contain toxins or heavy metals that threaten the health of plants (Pickett et al., 2001). For that reason, it may be necessary to bring in outside soil and compost in order to successfully grow uncontaminated produce. Access to water was also vital for a community garden to survive. In Drake and Lawson's 2015 study, surveyed community gardeners said their top challenge in gardening was getting water to their garden site.

Gardening materials were of little use if a garden organization lacks funding. Money allows for both the preparation of a garden location, as well as

the provision of garden facilities, such as plant boxes or a tool shed. Support from outside organizations and institutions were often necessary for garden survival. A staggering one percent of garden organizations in the U.S. partner with outside organizations (Drake & Lawson, 2015). Supporting organizations may be nongovernmental organizations, churches, nonprofits, schools, or local governments. Even if a partnership was obtained, the relationship between the garden and partnering organization was not always healthy (Milburn & Vail, 2010). Often, the services were first offered free of charge; however, after a period of time, the outside organizations may begin to request payments with the threat of service termination (Saldivar-Tanaka & Krasny, 2004).

Even if a garden has support and funding, the design, placement, and accessibility of the garden can ensure its success or doom it to failure (Drake & Lawson, 2015). Community gardens that were centrally located within neighborhoods encountered more success. A central location made it easier for volunteers to access their garden from their home (Drake & Lawson, 2015).

Perhaps the most pervasive barrier to community garden success was that of the right to open space. The city and city planners decide who has a right to what areas within a city. In places with healthy community gardening organizations, local government supports community gardens by providing them open space within the city, providing leases for land parcels, or willfully

dedicating certain areas to urban gardening (Drake & Lawson, 2015). A lack of support in a community can easily kill a community garden project.

Collaboration

U.S. Cooperative Extension System. States and local counties can play a critical role in providing resources and support to rural people and communities to improve health. This role and the coordination of services and educational outreach can be effectively supported through the U.S. Cooperative Extension System (CES). The USDA's Cooperative Extension System empowers farmers, ranchers, and communities of all sizes to meet the challenges they face, adapt to changing technology, improve nutrition and food safety, prepare for and respond to emergencies, and protect our environment. Cooperative Extension System is operated through the nation's land-grant university system in partnership with federal, state and local governments. As the federal partner, the National Institute of Food and Agriculture (NIFA) develops methods to address national priorities, funds and awards grants, and provides program leadership. The agency supports both the universities and local extension offices to bring science directly to the regional and county level (U.S. Department of Agriculture, National Institute of Food and Agriculture [NIFA], 2018).

Cooperative Extension System is a nationwide, non-credit educational network that addresses public needs by providing non-formal higher education and learning activities to farmers, ranchers, communities, youth, and families

throughout the nation. With an organization that has been operating for over a century, CES is well positioned to efficiently get needed tools and knowledge into the hands of the people who require them. At a time when agricultural, food, and environmental challenges were mounting and needs were growing CES was more relevant than ever. With its wide reach — an office in or near most of the nation's approximately 3,000 counties — CES agents (educators) help farmers grow crops, homeowners plan and maintain their homes, and youth learn skills to become tomorrow's leaders (NIFA, 2018).

Engaging extension educators in a learning community presents relatively few challenges and results in positive outcomes for educators and program development (Krasny & Doyle, 2002). In addition, extension agents may be the best resource to evaluate self-perceived problems of senior adults and to coordinate community agencies and organizations, educational and research institutions, health-care systems, and public policy-makers. The synergistic effect of these activities can lead to improved nutritional health and life quality while reducing long-term, health-related costs of older people in our communities (Lauritzen & Windham, 1994).

Given the role that extension professionals have in supporting efforts to establish financial viability and social connections at the household and community levels, it is critical that a more informed understanding of feasible

approaches to alleviating hunger and food insecurity become the norm among Extension professionals (Schattman, Berlin, Finch-Bochner & Lawrence, 2015).

A specific example of the role CES can play in a community garden project can be appreciated in a study conducted in 2015 and located in the Lower Mississippi Delta. Participants indicated that the project provided the following benefits: increased their self-efficacy and responsibility for personal and community health, exposure to new types of healthy foods, and gardening was a way to build community togetherness and a legacy (Landry, Chittendon, Coker & Weiss, 2015). Additionally, community gardens could supply fresh produce to local food bank recipients and homebound seniors. As a result, both seniors and youth would benefit from this intergenerational partnership, thus strengthening CES' leadership role in forging partnerships for sustainable communities.

In addition to receiving fresh fruits and vegetables, recipients could participate in cooking demonstrations, receive nutrition information fact sheets, and sample low-cost, nutritious dishes featuring garden fresh produce prepared by CES personnel. The data clearly show that distributing local, fresh produce directly to these individuals provided learning opportunities and resulted in behavioral changes. Programs demonstrate that the direct distribution of produce to individuals through a CES education program can be a successful way to improve participants' diets and their understanding of basic nutrition. However, the benefits do not stop there. On-site distribution allows for cross

programming in nutrition education and provides an opportunity to recruit participants for other extension programs (Murphy, 2013).

Due to their tangible, real-life nature, gardens can enhance learning in multiple settings, including extension's education programs. Gardens provide opportunities for hands-on involvement, enabling the type of sensory, exploratory learning experiences recommended for extension's clientele. In addition, gardens can be a source of the concrete experiences necessary for experiential learning. When properly designed and interpreted, gardens can support self-directed learning that results in both short- and long-term outcomes. These include knowledge gain, increased curiosity, improved skills, problem solving, behavior change, increased confidence, and attitude change (Glen, Moore, Jayaratne & Bradley, 2014).

Texas A&M AgriLife Extension Service. As one of 50 extension service agencies within the Cooperative Extension System, the Texas A&M AgriLife Extension Service is a unique education agency with a statewide network of professional educators, trained volunteers, and county offices. It reaches into every Texas county to address local priority needs. AgriLife Extension agents provide programs, tools, resources on a local and statewide level that teach people how to improve agriculture and food production, advance health practices, protect the environment, strengthen communities, and enrich youth. Some of the major efforts include mitigating drought impacts; conserving water

use in homes, landscapes, and production agriculture; improving emergency management; enhancing food security; and protecting human health through education about diet, exercise, and disease prevention and management.

AgriLife Extension demonstrates the latest technology and best practices to improve the state's food and fiber system, which serves all Texas consumers and contributes nine percent of the gross domestic product. Texas 4-H, the primary youth program, engages some 600,000 youth every year in learning projects, leadership development, and community service.

Collaborative programs enable extension educators and their partners to extend resources and prevent duplication of services. In total, extension personnel and extension-trained volunteers achieved nearly 23 million contacts, including distance education via the Web (Texas A&M AgriLife Extension Service, 2018).

The mission of AgriLife Extension as follows: Through the application of science-based knowledge, we create high-quality, relevant continuing education that encourages lasting and effective change. AgriLife Extension was established in 1915, the agency is housed in 251 of 254 Texas counties with an annual operating budget of 154 million. As reported in 2016, AgriLife Extension has over 100,000 volunteers with 3.6 million service hours logged. Three aspects of AgriLife Extension's program development and delivery process that were essential to success were the network of educators and volunteers, the

collaboration with other agencies and organizations, and the involvement of local people (Texas A&M AgriLife Extension Service, 2018).

Use of Volunteers. Growing and donating fresh garden produce to those in need is a very rewarding volunteer experience. In recent years, emergency food programs such as food pantries and soup kitchens have reported a sharp increase in the demand for food (Murphy, 2013). All generations, genders, and backgrounds can participate in volunteering, although some groups were better represented in terms of participation and hours per volunteer. In 2013, Andrews and Lockett found that women aged 45-54, parents, and full-time employees represent some of those groups with higher volunteer rates. Generation Y (also known as Millennials), however, had the lowest percentage of volunteerism of any group. Former and current extension 4-H participants may be a large, untapped source for potential donors to extension programs, the same may hold true for volunteerism. In a study conducted in Oregon, Voluntad, Dawson, and Corp (2004) found that at-risk youth were able to work in the community garden from seeding to harvest. Through their efforts, food bank recipients and homebound seniors were provided garden produce, resulting in an increase in fresh vegetable consumption and leading to a healthier diet. Participants received educational support addressing gardening techniques, nutrition and health tips utilizing fresh produce, leadership skills, and communication techniques.

In 1998, Congress revealed that approximately 75% of youth offenders were high school dropouts lacking basic literacy and life skills, posed little or no job experience, and lacked marketable skills. Researchers have suggested that in order to avoid further criminal activity, thus reducing recidivism, more programs should be developed to teach youth life skills (Voluntad, Dawson & Corp, 2004). Younger generations may feel intimidated by the prospect of keeping a garden, resulting in reluctance to volunteer in community gardens and failure to learn about agriculture and the importance of eating healthy (Landry, Chittendon, Coker & Weiss, 2015); however, teaching youth how to garden could provide a bank of volunteers while empowering youth with a useful life skill.

Potential Results of Partnerships. The national rate of low or very low food security in the U.S. has increased every year since 1998. Recent estimates suggest 50 million people struggle daily with where their next meal will come due to a lack of money or other resources for basic nutrition. According to Feeding America, the nation's largest nonprofit hunger relief network, more than a third of working households were food insecure in 2010. Increasing inter-organizational and inter-sectoral collaboration would lead toward more coordinated, better-utilized hunger response programs (Paynter, 2013).

In a study conducted in Pendleton, Oregon it was noted that both seniors and youth benefited from an intergenerational partnership of a community garden that supplied fresh produce to local food bank recipients and homebound

seniors, thus strengthening extension's leadership role in forging partnerships for sustainable communities (Voluntad, Dawson & Corp, 2004). Teaching youth how to garden could help solve the issue of a lack of volunteers and has the potential to empower youth with a new and useful life skill and garner enthusiasm for community gardens (Landry, Chittendon, Coker & Weiss, 2015).

Justification

Past research does not address in what manner a community garden could improve food security issues nor does research address the quality of life provided through senior adult nutrition assistance programs. By exploring the topics of importance surrounding food security and nutrition, county AgriLife Extension agents can learn how to engage adult and youth volunteers to produce vegetables high in nutritional value, address food insecurity issues, and increase fresh vegetable consumption in rural senior adults that receive food aid. In addition, food nutrition site directors can receive a better understanding of the issues surrounding senior adult nutrition and food insecurity from food assistance participants.

Through this study and additional future research it is conceivable that Texas community gardens could be sustainable through Texas A&M AgriLife Extension oversight, local government support, and volunteerism. It may also possible for community gardens to be used as a low-cost supplemental food assistance tool in providing a more resilient and food-secure system for rural

senior adults through the direct integration of food production and food consumption. As a result of this study, Texas A&M AgriLife Extension agents could develop a model for their county to utilize when implementing a volunteer-based community garden as a tool to reduce food insecurity and improve the nutritional health of senior citizens in a rural environment.

Chapter 3: Methods

Introduction

This three-phase study was designed utilizing an explanatory sequential mixed methodology approach for phases 1 and 2. Phase 3 involved a review of Texas community gardens models in order to provide the framework of program goals, implementation, and results of these food assistance projects for sustainability and to explore how extension plays a role. This study contained a quantitative food insecurity survey of 83 senior adult congregate meal participants, interviews with four food nutrition site program directors, and a review of four Texas community gardens in differing population areas which utilize Texas A&M AgriLife Extension Service to provide project oversight.

The purpose of this study was to determine the feasibility of using a community garden as a supplemental food assistance tool for congregate meals sites and food pantries. This possibility was explored through gaining a better understanding of food aid programs in the county, examining the perceptions and reality of food security by site directors and senior adults, and probing the possible limitations or challenges site directors face in either storing or providing fresh vegetables. The establishment of partnerships between AgriLife Extension county agents, adult and youth volunteers, and local civic organizations were

assessed through the review of community garden case studies as to how best utilize a designated community space to benefit food insecure individuals. Lastly, the health outcomes, social connections, and psychosocial benefits of employing these collaborations were presented. There were five objectives to this study:

1. Survey the trends in food assistance received by senior adults in a rural environment.
2. Compare and contrast the differences between life satisfaction of senior adults, food insecurity, vegetable consumption, and gardening knowledge as experienced by congregate meal participants and perceived by food site directors.
3. Deliberate possible limitations or challenges food site directors face in providing fresh vegetables to food assistance recipients.
4. Determine if community gardens have the potential for sustainability, by exploring the successes and limitations of models in urban, suburban, semi-suburban, and rural areas through the collaboration between Texas A&M AgriLife Extension Service, local government, and volunteers.
5. Make recommendations on the viability of a community based garden to bridge the gap between food assistance programs and the nutritional needs of rural senior adults.

An explanatory sequential mixed methodology type of design consists of first collecting quantitative data and then gathering qualitative data to help explain or elaborate on the quantitative results. The rationale for this approach was that the quantitative data and results would provide a general picture of the research problem; more analysis, specifically through qualitative data collection, was needed to refine, extend, or explain the general quantitative picture (Creswell, 2015).

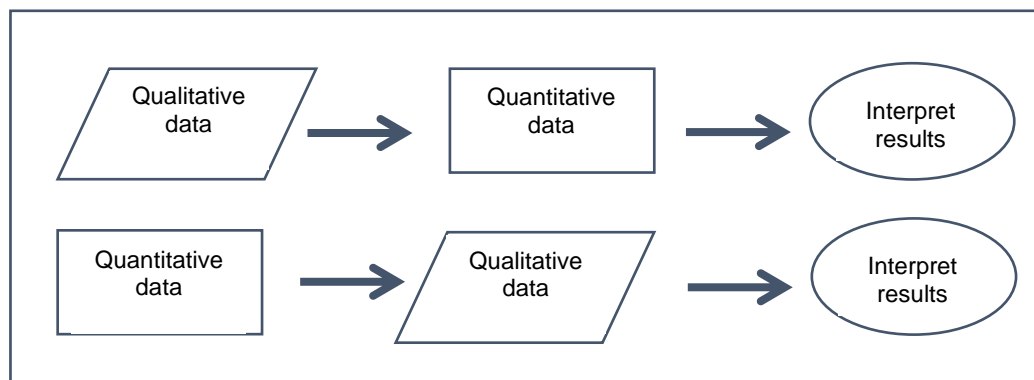


Figure 4. Explanatory sequential design. Adapted from *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research* (5th ed.) by J. W. Creswell, 2015, University of Nebraska.

For this study, researcher found that a mixed method design approach allowed for a deeper understanding of trends in rural senior adult food insecurity as well as a thorough examination of the challenges food assistance program directors face. A combination of numerical and narrative data was utilized to create a clear picture of the benefits and possible challenges of using a

community garden to supplement food assistance programs. A comparison from key questions and answers received from senior adult participants and food site directors were linked.

Two data collection surveys were utilized as the primary research tools in this dissertation. This portion of the study was two-fold and encompassed surveying senior adults to identify the current trends in food security attitudes from a sample of East Texas respondents (quantitative approach). Secondly, food assistance program directors were interviewed to learn their perspectives on food assistance participant's food security and about the challenges both financially and systemically in utilizing fresh produce at their site (qualitative approach). Finally, issues of trustworthiness that involved credibility, transferability, dependability, conformability, and reliability were detailed. Ethical procedures and institutional review board (IRB) documents were included as necessary and explained. Stephen F. Austin State University's Department of Human Sciences Institutional Review Board approved all questionnaires and procedures for this mixed-method analysis. This study took place in May 2018 at two senior nutrition centers and two food pantries within Shelby County, Texas, a rural county in East Texas.

Phase 1: Quantitative Study - Trends in Senior Adult Food Security

To collect numerical research data on food insecurity, quality of foods received, and participant demographics the quantitative research approach was

employed. Statistics help explain complex relationships in data, help make predictions, and aid in answering the basic question, “Is what I’ve found significant?” According to Babbie (2017), statistics should be used when conducting surveys or when undertaking quantitative research. Because of the numerical nature of quantitative research, statistics were necessary to help analyze and explain findings.

In quantitative research, according to Creswell (2015), the investigator identifies a research problem based on trends in the field or on the need to explain why something occurs. Describing a trend means that the research problem can be answered best by a study in which the researcher seeks to establish the overall tendency of responses from individuals and to note how this tendency varies among people. In addition, some quantitative research requires explanation of how one variable affects another. Creswell (p.112) goes on to describe, “By explaining a relation among variables, you were interested in determining whether one or more variables might influence another variable.” The research questions were specific, narrow questions to obtain measurable and observable data on variables (Creswell, 2015).

Research designs were the specific procedures involved in the research process. There were three types of quantitative research designs: *experimental, correlational, and survey*. In quantitative research where an activity or materials were not tested or an interest in the association among

variables was not desired, the survey research design was a good procedure to use. "Survey designs were procedures in quantitative research in which a survey or questionnaire was administered to a small sample to identify trends in attitudes, opinions, behavior, or characteristics of a large population" (Creswell, 2015, p. 379).

There were two basic kinds of survey designs: *cross-sectional* and *longitudinal*. In a cross-sectional survey design, the researcher collected data at one point in time. In this study, the cross-sectional survey design was employed to examine current attitudes, beliefs, opinions, or practices in regards to food security issues.

Participants. The quantitative food insecurity survey included a voluntary sample of community-dwelling, non-institutionalized older adults aged 60 years or above that attended their local senior center at a minimum of one day per week. No regard to gender, ethnicity, or race in selection of participants was given. This study was conducted with the cooperation of the Shelby County Senior Nutrition Site and Joaquin Senior Nutrition Site.

Participants for the food insecurity survey were recruited through posting of flyers at the nutrition sites and table tents in each center and from the encouragement of each senior center director. The study was limited to a sample of adults who live in Shelby County, Texas, and receive food assistance by participating in a congregate nutrition site. Researchers collected data from

83 participants through one-on-one interviews during a four-week period in May 2018. Respondents age 60 or above were invited to participate in the study. Participants were excluded if they were homebound or cognitively impaired as determined by senior center directors. Study personnel obtained written informed consent from interested seniors yielding 83 participants.

The Study Area: Shelby County, Texas. This study area was located in Shelby County, a rural region in the state of Texas, U.S. that borders Louisiana to the east (Figure 5). There were four cities in Shelby County (Center, Huxley, Joaquin, and Timpson), one town (Tenaha), and six designated communities (Arcadia, Brooklyn, Dreka, Possum Trot, Shelbyville, and Weaver). The county was created in 1835 as a municipality of Mexico and organized as a U.S. county in 1837.

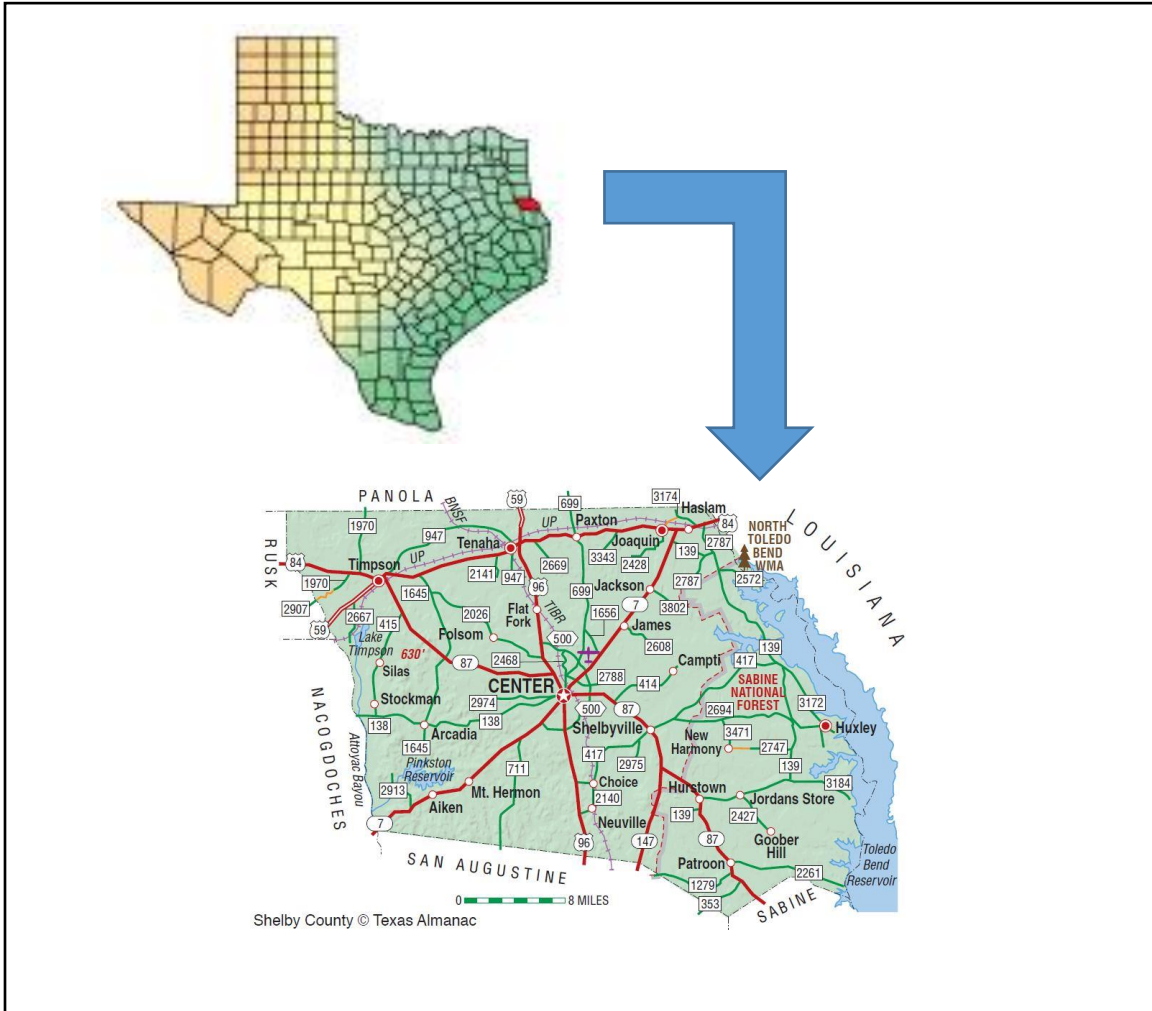


Figure 5. Shelby County, Texas. Adapted from Texas Almanac, Texas State Historical Association, 2018.

According to the U.S. Census Bureau (2015), the county has a total area of 835 square miles (2,160 km²) of which 796 square miles (2,060 km²) is land and 39 square miles (100 km²) or 4.7% is water. As of the census of 2010, there were 25,224 people, of this population, 9,595 were considered a household, and 6,908 were considered families that resided in the county. The population density

was 32 people per square mile (12/km²). There were 11,955 housing units at an average density of 15 per square mile (6/km²). The racial makeup of the county was predominantly white (U.S. Census Bureau, 2015) (Table 3).

Table 3

Percent Racial Makeup of Shelby County, Texas (U.S. Census Bureau, 2015)

Race/Ethnicity	Percent of Shelby County, Texas
White	72.65
Black	19.44
Hispanic	9.87
Other Races	5.87
Two or more races	1.44
Native American	0.36
Asian	0.23
Pacific Islander	0.02

Out of the 9,595 households, 32.4% had children under the age of 18 living with them, 55.1% were married couples living together, 12.9% had a female householder with no husband present, and 28% were non-families. 25.4% of all households were made up of individuals, and 13.6% had someone living

alone who was 65 years of age or older. The average household size was 2.59, and the average family size was 3.08 (U.S. Census Bureau, 2015).

In the county, the population was spread out with 26.6% under the age of 18, 8.8% from 18 to 24, 25.8% from 25 to 44, 22.2% from 45 to 64, and 16.6% who were 65 years of age or older (Table 4). The median age was 37 years. For every 100 females there were 92.4 males. For every 100 females age 18 and over, there were 89.2 males (US Census Bureau, 2015).

Table 4

Age Ranges and Percentages of Residents of Shelby County, Texas (U.S. Census Bureau, 2015)

Age Range	Percentage
Under 18 years	26.60
18 to 24 years	8.80
25 to 44 years	25.80
45 to 64	22.20
65 years and older	16.60

The median income for a household in the county was \$29,112, and the median income for a family was \$34,021. Males had a median income of \$26,501 versus \$20,280 for females. The per capita income for the county was \$15,186. About 14.9% of families and 19.4% of the population were below the

poverty line, including 24.7% of those under age 18 and 16.9% of those age 65 years or over (U.S. Census Bureau, 2015).

Two congregate food assistance programs operate in Shelby County, Texas: Center, the largest populated city (5,540) provides lunch to seniors age 60 and above for a per meal donation of \$3.00, Monday through Friday. In Joaquin (population 822), a Thursday congregate nutrition site provides lunch to anyone in the community that is in need of a meal regardless of age.

Hypotheses. The resulting hypotheses were analyzed through use of a food security survey instrument with a sample of senior adults that receive food assistance from congregate meal sites in Shelby County, Texas:

- H₁: There are differences in life satisfaction among different age groups for the 2018 congregate meal participants.
- H₂: There are differences in life satisfaction among different levels of education for the 2018 congregate meal participants.
- H₃: There are differences in food security among different age groups for the 2018 congregate meal participants.
- H₄: There are differences in food security among different levels of education for the 2018 congregate meal participants.
- H₅: There is an association between life satisfaction and food security for the 2018 congregate meal participants.
- H₆: There is an association between life satisfaction and have grown a vegetable garden for the 2018 congregate meal participants.
- H₇: There is an association between life satisfaction and times per day vegetables were consumed for the 2018 congregate meal participants.

Research questions that were addressed through the survey of senior adult participants that received food assistance include:

1. What types of food assistance did senior adults receive in a rural environment?
2. What was the quality and satisfaction of food received through food assistance programs by recipients?
3. Were fresh vegetables distributed through food assistance programs?
4. How many servings of vegetables do food assistance recipients consume in a day?
5. What was the quality of life of food assistance recipients?
6. Do food assistance recipients face food insecurity issues?
7. Do food assistance recipients have any past experience with vegetable or fruit gardening? Do they desire educational programs on this topic?

Through this study and future research, it was predicted that Texas community gardens could be sustainable through Texas A&M AgriLife Extension management, local government support, and volunteerism and be used as a low-cost supplemental food assistance tool in providing a more resilient and food-secure system for rural senior adults through the direct integration of food production and food consumption.

Method. Research over the past two decades has identified a particular set of this kind of condition, experience, or behavior pattern that consistently characterizes the phenomenon of food insecurity and hunger (Borden et al., 2015). To gather sufficient and appropriate data and to identify this type of condition in Shelby County, Texas, a purposeful sampling with a structured interview form was developed by the researcher and used to select participants who meet the following three criteria: 1) age 60 or above, 2) live in Shelby County, Texas, and 3) receive some type of food assistance. This instrument was on a form in which the researcher recorded answers supplied by the participant in the study. The researcher asked a question from the interview guide, listened for answers, and recorded responses on the survey. Babbie (2017) describes conducting one-on-one interviews and recording respondent answers would lead to a higher response rate than a mailed questionnaire, telephone or focus group interviews.

Respondent criteria requirements of age, location and food assistance received, and in addition to, chain referral sampling was used to attain adequate sample size and achieve variation. Chain referral sampling that includes senior adults who receive food assistance through means other than those listed in the criteria may assist in acquiring a more conventional representation (Babbie, 2017).

In order to increase the sample diversity in regards to ethnicity and race, data from multiple food assistance sites was collected. A team of two researchers conducted interviews with individual participants during a four-week time period in May 2018. Interviewers approached potential respondents as they engaged in more passive or sedentary and less time-restrictive activities at the various locations. For example, respondents were approached as they were waiting for lunches to be served and in between scheduled site social activities.

The structured interview survey addressed such issues as eating habits and food preferences, food security, self-reported health, social network and awareness of community programs. Background information regarding socio-demographic characteristics was collected at the end of the study. See Appendix B for data collection survey. Participants were made aware in writing of the established criteria for this study that is listed in a sample letter provided in Appendix A. Any ambiguity was resolved through additional verbal correspondence.

Pre-testing of the proposed questionnaire protocol occurred in February 2018. Ten practice questionnaires were distributed to a local group of retired educators (age 60 and above) and AgriLife Extension volunteers. This practice helped the researcher determine ways to make the interview process run more smoothly, estimated response time, evaluated the effectiveness of the proposed interview protocol, and developed training procedures for the project team.

Food insecurity interview location sites. Participants were contacted and interviewed at the following two congregate food assistance sites in Shelby County, Texas:

1. Shelby County Senior Nutrition Site – This site was located in the largest city in the county, Center. At this location, the Meals on Wheels program and a Monday through Friday congregate lunch program was provided senior age adults. Approximately 250 meals were provided to homebound senior adults each week and 200 senior adults were served a hot meal Monday through Friday. This site was partially funded by the state of Texas and also relies on food from the East Texas Food Bank of Tyler, Texas along with donations from the local community.

2. Joaquin Senior Nutrition Site – This site provided one meal each Thursday for people of any age as a congregate lunch program. Approximately 50 senior adults were served a hot meal one time per week. Meals were provided by a local church.

Patton (2002) noted that sample size is contingent upon what the research wants to know, the reason for the study, the risks and benefits involved, what constitutes credibility, and what can be accomplished with available time and resources. Two criteria – adequate numbers to reflect the target population, and saturation of data to the point where the investigator is no longer discovering anything original from the sample – unite to establish when the study has run its

course. This research sample consisted of 83 individuals, with the number of daily participants ranging from 30 to 100 (A. Golden, personal communication, May 2, 2018). As this study was conducted with human participants, proper IRB forms were submitted for approval. Once these forms were approved, the directors of the senior nutrition sites were contacted, the process and value of the study explained, and a forum where participants had access to information regarding the study and participation was negotiated. Recommendations from these participants of other senior adults who meet the criteria for this research were encouraged. A formal letter of cooperation was submitted to the senior nutrition sites. All contact, including interviews, took place at the listed nutrition sites unless otherwise agreed upon and arranged.

Interview protocol. The survey questions outlined below provided basic information to respondents:

- Thank you for your willingness to participate in this study.
- The purpose of this survey is to understand food security trends in rural, senior adults in Shelby County, Texas. Because of the nature of the study, there were no right or wrong answers.
- The interview will last approximately 10 minutes, and you may take home a gift bag as a thank you for your participation.

- Concluding comments: Thank you for your participation. This research study is being conducted on behalf of Stephen F. Austin State University as part of a Ph.D. dissertation project.

Strategies for dealing with potential non-response bias. Data was analyzed to provide insight into the trends of food security in senior adults living in a rural environment. Researchers completed a contact log to record basic information about respondents and non-respondents (Appendix G). The contact log listed date, time, gender, and response status (i.e., respondent versus non-respondent) for each individual invited to participate in the study.

Ethical procedures. In the data collection phases of this study, permission to conduct the study interview was granted from two sources. Shelby County Outreach Ministry granted permission to interview participants at the Shelby County Senior Nutrition Site, and the First Baptist Church in Joaquin granted permission for interviewing participants at the Joaquin Nutrition Site. During the interview process, voluntary participants were given a consent form outlining their right to participate or withdraw from the study. Participants were informed of the time commitment to participate in the study and were given information about how the results would be used.

Completed interview forms were assigned control numbers in the field and these numbers were used as the case number on the coding form. The interview and coding forms would be kept by the researcher for five years (Creswell, 2015)

then discarded. Consent forms and demographic data forms will be kept until the end of the project then disposed of after the dissertation approval process.

Assumptions. The first assumption of this study was that the participants would offer honest, complete, and thoughtful answers to questionnaire and interview questions. It was also anticipated that these adults were free to express themselves without judgment and to ask questions of the interviewer if he or she did not understand an inquiry or needed further clarification. Commitment of participants in the research interview was also anticipated. Finally, it was assumed that these adults would provide valuable and honest insights into their experiences that would provide information that the researcher could use in this study. These assumptions were necessary in order to provide confidence in accurate cataloging and interpretation of participant responses.

Data Analysis. After collecting the data, the structured survey questionnaires were entered into IBM SPSS (version 25) for statistical analyses. Univariate frequencies, cross tabulations, means and medians were calculated to understand the demographic data and variables. Indices for life satisfaction and food security were generated and Cronback's (coefficient) alpha measure of reliability was examined. In social sciences, an alpha value of .70 or higher was sought to be adequate in determining the reliability of an index (Szafran, 2012). To explore if there were any significant differences among means of three or more groups, researcher used one-way ANOVA (analysis of variance) bivariate

inferential analysis, to determine whether there was reason to believe that population means were equal by examining the variability within and among the different groups. In this analysis, researcher explored the differences between life satisfaction and food security as independent variables and dependent variables of age and levels of education. The F ratio and its significance were examined based upon p value ($\alpha = 0.05$) and multiple comparison procedures (post hoc) were made where significant differences occurred using Tukey HSD test (Honestly Significant Differences).

Phase 2: Qualitative Study - Perceptions of Nutrition Site Directors

According to Creswell (2015), qualitative research was best suited to address a research problem in which you do not know the variables and need to explore. Creswell (p. 203) goes on to explain, "In a qualitative study, you identify themes, in which a rich, complex picture emerges. From this complex picture, you make an interpretation of the meaning of the data by reflecting on how the findings relate to existing research, by stating a personal reflection about the significance of the lessons learned during the study." The paradigm is a constructivist approach where reality is constructed by the individuals being interviewed. Theories may emerge during the data collection and analysis; however, the researcher is not limited by a single theory that serves a test around which the entire study is based. Because the participants included in the study had diverse backgrounds, education and work experience, this approach

took into consideration all of these factors that inform the meanings they place on the subject of food security in Shelby County, Texas and the clientele they served through food assistance programs. Multiple perspectives from the interview participants also allowed for a more complete picture that emerged with themes.

Creswell (2015) outlined five paradigm assumptions associated with qualitative and quantitative research: *ontological, epistemological, axiological, rhetorical, and methodological*. These assumptions help answer questions related to issues of reality, relationships, biases, values, processes, and language. In qualitative research, the researcher interacts with the researched. In this study, researcher was closely interacting with the nutrition site directors in Shelby County. The reality in qualitative research was subjective and therefore multiple perspectives could be considered. The realities of each of the respondents were viewed as subjective, with definite biases and values that may be unique to each person. The methodological assumption for qualitative research was inductive, bound in context, with emerging categories and patterns.

In this study, a qualitative approach was used to determine the central phenomenon surrounding food security and quality of life of senior adults who participate in food assistance programs through the perspective of the food nutrition site directors. In addition, differences between key research questions (see section below) were examined to see if the two sets of respondent answers

varied, and if so, what was the rationale? In this phase of the study, the portion of the qualitative phase was examined through the below purpose statement:

The purpose of this mixed method study was to determine the feasibility of using a community garden as a supplemental food assistance tool for congregate meals sites and food pantries. This possibility was explored from gaining a better understanding of food aid programs in the county, examining the perceptions and reality of food security by site directors and senior adults, and probing the possible limitations or challenges site directors face in either storing or providing fresh vegetables.

Participants. Researcher contacted four nutrition site directors by phone and an appointment was scheduled for a one-on-one interview at each food assistance site during May 2018. As a result, four site directors were voluntarily interviewed at the following congregate meal sites and food pantries in Shelby County, Texas:

Congregate Meal Sites:

1. Shelby County Senior Nutrition Site – This site is located in the largest city in the county, Center. At this location, the Meals on Wheels program and a Monday through Friday congregate lunch program was provided senior age adults. Approximately 250 meals were provided to homebound senior adults each week and 200 senior adults were served a hot meal Monday through Friday. This

site was partially funded by the state of Texas and also relies on food donations from the local community, and monetary donations from meal participants and the local community to purchase lower cost food from the East Texas Food Bank of Tyler, Texas.

2. Joaquin Senior Nutrition Site – This site provides one meal each Thursday for people of any age as a congregate lunch program. Approximately 50 senior adults were served a hot meal one time per week. Meals were provided by a church supported by the local community.

Food Pantries:

3. Shelby County Outreach Ministry – Helping Hands Food Pantry – This site provides food boxes to those in need on a monthly basis. The food provided, for the most part, was canned or dry packaged. Due to guidelines from the East Texas Food Bank (where the food is purchased at a lower cost), fresh fruit and vegetables cannot be provided in the boxes through this food assistance program. This food pantry provides approximately 50 pounds of food per month to 250 limited resource individuals in Shelby County, Texas.
4. Tri-County Community Action Group – Harvest for Homes Food Pantry - This site provides a food box to those in need on a weekly basis. The food provided for the most part was canned or dry

packaged. Due to guidelines from the East Texas Food Bank (where the food is purchased at a lower cost), fresh fruit and vegetables cannot be provided in the boxes through this food assistance program. However, this site does receive fresh produce one time per month that they allow participants to partake, if they choose. This food pantry provides approximately 10 pounds of food per week to 50 limited resource individuals in Shelby County, Texas.

Research Questions. To explore the possible connection between the quantitative phase and food security and quality of life of food assistance recipients through the perception of nutrition site directors, the following questions were addressed:

1. What were the goals of the food assistance program/site?
2. Were there criteria for receiving food assistance from site? If so, what were the criteria?
3. What types of food products/groups were served/provided at site?
4. If vegetables were served/provided, how were they prepared?
5. If vegetables were served/provided, how often were *fresh* vegetables served per week?

6. Were there any limitations or challenges site directors faced in providing fresh vegetables to food assistance recipients? If so, what were the limitations or challenges?
7. Did food assistance participants desire educational programming on gardening, nutrition, or food preparation at site?
8. Did the site directors desire to receive fresh vegetables from a community garden to provide food assistance participants?

Method. The qualitative interviews were conducted in May 2018 using a one-on-one voluntary interview in a face-to-face approach with the food assistance program directors from two nutrition sites and two food pantries in Shelby County, Texas. The qualitative set of interview survey was developed by the researcher and contained 28 questions of which 23 were open-ended, and the interviews lasted between 30 and 60 minutes (Appendix C). Upon agreeing to participate in an onsite interview, respondents were asked to sign a consent form (Appendix A). Respondents were asked the same series of questions as consistency in the questioning procedures and on-site documentation methods ensured consistency in the data which improved overall data quality (Babbie, 2017).

Interview protocol. The interview statements outlined below provided basic information regarding participation in the study:

- Thank you for your willingness to participate in this study.

- The purpose of this interview is to understand food security trends in rural, senior adults in Shelby County, Texas. Because of the nature of the study, there were no right or wrong answers.
- The interview will last approximately 30 minutes.
- Concluding comments: Thank you for your participation. This research study is conducted on behalf of Stephen F. Austin State University as part of a Ph.D. dissertation project.

Babbie (2017) recommends recording and transcribing respondents' words to ensure accuracy in the data collection and analysis process. Thus, with respondent permission, interviews were digitally recorded and transcribed for analysis.

Strategies for dealing with potential non-response bias. Data were analyzed to provide insight into the trends of food security in senior adults living in a rural environment, the types of food groups provided participants, the manner in which food groups were stored and prepared, the criteria for participating in the food assistance program, the goals of the program, the challenges directors face in providing fresh vegetables to participants, and the types of educational programs desired at each site. Findings were not generalized to the general public; however, these study results were used to develop a summary of the food assistance programs in Shelby County, Texas and provided to the executive director of each food assistance site.

Researchers completed a contact log to record basic information about respondents and non-respondents (Appendix G). The contact log listed date, time, gender, and response status (e.g., respondent versus non-respondent) for each site director invited to participate in the study.

Ethical procedures. Because of the personal nature of qualitative research, there were ethical issues that were considered. Babbie (2017) notes that the intimate nature of qualitative research may lead to certain ethical pitfalls. These issues include the interaction between the researcher and participant where the interviewer is the instrument. This concern is focused around the idea that qualitative research is fundamentally constructivist – where meanings were generated from experiences. Despite the best intentions of the interviewer to make the participants' interview process a reconstruction or recollection that is unchanged by the relationship of the interviewer, there will no doubt be issues that arise depending on the participants comfort level and the skill of the interviewer to effectively conduct an interview (Babbie, 2017).

In the data collection phases of this study, permission to conduct the study interview was granted from two sources; the Executive Director of Shelby County Outreach Ministry granted permission to interview nutrition site directors at the senior nutrition site and the Helping Hands Food Pantry, the Mission's Director of First Baptist Church in Joaquin granted permission for interviewing the site director at the Joaquin Nutrition Site and lastly, the Executive Director of Tri-

County Community Action Group gave consent to interview the nutrition site director of the Harvest to Homes Food Pantry. During the interview process, voluntary participants were given a consent form outlining their right to participate or withdraw from the study. Participants were informed of the time commitment to participate in the study and were given information about how the results would be used.

Completed interview forms were assigned control numbers in the field and these numbers were used as the case number on the coding form. The interview and coding forms will be kept by the researcher for five years (Creswell, 2015) then discarded. Consent forms and demographic data forms will be kept until the end of the project then disposed of after the dissertation approval process.

Assumptions. The first assumption of this study was that the participants would offer honest, complete, and thoughtful answers to interview questions. It was also assumed that these adults were free to express themselves without judgment and to ask questions of the interviewer if he or she does not understand an inquiry or need further clarification. Commitment of participants in the research interview was also anticipated. Finally, it was assumed that these adults would provide valuable and honest insights into their experiences that would provide information that the researcher could use in this study. These assumptions were necessary in order to provide confidence in accurate cataloging and interpretation of participant responses.

Data Analysis. In this qualitative research, statistics were not used to analyze the data; instead, the researcher analyzed words (e.g., transcriptions from interviews). Rather than relying on statistical procedures, the qualitative researcher analyzed the words to group them into larger meanings of understanding, such as themes (Creswell, 2015). Handwritten and digitally recorded information collected from the food site director interviews was typed in Microsoft Word 2016 to understand the developing themes. The researcher hand coded the data, by reading through each interview, to determine possible themes. Three themes, which were discussed in Chapter 4, emerged. These themes were then grouped together to compare and contrast the similarities between site director responses. Two sections of data (food products/groups provided or served and participant demographics from the interviews) were entered into SPSS where the univariate frequencies were calculated and analyzed.

Phase 3: A Review of Texas Community garden in Four Differing Population Areas

Data was collected by researcher from websites, news articles, and personal communication with extension agents from four community garden models in Texas. These community garden models were reviewed to assess vegetable yields and volunteer hours engaged. Because there were differences in the dynamics and sustainability of community gardens based upon population,

a garden based in an urban, suburban, and semi-suburban setting were explored and compared to data collected from a rural garden (Shelby County Community Garden). These models were selected based upon their location and population served, type of volunteer system provided, and the role AgriLife Extension plays in supporting the project. In Chapter 4, a narrative summary of these garden projects' background, implementation, maintenance, and results were provided.

Three primary theories from previous studies were outlined in the literature review and were further examined from Loria (2013) in which he proposed that community gardens have the potential to foster health, quality of life, ecological sustainability, civic engagement, cultural preservation, and social capital with human communities. Another study that was explored was the theory proposed by Fitzgerald and Spaccarotella in 2009 in which they speculated that vegetables gardens may be particularly advantageous for low-income groups who do not identify fresh fruits or vegetables as a staple food, perhaps because of perceived costs and when price was a strong determinant of food choice. The final theory investigated was from one conducted in 2010 by Sommerfeld, McFarland, Waliczek, and Zajicek in which they stated that community gardens offer a viable low-cost option to increasing access to fresh produce in areas where residents struggle to acquire adequate amounts of fresh fruits and vegetables for a healthy diet. They explained the relationship between fruit and vegetable consumption and gardening as, "...older adults report that factors such as ownership of a

garden at some point, experiences with foods eaten from a garden (past or present), early exposure to the taste of fresh fruit and vegetables, the availability of fresh produce, and eating with others can enhance fruit and vegetable consumption of this population” (p. 712). However, according to a study by Mead (2008), he stated that the literature has failed to address community gardens as a means to supplement senior adult food assistance programs.

Chapter 4: Results

Introduction

This chapter sets out the quantitative results of the food insecurity questionnaire and the qualitative results from the food site director interviews and then utilizes the results to make a comparison between key questions and answers received from both sets of respondents. In addition, the results of a review of four Texas community gardens in differing population areas were compared to assess their annual vegetable yields and community service hours while examining the use of Texas A&M AgriLife Extension Service county agents to provide oversight of project and volunteers.

This explanatory sequential mixed methods design emphasized quantitative research analysis to generate new information with the qualitative analysis playing a minor supporting role. Along with the surveys and interviews conducted at two congregate meal and two food pantry sites, researcher utilized data referenced from other community garden studies, internet webpage statistics, and garden newsletters and journals. These research results were outlined in the subsequent section, referenced and cited throughout the discussion chapter, and used to further validate the conclusions. The research population was comprised of 83 participants and use of a one-on-one survey

method was utilized in order to ensure that there was 100% data collection using a non-purposive sampling approach. Study results from four onsite food site director interviews were also presented for the qualitative analysis section.

The first step in providing the results was to assess the descriptive statistics to establish the control variables and the basic characteristics of the sample. This step was followed by an analysis of the remaining variables and aspects of the food security questionnaire under the following headings:

1. Food sources and types received
2. Congregate meal satisfaction
3. Vegetable consumption
4. Quality and satisfaction with life
5. Food security
6. Gardening experiences and education desired
7. Life satisfaction index
8. Food security index

Data were collected to survey the trends in food assistance received by rural senior adults and to discuss the possible limitations and challenges faced by food site program directors in providing fresh vegetables to food assistance recipients in Shelby County, Texas. A qualitative analysis of these interviews was provided under the sections 1) site background, 2) types of food products provided, 3) perceptions about food assistance, and 4) educational programs

preferred. A comparison was then drawn from the following key research questions posed to both sets of respondents:

1. Is food security and issue/concern?
2. What types of food were served at meal site?
3. How were vegetables served?
4. How often were fresh/raw vegetables served?
5. What were the levels of satisfaction of the quality of foods served?
6. Were educational programs on gardening desired?
7. Would you/they garden if space were provided?

In the last section, community garden models in four different population areas in Texas were discussed as to their program goals and background, implementation, maintenance, and results.

Phase 1: Quantitative Analysis – Trends in Senior Adult Food Security

Demographic Statistics. In May 2018, one-on-one surveys were conducted onsite at two congregate nutrition sites in Shelby County, Texas with 83 participants, age 60 or above. All respondents received meals from a congregate nutrition site in Shelby County, Texas. A summary of demographic information for respondents is presented below in Table 5.

Table 5

Food Insecurity Study Participant Profile

Variable (n=83)		f	Percent	Valid Percent	Cumulative Percent
Gender	Male	28	33.7	33.7	33.7
	Female	55	66.3	66.3	100.0
Age	60-69	30	36.1	36.1	36.1
	70-79	40	48.2	48.2	84.3
	80-89	13	15.7	15.7	100.0
Ethnicity	Hispanic	1	1.2	1.2	1.2
	Non-Hispanic	82	98.8	98.8	100.0
Race	Non-white	12	14.5	14.5	14.5
	White	71	85.5	85.5	100.0
Education	High School or Less	51	61.4	61.4	61.4
	Some College or Technical School	20	24.1	24.1	85.5
	College Degree	12	14.5	14.5	100.0

Gender. Although ideally the research should have attracted a 50/50 split of males and females in the research population in order to ensure a lack of bias, these results were not possible due to the uneven gender distribution in participation at the congregate nutrition sites. Accordingly, the research population gender distribution was calculated as being 66% female ($n = 55$) and 34% male ($n = 28$).

Age. As the two senior nutrition sites were designed to provide meals for older adults, this study specifically sought to target senior adults (age 60 and

above) to understand their trends in procuring foods and the relationship between quality of life, vegetable consumption, and food security. Data from respondents below 60 years of age was not obtained. The definition of the term *senior adult*, in this study, was established as age 60 or above and one who receives food assistance services from either the Shelby County Senior Nutrition Site (A. Golden, personal communication, May 4, 2018) and the Joaquin Senior Nutrition Site (N. Hardy, personal communication, May 9, 2018). The age distribution of the research population is shown in Figure 6.

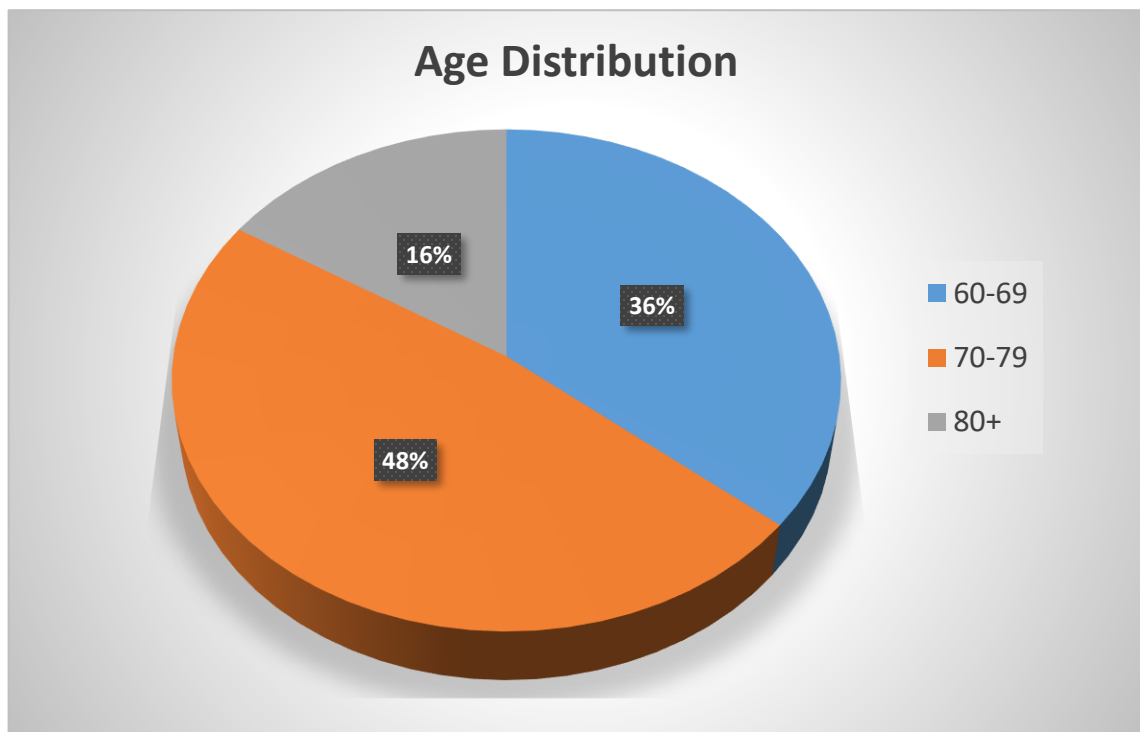


Figure 6. Age distribution of respondents.

As seen in the figure above, almost half of the research population were between the ages of 70 to 79 (48%) with slightly fewer individuals in the 60 to 69 age range (36%), and the fewest number of participants ranged from 80 and above (16%). The mean age was 72 years and the standard deviation was 6.547, which was interpreted as the number of cases being approximately 6.547 away from the mean value. The minimum reported age was 60 and the oldest respondent was 89 years.

Race and ethnicity. The data reflected the research population is very white and non-Hispanic (86%), and only 15% of the population was non-white (black or African American, American Indian or Alaska Native, Asian or Native Hawaiian or other Pacific Islander). Race demographics and research population were near reflective of the findings by the U.S. Census Bureau in 2015 for Shelby County, Texas as these findings reflect three-quarters (78%) were considered white and one-fourth (22%) non-white.

Educational background. This demographic was useful to realize the relationship between food assistance participants and level of education, insofar as understanding whether senior adults with a lower level of education were more likely to rely on the services of food assistance programs in Shelby County, Texas. The results are shown in Figure 7.

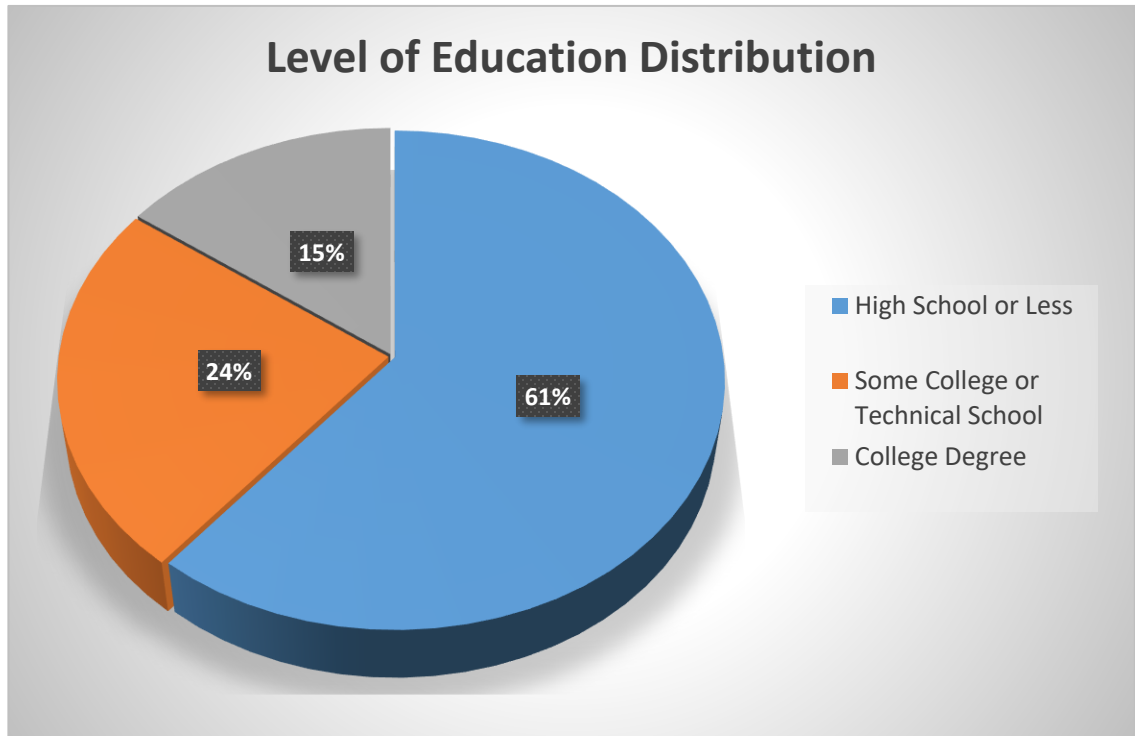


Figure 7. Highest level of education distribution.

As can be seen from this figure, the greatest proportion of the research population had either a high school diploma or less (61%), whereas 24% had some college or technical school education, and only 15% had a college degree. This data also aligns with the average distribution of the research population and the expected demographic of the location according to the U.S. Census Bureau (2015) in which it reflected that 75% of Shelby County indicated a high school-level education, 10% less than a high school degree, and only 15% indicated they had a college degree. This feedback demonstrated that the population

could be considered representative of the areas, and thus adds further weight to the research. At the time of this survey, the respondents' median highest level of school completed was high school ($n = 39$), with 12 reporting they had less than a high school education and five stating they had a graduate or professional degree. In addition, 20 indicated they had some college or technical schooling and seven reported having a bachelor's degree (Table 6).

Table 6

Highest Level of School Completed

Level of Education	<i>f</i>	Percent	Cumulative Percent
Less than High School	12	14.5	14.5
High School or GED	39	47.0	61.4
Some College or Technical School	20	24.1	85.5
Bachelor's Degree	7	8.4	94.0
Graduate or Professional Degree	5	6.0	100.0
Total	83	100.0	

In addition to respondent demographic background information, this study used data from self-reported measures that assessed how respondents received their food, how vegetables were served at meal sites, their satisfaction with food quality and temperature, quantity of vegetables consumed daily, life satisfaction,

the relationship between food and financial security, past fruit and vegetable gardening experiences, and their desire to receive educational programs on gardening. This section of the questionnaire was analyzed using IBM SPSS (version 25) and Excel to provide descriptive statistics and also to create a series of visual displays which helped to explain the relationships between the variables examined in this study. It should be noted, at the onset of this study, that a research population of 83 can be considered sufficiently large for the responses to have statistical meaning and validity under the analysis carried out in the previous chapter. In order to ensure that each variable was analyzed to its fullest extent, the researcher only examined one variable at a time (univariate) and where a relationship between variables was examined the researcher ensured that there was at least one dependent variable in the analysis.

Food Sources and Types Received. In the first section of the study, question 1 was used to determine the trends in receiving food by the research population ($n = 83$ participants; $N = 245$ responses). As this question, “How do you receive your food?,” was a multiple response query, the researcher recoded the categories in SPSS to a temporary group labeled *Source Frequencies*. This recoding was to eliminate an invalid response of “no” for non-selected categories. The results can be seen below in Table 7 which helps explain inclinations senior adults in Shelby County utilized to obtain food. As can be seen from the responses, the mode was “participate in a congregate meal program”, with all

respondents (100%) indicating they received food from this source, a very high majority shopped for their own food (91.6%), while only a little over one-third received food from a food pantry, grew their own, or had someone else do their shopping for them. At the bottom of the spectrum, only 2% received assistance from Meals on Wheels. Of the 245 responses, 83 participants (2.95%), on average, utilized three diverse resources to obtain food.

Table 7

Food Source Frequencies

Source	f	Cases	Percent of Responses
Participate congregate meal program	83	33.9	100.0
Shop at store for own food	76	31.0	91.6
Food pantry supplies	24	9.8	28.9
Grow or raise own food	23	9.4	27.7
Family, friend or service shops	19	7.8	22.9
Shop at farmer's market	15	6.1	18.1
Receive food from Meals on Wheels	5	2.0	2.0
Total	245	100.0	295.2

The second question was a filter question used to establish if the respondent had or had not participated in a congregate meal program. If responding “yes,” the interview continued; if “no,” the interview ended as

participation in a congregate meal program was a determining factor in collecting and analyzing this data.

The third question was posed to determine the quantity of meals received from a congregate meal site by each participant. The mean was 3.45 meals per week, the standard deviation 1.595, and with the results reflected below in Table 8. This table shows that 38.6% ($M = 3.45$; $SD = 1.595$) of respondents received meals from a congregate meal site five days per week, 21.7% received meals one and four days, 18.1% participated three days, and none of the respondents received meals from this food source only two days per week. However, the data may be inaccurately interpreted when the two sites were combined, as five lunch time meals (Monday – Friday) were served at the Shelby County Senior Nutrition Site and only one lunch time meal (Thursday) was served weekly at the Joaquin Senior Nutrition Site.

Table 8

Quantity of Meals

Number of Meals	<i>f</i>	Percent	Cumulative Percent
1	18	21.7	21.7
2	0	0.0	0.0
3	15	18.1	39.8
4	18	21.7	61.4
5	32	38.6	100.0
Total	83	100	

By constructing a cross-tabulation of both meal sites with quantity of meals received per week, the data were more precisely analyzed. This bar chart in Figure 8 now reflects the quantity of meals received by participants for number of days per week at each individual nutrition site. As shown in this figure, 31 participants (46.3%) received a meal from the Shelby County Nutrition Site five days per week as opposed to five participants (7.5%) receiving one meal one day per week from this site. It is interesting to note, that no participants received meals only on two days per week at this site. Whereas, at the Joaquin Nutrition Site, 16 participants (100%) received one meal per week from this site which is consistent with the data as this site only served meals on Thursday.

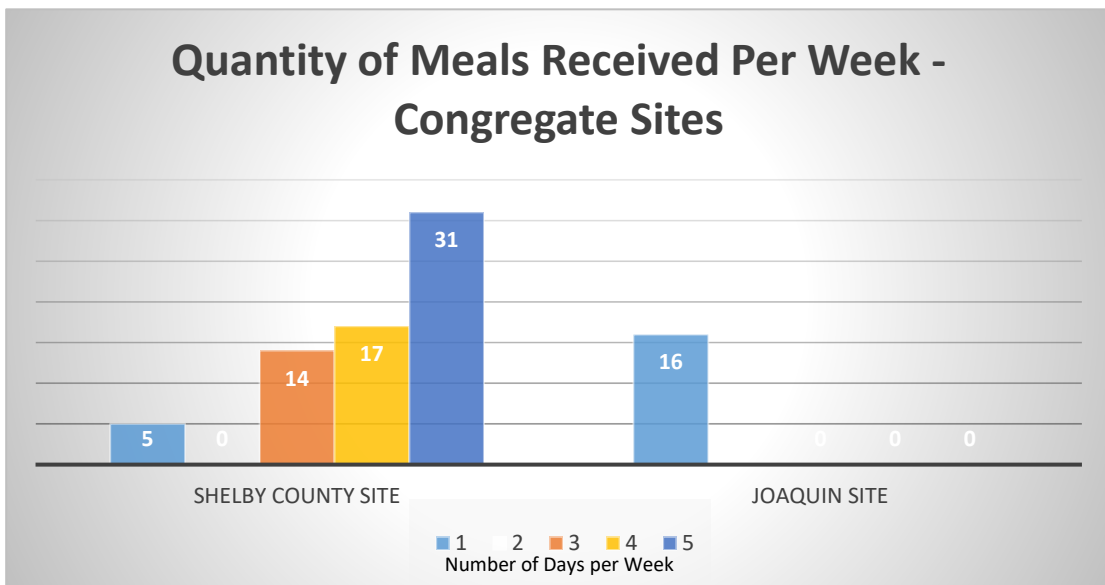


Figure 8. Quantity of meals received per week at each site.

This section goes on to explore the questions, “What type of food do you receive from the congregate meal site?” next, “If you receive vegetables from the congregate meal site, how were they served?” and lastly, “In how many meals per week do you receive fresh vegetables from congregate meal sites?” Questions 4 and 5 were multiple response queries. The researcher recoded the categories in SPSS to a temporary group labeled *Food Types* (question 4) and *Types of Vegetables Served* (question 5) to eliminate an invalid response of “no” for non-selected categories.

The results are reflected in Tables 9 and 10 which explain the food groups and types of vegetables received by participants at congregate meal sites in Shelby County, Texas. As indicated, the modal response from 100% of participants was “received a protein food group”, 96.4% indicated they received vegetables, 92.8% fruit, 90.4% dairy, and 86.7% grains. Of the 387 responses, 83 participants (4.66%), on average, received food from all five food groups (U.S. Department of Health and Human Services, Dietary Guidelines for Americans (2015) reports that there were five main food groups: protein, grains, vegetables, fruit, and dairy. Dessert is not considered a food group in these guidelines, and was, therefore, not calculated in the total number of responses). On types of vegetables served, a large majority (95.2%) indicated the vegetables were cooked (mode), 67.5% said they received fresh (raw or uncooked vegetables), 55.4% received canned or reheated, and 39.8% frozen. Of the 260

responses, 83 participants (3.13%), on average, received vegetables prepared and served in three distinct manners. Table 11 reflects the responses to question 6 which addressed the number of meals per week participants received fresh vegetables. The average number of meals in which fresh vegetables were served averaged a little more than one time per week ($M = 1.40$; $SD = 1.268$).

Table 9

Food Type Frequencies

Food Type	<i>f</i>	Percent of Cases	Percent of Responses
Meat or other protein	83	18.3	100.0
Vegetables	80	17.7	96.4
Fruit	77	17.0	92.8
Dairy	75	16.6	90.4
Grains	72	15.9	86.7
Dessert	66	14.6	79.5
Total	453	100.0	545.8

Table 10

Type of Vegetables Served

Vegetables Served	<i>f</i>	Percent of Cases	Percent of Responses
Cooked	79	30.4	95.2
Fresh (not cooked or raw)	56	21.5	67.5
Canned	46	17.7	55.4
Reheated	46	17.7	55.4
Frozen	33	12.7	39.8
Total	260	100.0	313.3

Table 11

Quantity of Meals per Week with Fresh Vegetables

Meals per Week with Fresh Vegetables	<i>f</i>	Percent of Cases	Percent of Responses
0	25	30.1	30.1
1	23	27.7	57.8
2	18	21.7	79.5
3	13	15.7	95.2
4	2	2.4	97.6
5	2	2.4	100.0
Total	83	100.0	

Congregate Meal Satisfaction. Continuing with the first section of the questionnaire, questions 7 and 8 pertained to the quality and temperature satisfaction of food received from a congregate meal site on a scale that ranged from never satisfied, sometimes satisfied, to always satisfied. Table 12 reflects the results of satisfaction in the quality of food received, and Table 13 reveals the outcomes of satisfaction with the temperature of food received. In both questions, nearly the same number of respondents indicated they were sometimes satisfied ($n = 47$ quality and $n = 45$ temperature). There was little difference in the never satisfied ($n = 17$) and always satisfied ($n = 19$) rankings of quality of food received, but a large disparity was shown regarding temperature, never satisfied ($n = 9$) and always satisfied ($n = 29$). The median level of satisfaction for both quality and temperature of food was “sometimes.”

Table 12

Food Quality Satisfaction

Quality	<i>f</i>	Percent of Cases	Percent of Responses
Never satisfied	17	20.5	20.5
Sometimes satisfied	47	56.6	77.1
Always satisfied	19	22.9	100.0
Total	83	100.0	

Table 13

Temperature Quality Satisfaction

Quality	<i>f</i>	Percent of Cases	Percent of Responses
Never satisfied	9	10.8	10.8
Sometimes satisfied	45	54.2	65.1
Always satisfied	29	34.9	100.0
Total	83	100.0	

Vegetable Consumption. Section two of the questionnaire asked respondents about the quantity of vegetables they had consumed from the past month and how much they eat of vegetables on a daily basis. Figure 9 reflects the times per day vegetables were consumed (fresh, canned, cooked, or frozen) ($M = 1.73$ times per day; $SD = 0.700$). The majority of respondents indicated they had eaten two servings (44.6%) or one serving (41%) of vegetables each day for the past month. Very few (14.5%) indicated they consumed three servings daily.

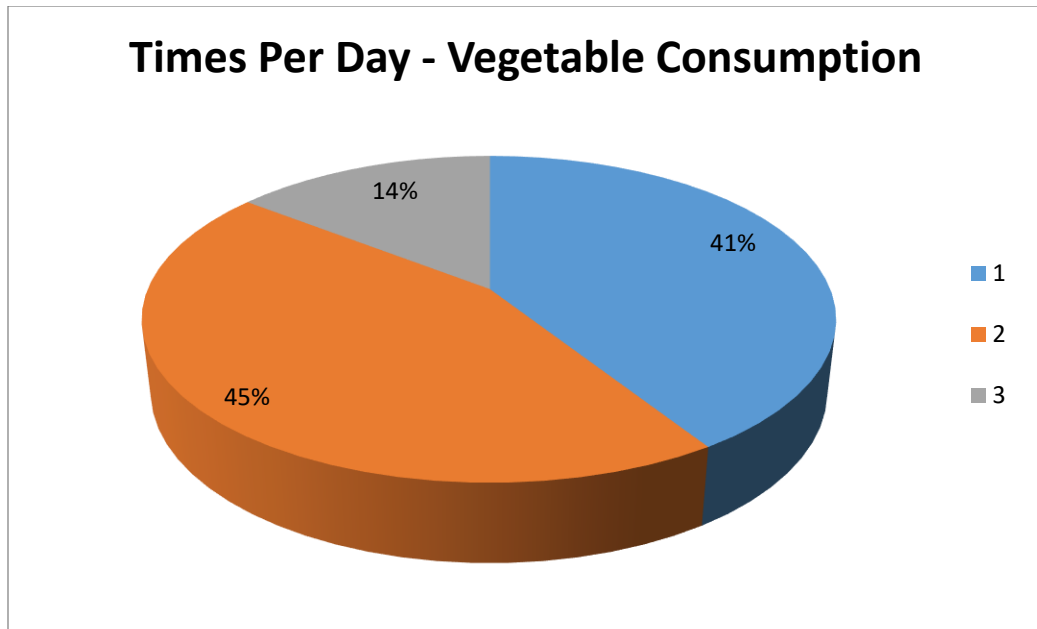


Figure 9. Times per day of vegetable consumption.

Figure 10 is an indication of the quantity of those vegetables consumed (M = about half a cup serving; $SD = 0.755$). Over half (50.6%) of respondents said they had eaten half a cup of vegetables per serving during the past month, 24.1% said one cup, and 22.9% said less than half a cup. The fewest number of respondents indicated they had consumed more than one cup (2.4%) of vegetables per serving.

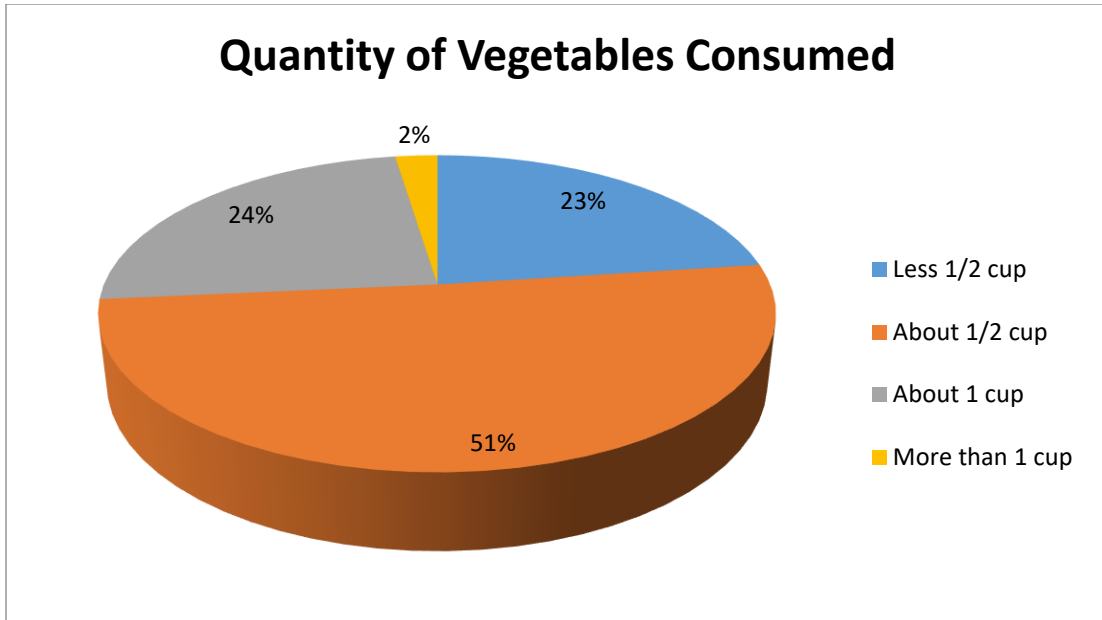


Figure 10. Quantity of vegetable consumption.

Quality and Satisfaction of Life. The third section of the questionnaire addressed quality and satisfaction of life. Question 11 asked respondents to indicate their quality of life as a whole and to rate it on a scale from very bad to very good. Four questions were then posed to the research population to ascertain their satisfaction with life to the extent that they agree or disagree. Table 14 below illustrates their self-reported quality of life as a whole. The highest number of the respondents (83%) indicated that their quality of life as a whole was either good (42%) or somewhat okay (41%) with a median of “good.” Whereas, 8.4% saw their quality of life “bad” and, equally, on the opposite end of the scale, 8.4% rated their life very good.

Table 14

Quality of Life as a Whole

Quality of Life	<i>f</i>	Percent	Cumulative Percent
Bad	7	8.4	8.4
Somewhat Okay	34	41.0	49.4
Good	35	42.2	91.6
Very Good	7	8.4	100.0
Total	83	100.0	

Tables 15 - 17 reflects the extent to which the respondents agreed or disagreed with their satisfaction of life. In comparing Tables 15 and 16, the data shows the respondents almost equally rated their life satisfaction the same, with half indicating the median, they “agree” that they enjoy their life overall (56.6%) and they are happy much of the time (51.8%). In both questions, the respondents equally indicated “strongly agree” (8.4% each) and “disagree” (6% each) with the statements.

Table 15

Enjoy Life Overall

Enjoy Life	<i>f</i>	Percent	Cumulative Percent
Disagree	5	6.0	6.0
Neither Agree nor Disagree	24	28.9	34.9
Agree	47	56.6	91.6
Strongly Agree	7	8.4	100.0
Total	83	100.0	

Table 16

Happy Much of the Time

Happy	<i>f</i>	Percent	Cumulative Percent
Disagree	5	6.0	6.0
Neither Agree nor Disagree	28	33.7	39.8
Agree	43	51.8	91.6
Strongly Agree	7	8.4	100.0
Total	83	100.0	

In Table 17 below, the data reflected over half of the respondents indicated they “agree” (median) that they look forward to things (53%). A large percentage of the respondents were neutral on the subject, neither agreeing nor

disagreeing (31.3%) with looking forward to things. The respondents that “strongly agree” (4.8% each) and on the opposite end, “disagree” (10.8% each) with the statement were outlined.

Table 17

Look Forward to Things

Look Forward	f	Percent	Cumulative Percent
Disagree	9	10.8	10.8
Neither Agree nor Disagree	26	31.3	42.2
Agree	44	53.0	95.2
Strongly Agree	4	4.8	100.0
Total	83	100.0	

The data in Table 18 below was ranked-ordered contrasting from the previously three tables, beginning with “agree” (median) to “strongly disagree.” The data reflected that almost half of the respondents were neutral on the subject (43.4%) and 30.1% disagreed with the statement “life gets me down.” This table also shows that 21.7% agreed with the statement while only 4.8% strongly disagreed.

Table 18

Life Gets Me Down

Life Down	f	Percent	Cumulative Percent
Agree	18	21.7	21.7
Neither Agree nor Disagree	36	43.4	65.1
Disagree	25	30.1	95.2
Strongly Disagree	4	4.8	100.0
Total	83	100.0	

Food Security Among Senior Adults. The fourth part of the questionnaire addressed the respondent's food security in three questions on a scale ranging from never to always. As shown in Table 19, the highest percentage of respondents (37.3%) indicated that having enough food before money ran out was never a concern and it was also the median. Slightly below this indicator, 33.7%, said food ran out before they had money to purchase more, 21.7% stated this problem occurred often for them, and 7.2% indicated that it was always a concern.

Table 19

Food and Money to Purchase More

Food and Money	f	Percent	Cumulative Percent
Never True	31	37.3	37.3
Sometimes True	28	33.7	71.1
Often True	18	21.7	92.8
Always True	6	7.2	100.0
Total	83	100.0	

Similar responses were indicated in question 17 and shown in Table 20. The largest percent (36.1%), said that they “never” (reported median) had a situation where their food did not last and they had no more money. Sometimes a concern was indicated by 37.3% while often by 18.1% and 8.4% indicated it was always a concern.

Table 20

Food Did Not Last and No Money to Purchase More

Food and Money	<i>f</i>	Percent	Cumulative Percent
Never True	30	36.1	36.1
Sometimes True	31	37.3	73.5
Often True	15	18.1	91.6
Always True	7	8.4	100.0
Total	83	100.0	

The last question in this section and Table 21 reflected the respondent's ability to afford balanced meals. Over 40% said they sometimes could not afford to eat a balanced meal, 30.1% said never, 20.5% indicated the inability to afford balanced meals occurred often, and 6% said this situation always occurred and this inability was also the median.

Table 21

Afford to Eat Balanced Meals

Afford Balanced Meals	<i>f</i>	Percent	Cumulative Percent
Never True	25	30.1	30.1
Sometimes True	36	43.4	73.5
Often True	17	20.5	94.0
Always True	5	6.0	100.0
Total	83	100.0	

Gardening Experiences and Education Desired. The fifth section and last eight questions of the questionnaire dealt with the respondent's gardening experiences and their desire for educational programs and/or opportunities to garden. Respondents were asked whether they had grown a vegetable garden in the past five years (mode = no), and if so, how many times per year have they grown produce (mode = one time). The questionnaire continued by asking the same information regarding raising fruit or berries. Figure 11 reflects, of the 83 respondents, 31 (37.3%) had gardened in the past five years, 51 (61.4%) said they had not gardened, and one was unsure (1.2%). Of the respondents that had gardened, 27 (32.5%) indicated that they had done so one time per year and only four (4.8%) had gardened two or more times in a year.

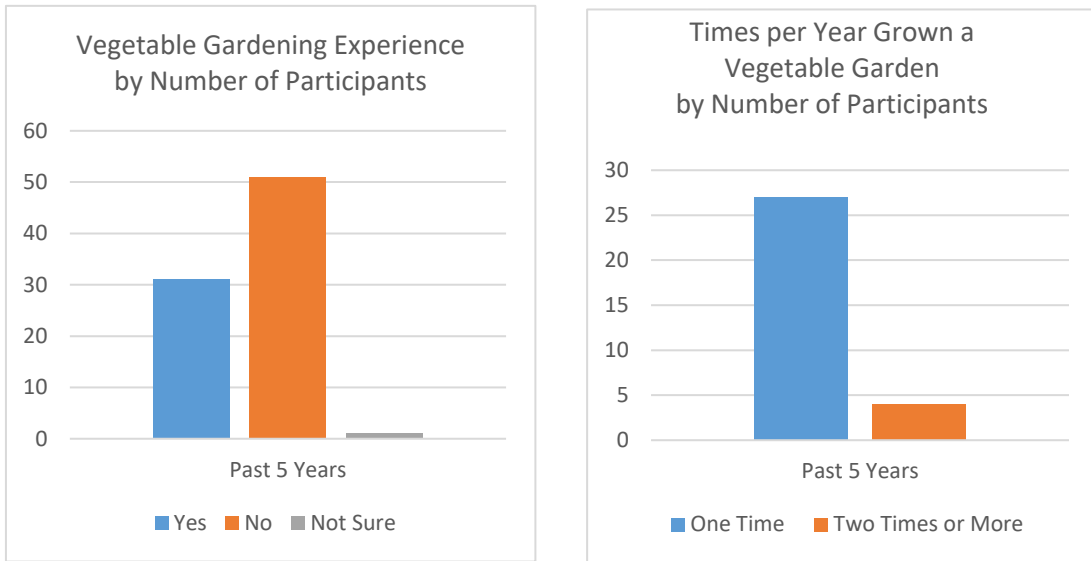


Figure 11. Vegetable garden experience and how often practiced.

Figure 12 reflects, that of the 83 respondents, 16 (19.3%) had grown fruit in the past five years, 65 (78.3%) said they had not (mode = no), and two (2.4%) were not sure. Of the respondents that had grown fruit, 13 (15.7%) indicated that they had done so one time per year (modal response) and only one (1.2%) had raised fruit two or more times in a year.

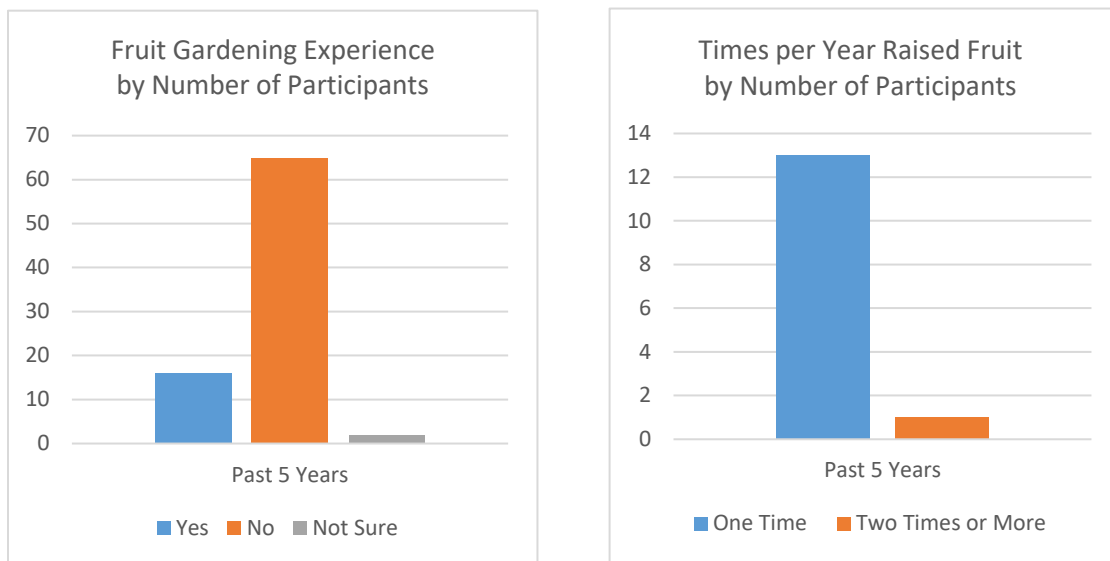


Figure 12. Fruit garden experience and how often practiced.

The last questions in this section were indicators of possible educational programs/garden sites for respondents to participate. Questions 23 and 24 asked if they would like to be shown how to garden and/or desired to have help creating or planting a garden. Figure 13 reflects, of the 83 respondents, 17 would like a program on how to garden, 43 would not like a program, and 21 were unsure. On question 24, 16 would like to have help planting or creating a garden, 44 would not, and 23 were unsure. Questions 25 and 26 asked if they would garden if a plot were available at the Shelby County Senior Nutrition Site or the community garden site. Figure 13 reflects, of the 83 respondents, 20

indicated they would garden at the Shelby County Senior Nutrition Site if a plot were available, 32 would not, 31 were unsure; and seven would garden at the community garden site if a plot were available, 49 would not, and 27 were unsure. The modal response for questions 23-26 were all “no,” indicating that at the time of this survey, participants were not interested in receiving education on nor participating in a garden project.

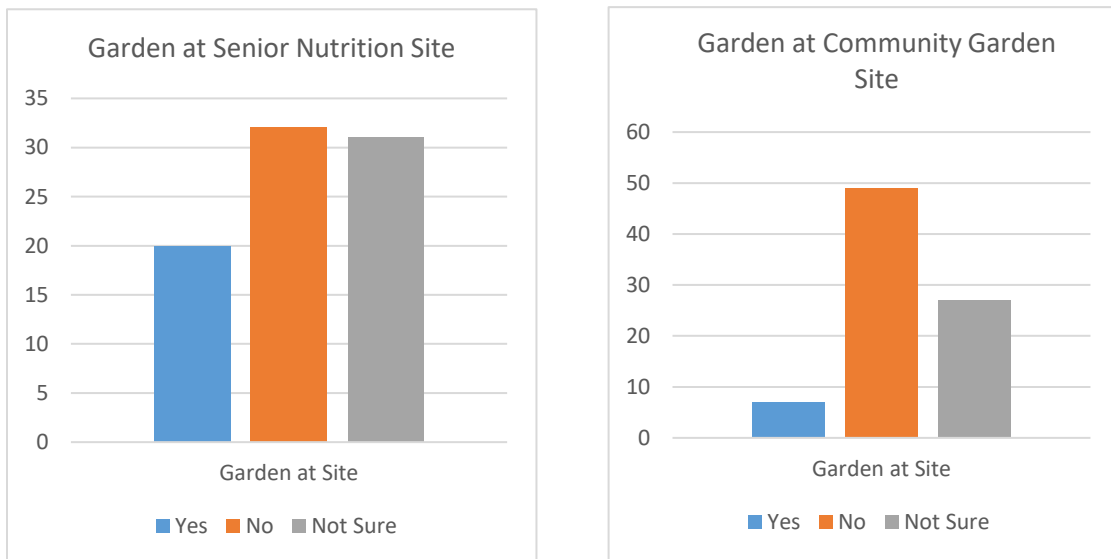


Figure 13. Garden education programs and desire to garden.

Two indices were generated using SPSS by researcher to analysis life satisfaction and food security within the research population and were utilized to examine the following hypotheses:

- H₁: There are differences in life satisfaction among different age groups for the 2018 congregate meal participants.
- H₂: There are differences in life satisfaction among different levels of education for the 2018 congregate meal participants.
- H₃: There are differences in food security among different age groups for the 2018 congregate meal participants.
- H₄: There are differences in food security among different levels of education for the 2018 congregate meal participants.
- H₅: There is an association between life satisfaction and food security for the 2018 congregate meal participants.
- H₆: There is an association between life satisfaction and have grown a vegetable garden for the 2018 congregate meal participants.
- H₇: There is an association between life satisfaction and times per day vegetables were consumed for the 2018 congregate meal participants.

Life Satisfaction Index. In an effort to rank quality of life values reported by respondents, a life satisfaction index, which included a combination of questions 12-15, was created and the reliability of the index was checked for consistency using Cronback's alpha. The alpha value is based on the correlations of the items in the index with each other. Alpha ranged in value from 0 to 1; the closer to 1, the greater the reliability of the index (Szafran, 2012). According to Szafran (2012), alpha values of .70 or higher were generally considered adequate in the social sciences. Alpha values of .80 to .89 were considered good, and values of .90 and above were excellent (Szafran, 2012).

Respondents were asked to indicate the extent in which they agreed or disagreed with how they enjoy life overall on a scale of 1 to 5, if they were happy much of the time, if they look forward to things, and if life gets them down. Table 22 below reflects these rankings and the life satisfaction value. The mean average was 3.5 indicating that the majority of respondents neither agreed nor disagreed with life satisfaction overall. Over half (62.8%) of the respondents indicated that they were neutral on the subject (neither agree nor disagree with life satisfaction). Agreeing with life satisfaction, were 25.3% of the research population, 10.8% disagreed, only 1.2% strongly agreed, and none strongly disagreed. The Cronback's alpha was .820, which indicates good reliability.

Table 22

Life Satisfaction Index

Value and Range	f	Percent	Cumulative Percent
Strongly Disagree: 1.0 – 1.9	0	0.0	0.0
Disagree: 2.0 – 2.9	9	10.8	10.8
Neutral: 3.0 – 3.9	52	62.8	48.2
Agree: 4.0 – 4.9	21	25.3	94.6
Strongly Agree: 5.0+	1	1.2	100.0
Total	83	100.0	

Food Security Index. The second index was designed to reflect the level of food security respondents experienced over the past year and the reliability the index was checked for consistency using Cronback's alpha, as described above. This index was a combination of questions 16-18 of the survey. Respondents were asked to indicate the level to which they worried whether food would run out before they had money to purchase more, the food did not last and they did not have money to buy more, and if they could not afford to eat balanced meals on a scale of 1 to 4. Table 23 below reflects these rankings and the food security value. The mean average was 2.0 indicating that the majority of respondents specified that they were food insecure sometimes within the past 12 months. Over half (62.6%) of the respondents indicated that that at some point in the past year they were food insecure with 37.3% signifying they were never food secure. Of the group sampled, 39.7% indicated they were food insecure sometimes, 20.5% often, and 2.4% always. The Cronback's alpha was .914, which indicates excellent reliability of this index.

Table 23

Food Security Index

Value and Range	<i>f</i>	Percent	Cumulative Percent
Never True: 1.0 – 1.9	31	37.3	37.3
Sometimes True: 2.0 – 2.9	33	39.7	71.5
Often True: 3.0 – 3.9	17	20.5	95.2
Always True: 4.0	2	2.4	100.0
Total	83	100.0	

One-Way (Analysis of Variance) ANOVA. To test research hypotheses H₁ through H₄ in this study, researcher utilized the one-way ANOVA (analysis of variance) multivariate analysis. ANOVA is designed to be used for categorical independent variables (factors) but can make use of continuous independent variables if they were collapsed into discrete categories.

Listed below were the results from analyzing the one-way ANOVA for each hypothesis in this study. In the first two hypotheses, the independent variable was life satisfaction and the dependent variables were age and levels of education. In the third and fourth hypotheses the independent variable was food security and the dependent variables were age and levels of education.

H₁: There are differences in life satisfaction among different age groups for the 2018 congregate meal participants.

There were no significant differences between life satisfaction and age ($F = 0.955$, $df = 2$ and 80 , $p = 0.389$). On the life satisfaction index that ranged from 1 to 5, the 2018 congregate meal participants in Shelby County, Texas who were in their 80s averaged 3.69 while those in their 70s averaged 3.43 and those in their 60s averaged 3.52.

H₂: There are differences in life satisfaction among different levels of education for the 2018 congregate meal participants.

There were no significant differences between life satisfaction among different levels of education ($F = 0.559$, $df = 4$ and 78 , $p = 0.693$). On the life satisfaction index that ranged from 1 to 5, the 2018 congregate meal participants in Shelby County, Texas who were had less than a high school degree averaged 3.56, those with a high school degree averaged 3.44, those with some college or technical school averaged 3.46, while those with a bachelor degree averaged 3.57 and with a graduate or professional degree averaged 3.85.

H₃: There are differences in food security among different age groups for the 2018 congregate meal participants.

There were no significant differences between food security and age. ($F = 1.089$, $df = 2$ and 80 , $p = 0.341$). On the food security index that ranged from 1 to 4, the 2018 congregate meal participants in Shelby County, Texas who were in their 80s averaged 1.85 while those in their 70s averaged 2.14 and those in their 60s averaged 1.88.

H₄: There are differences in food security among different levels of education for the 2018 congregate meal participants.

There were no significant differences between food security among different levels of education ($F = 2.354$, $df = 4$ and 78 , $p = 0.061$). On the food security index that ranged from 1 to 4, the 2018 congregate meal participants in Shelby County, Texas who were had less than a high school degree averaged 2.53, those with a high school degree averaged 2.08, those with some college or technical school averaged 1.73, while those with a bachelor's degree averaged 1.62 and with a graduate or professional degree averaged 1.73.

Correlation Analyses. Three separate correlations were examined as part of this study to test research hypotheses H₅ through H₇. A correlational analysis using Pearson's r was conducted to determine the relationship between life satisfaction, on a scale of 1 to 5, with higher scores indicating greater life satisfaction. The measure of food security ranged from 1 to 4 with higher scores indicating greater food security.

H₅: There is an association between life satisfaction and food security for the 2018 congregate meal participants.

The analysis indicated that there was a strong negative relationship (Pearson's $r = -.513$) between life satisfaction and food security. Individuals with higher life satisfaction tend to have less food security. This correlation was interpreted to mean that as life satisfaction decreases then food security also decreases.

Next, the relationship between life satisfaction and have grown a vegetable garden in the past five years were examined using the crosstabs procedure and eta as the measure of association because the relationship between scale (life satisfaction) and nominal (grown a vegetable garden) variables were examined. When life satisfaction is the dependent variable, there is a weak relationship between the two variables ($\eta = .166$).

H₆: There is an association between life satisfaction and have grown a vegetable garden for the 2018 congregate meal participants.

Lastly, the relationship between life satisfaction and times per day vegetables were consumed was explored using Pearson's r . The analysis indicated that there was a strong positive relationship (Pearson's $r = .406$) between life satisfaction and times per day vegetables were consumed which

means that as life satisfaction increases the number of times per day vegetables were consumed also increases.

H7: There is an association between life satisfaction and times per day vegetables were consumed for the 2018 congregate meal participants.

Need for Follow-up Explanations. The results of the quantitative experiment do not support the hypotheses. Based on previous research, studies have shown that there was a significant difference in life satisfaction and food security when examining age and levels of education. Therefore, more data is needed through future research and/or larger sample size to determine why there were discrepancies in these relationships.

Phase 2: Qualitative Analysis – Perceptions of Nutrition Site Directors

Data were collected to discuss the possible limitations and challenges faced by food site program directors in providing fresh vegetables to food assistance recipients in Shelby County, Texas. A summary of these interviews was provided below under the sections of 1) participant demographics, 2) site background, 3) types of food products provided, 4) perceptions about food assistance, and 5) educational programs preferred.

Demographic Statistics. In May 2018, one-on-one interviews with food nutrition site directors were conducted at two congregate nutrition sites and two food pantries in Shelby County, Texas with four (female) participants. Due to the

small sample size ($n = 4$), a narrative summary of demographic information for respondents was presented.

Gender. For this study, ideally, it would have been valuable to have a research sample in which site directors of both genders were interviewed. However, in Shelby County, Texas, at the time of this study, all directors interviewed were female.

Age. The ages of the site directors ranged from a minimum of 26 years to 65 years, with two directors indicating their age in the 40s (42 and 47).

Race and ethnicity. All participants were non-Hispanic, with three considered white and one African American or Black.

Level of education. All participants ($n = 4$) responded that their highest level of education included some college or technical school. Two site directors indicated that they planned to return to college in the near future to complete bachelor's degrees.

In addition to respondent demographic background information, researcher used one-on-one interview techniques to digitally record and handwrite answers from participants to questions pertaining to the organization's goals, criteria for participants to receive food assistance at their site, types of food products provided food assistance participants (based upon food groups), their perceptions about food assistance they have from working with the senior adults in their program, and types of educational programs they would like to see

implemented at their site. Answers to interview questions pertaining to challenges perceived were grouped into the following three themes to compare and contrast the limitations, if any, site director's encounter:

- Theme 1: Challenges site directors perceive that food assistance participants face in receiving aid from a nutrition site.
- Theme 2: Challenges in storing fresh vegetables for clientele use.
- Theme 3: Challenges in distributing/serving fresh vegetables for clientele use.

Site Background. Questions 1 through 3 were utilized to explore the types of funding that nutrition sites received in order to provide food assistance and to determine the number of years a particular site director had been employed by the organization and in the position of director. Table 24 below provides a summary of this data. From this data, it was interesting to note that all four sites relied upon local donations and monetary support, and three of the four sites purchased food from the East Texas Food Bank in Tyler, Texas.

Table 24

Nutrition Site Funding and Experience of Site Directors

Nutrition Site Code	How Site is Funded/Food Provided	Years with Organization	Years as Director
Director A	Deep East Texas Council of Governments (DETCOG), community donations and monetary contributions, City of Center (utilities and building), East Texas Food Bank.	1	1
Director B	Church-based mission, community donations and monetary contributions.	8	8
Director C	Grants, monetary contributions from local businesses and individuals, East Texas Food Bank and Feeding America.	4	3
Director D	Deep East Texas Council of Governments (DETCOG), community donations, and East Texas Food Bank.	6	4

In the next question (4), participants were asked to summarize the goals of their food assistance program. A common goal of meeting nutrition needs was noted among all four sites directors:

Director A explained, “Our goal is to provide nutritious meals and provide avenues in which participants can make social and emotional connections.”

Director B stated, “We are here to provide a weekly hot meal to help those who don’t have the resources to enjoy that luxury a lot of people take for granted and to give those who are in need the food resources to meet their nutritional requirements.”

Director C said, “Our goal is to feed as many food insecure people in Shelby County as we can in one month, and to do so, as long as the resources are available.”

Director B echoed the others and added a spiritual connotation, “It is our mission to feed the hungry as directed in the Bible and modeled by Christ.”

In question 5, it was asked for the site directors to list the benefits they think their food assistance participants received from their site. Question 8 was combined in the responses for Table 25 to reflect how often participants could receive food assistance from a particular site. As reflected in this table, all four sites addressed the nutrition aspect of food insecure individuals in Shelby County. In addition, some sites touched on other important aspects such as, the emotional, physical, social and spiritual needs of individuals. One area that was not indicated as one that was addressed at a site was the mental aspect. As this aspect continues to impact communities negatively, this may need to be addressed by these sites or the site to have the resources to refer participants to the appropriate source to meet this potential need.

Table 25

Benefits and Frequency of Food Assistance at Nutrition Sites

Nutrition Site Code	Benefit of Site to Participant	Frequency of Food Assistance
Director A	<ul style="list-style-type: none"> • Social and emotional connections through friendships • Nutritious hot meals five days a week • Meals to homebound individuals seven days a week • Physical fitness and mental improving activities • Educational programs • Information on senior-based programs • Updated Medicare information • Protection from possible scams • Volunteer opportunities 	<p>5 days per week (Monday – Friday) – hot meal at site</p> <p>7 days per week – delivery for Meals on Wheels recipients</p>
Director B	<ul style="list-style-type: none"> • Social and emotional connections through friendships • Nutritious hot meals, food for their pantries and fresh produce • Educational programs • Spiritual needs addressed • Volunteer opportunities 	<p>1 hot meal provided each Thursday</p> <p>1 food box per family 2 times a month</p> <p>Fresh produce available as donated</p>
Director C	<ul style="list-style-type: none"> • Food • Nutrition and financial education programs • Resource center for services provided in the county/community • Financial assistance with utilities, homelessness, and transportation to physician offices 	<p>1 food box per family per month</p>
Director D	<ul style="list-style-type: none"> • Food and fresh produce • Nutrition, financial, and parenting education programs • Resource center for services provided in the county/community • Financial assistance with utilities, homelessness, preschool and day care • Computer lab for researching jobs and completing applications 	<p>1 food box per family per week</p> <p>Fresh produce available monthly</p>

It was interesting to note, from the responses in questions 6 and 9, the age, racial and socio-economical differences in the groups of people that frequented these sites, as perceived by the site directors. More senior adults (age 60 and above) tend to frequent the congregate meal site programs, whereas adults (age 18 and above), received food assistance from the food pantries. Racially, more whites frequented the congregate meal sites as did non-whites and the majority of participants at the food pantries were reported as non-white. On the economic side, congregate meal site directors indicated that their participants ranged from a fixed income, food insecure, to food secure, business owners, retired and financially secure. Food pantry directors indicated that all recipients were reported to be part of a limited resource audience.

As Director A indicated, “The participants that meet at this site do so Monday through Friday, for them, it’s a place to meet people, to get out of the house, and to be more active, regardless of their income.”

Question 7 pertained to the criteria established by the site or required by funding sources in which food assistance was made available to individuals (Table 26). Three of the four sites (A, C, and D) purchased food from the East Texas Food Bank, and these directors stated that food bank guidelines stipulated that they could not ask for any type of proof of income from food assistance recipients. However, Deep East Texas Council of Governments (DETCOG),

which provides funding for sites A and D, does permit them to require proof of income as eligibility to receive food assistance.

Table 26

Criteria to Receive Food Assistance

Nutrition Site Code	Age	Proof of Income
Director A	60 years or above, free or reduced cost (\$3.00) meal. Adults under 60 years, cost of \$6.00 per meal. Under 18 may receive meals free if with an adult age 60 or above.	No
Director B	Receive free meal regardless of age. Under 18 must be accompanied by an adult. Food boxes provided upon request for adults.	No
Director C	Food boxes provided upon request for adults (one per family per month).	No
Director D	Food boxes provided upon proof of income for adults (one per family per week).	Yes

Types of Food Provided. In this section, questions 10 through 14, site directors indicated the types of product by food group they either provided, served, prepared or delivered to food assistance participants. As these questions were multiple response queries, researcher recoded the categories in SPSS to a temporary group labeled *Protein* (question 10), *Grains* (question 11), *Vegetables* (question 12), *Fruit* (question 13), and *Dairy* (question 14) to eliminate an invalid response of “no” for non-selected categories.

The results shown below in Table 27 indicate the food groups and how they were received by participants at congregate meal and food pantry sites in Shelby County, Texas. As indicated, the modal response from 100% of site directors was that all five food groups were provided their clientele in the form of frozen, dried, canned, cooked, fresh or raw. The protein food group was provided to food assistance recipients, on average, in 3.75 distinct ways; grains in 2.5, vegetables in 2.75, dairy in 2.25, and fruit in 2.20. The data indicated that all four food sites offer protein, grain, vegetable, and fruit from these food groups with only three sites providing dairy.

Table 27

Food Groups Provided, Served, Prepared and/or Delivered at Nutrition Sites

Protein Food Group			
How Provided to Participants	<i>f</i>	Percent of Cases	Percent of Responses
Frozen	3	20.0	75
Dry	4	26.7	100
Canned	4	26.7	100
Cooked	2	13.3	50
Fresh or Raw	2	13.3	50
Total	15	100.0	

Grain Food Group			
How Provided to Participants	<i>f</i>	Percent of Cases	Percent of Responses
Canned	4	40	100
Cooked	3	30	75
Fresh or Raw	1	10	25
Total	10	100	

Vegetable Food Group			
How Provided to Participants	<i>f</i>	Percent of Cases	Percent of Responses
Frozen	2	18.2	50
Canned	4	36.4	100
Cooked	2	18.2	50
Fresh or Raw	3	27.3	75
Total	11	100.0	

Fruit Food Group			
How Provided to Participants	<i>f</i>	Percent of Cases	Percent of Responses
Frozen	2	18.2	50
Dry	1	9.1	25
Canned	4	36.4	100
Cooked	2	18.2	50
Fresh or Raw	2	18.2	50
Total	11	100.0	

Dairy Food Group			
How Provided to Participants	<i>f</i>	Percent of Cases	Percent of Responses
Dry	3	33.3	75
Canned	1	11.1	25
Cooked	2	22.2	59
Fresh or Raw	3	33.3	75
Total	9	100.0	

Protein food group. Examples of protein that were provided at the food sites included legumes, peanut butter and some dried or canned meat (26.7%), frozen meat (20%), cooked meat or cooked legumes (13.3%), and fresh or raw legumes (13.3%). Director A and C also provided frozen chicken to their clientele as they stated it was donated on a monthly basis from Tyson which is a producer and processor in Shelby County.

Grain food group. Dried grains (40%) such as, pasta, rice and oatmeal products, were the most common method provided. Canned ready-to-eat pasta-based meals (30%), and fresh grains (20%), such as bread, and cooked grains (10%) were also provided.

Vegetable food group. The data reflected the most frequent method of providing vegetables was canned (36.4%), fresh (27.3%), and lastly, frozen and/or cooked (18.2%). Three of the four sites received limited fresh produce donated from local farmers. As stated by Director A, “These fresh vegetables we

received were usually not marketable due to size, color, or bruising, so they were given to our site by local farmers.”

Dairy food group. This food group is the second least provided with dry and fresh the most common method (33.3%), cooked (22.2%), and canned (11.1%). Some examples provided were fresh cheese, yogurt, milk and powdered milk. Dairy was also provided cooked in various recipes at both congregate meal sites and was commonly provided is canned as condensed or evaporated milk.

Fruit food group. Fruit was provided the least amount of times by the food sites with the majority distributed in the form of canned (36.4%), frozen, cooked, fresh (18.2%), and dried with the least frequency (9.1%). At times, three of the four sites received very limited fresh fruit from local producers (peaches, plums, figs and berries). As stated by Director A, “Fruit that were donated to our food site were usually not marketable due to size, color, or bruising.”

Perceptions about Food Assistance. In the next section, perceptions about food assistance from the site director’s point of view were provided. These questions were posed as possible challenges or limitations that the participants face in engaging in the sites’ programs (question 15) and challenges or limitations that the site directors face in storing (question 16) and/or providing (question 17) fresh vegetables at their location. In analyzing this data, it was quickly observed that the site directors consistently faced similar challenges or

limitations. Possible methods for meeting these challenges or limitations will be addressed in Chapter 5.

Theme 1. Challenges food assistance participants face in partaking of the site’s programs as perceived from the directors’ point of view.

Site Director by Code	Challenge or Limitation
Director A	<ul style="list-style-type: none"> • Transportation to the site • Only available five days a week • Money for gasoline • Generation that feels must give to get • Special dietary needs were not met as staffing is limited
Director B	<ul style="list-style-type: none"> • Transportation to the site • Only available one day a week • Money for gasoline • Special dietary needs were not met as staffing is limited
Director C	<ul style="list-style-type: none"> • Transportation to the site • Limited amount of food boxes (funding and donations to purchase) • Food only provided on a monthly basis
Director D	<ul style="list-style-type: none"> • Transportation to the site • Limited amount of food boxes (funding and donations to purchase) • Small quantity of food only provided on a weekly basis

Theme 2. Challenges site director's face in storing fresh vegetables.

Site Director by Code	Challenge or Limitation
Director A	<ul style="list-style-type: none"> • Limited freezer and refrigerator space • When donated, receive too much of the same vegetable at the same time • Limited shelf life
Director B	<ul style="list-style-type: none"> • No freezer and limited refrigerator space • When donated, receive too much of the same vegetable at the same time • Limited shelf life as site is only open one day per week
Director C	<ul style="list-style-type: none"> • Limited freezer and refrigerator space • Limited building space • Limited shelf life
Director D	<ul style="list-style-type: none"> • No freezers or refrigerators at site • Limited building space • Limited shelf life

Theme 3. Challenges site director's face in distributing/serving fresh vegetables.

Site Director by Code	Challenge or Limitation
Director A	<ul style="list-style-type: none"> • Part time staff need education on how to prepare • Limited time in preparing/cooking to serve • Costly to purchase • Menus prepared a month in advance and submitted to funders
Director B	<ul style="list-style-type: none"> • Limited time in preparing/cooking to serve • Costly to purchase

Director C	<ul style="list-style-type: none"> • Not permitted by food bank to provide in food boxes (only commercially packaged foods were allowed) • Must be provided as a freebie • Limited number of food boxes provided each month • Limited amount of funding for food each month
Director D	<ul style="list-style-type: none"> • Not permitted to provide in food boxes (only commercially packaged foods were allowed) • Must be provided as a freebie • Limited number of food boxes provided each month • Limited amount of funding for food each month

Educational Programs Desired. Questions 18 through 21 provided an opportunity for the site directors to indicate whether they thought their clientele would be interested in learning how to garden (question 18), if they would be interested in a vegetable garden established at their site (question 19), if they would be interested in receiving fresh vegetables for participant consumption or distribution from the community garden (question 20), and finally, if they had any suggestions for how AgriLife Extension could partner with them to positively impact food security and/or provide educational programs at their site (question 21).

All four site directors responded positively in AgriLife Extension providing gardening “how to” classes and all directors would be in favor of a vegetable

garden (raised bed type) installed at their location to use as a teaching tool and as a means to provide fresh produce for their clientele to consume. In addition, all four site directors indicated they would like to partner with AgriLife Extension to receive fresh produce from the community garden project as Director A stated, "...it could make a nutritious and emotionally positive impact on participants." Director C commented, "Many of the donations to food pantries and the food that gets reclaimed from grocery stores and distributed is cosmetically imperfect food that cannot sell in stores or is food that is on the verge of rotting. The benefit of donated community garden produce is that it is truly fresh food." She went on to say that she believes that the ability to choose fresh and not partially-rotted food to take home and cook is important for food pantry shoppers. Her final comment was, "Community garden produce is so fresh that it can even be eaten raw – a delicacy that often is not an option with other food pantry food that must be commercially processed [canned or dry packaged]. The benefit of fresh community garden food addresses the dignity and respect that everyone deserves while 'honoring that everybody deserves fresh food.'"

All four site directors indicated they would like AgriLife Extension to provide monthly nutrition and food preparation programs for their clientele. At the food pantries, the directors indicated they would like programs provided on grocery shopping on budgeting for their clients.

Phase 3: A Review of Texas Community Gardens in Four Differing Population Areas

For the purpose of this section, data from four community garden models in Texas were reviewed to assess vegetable yields and volunteer hours engaged. Because there were differences in the dynamics and sustainability of community gardens based upon population, a garden based in an urban, suburban, and semi-suburban setting were explored and compared to data collected from a rural garden (Shelby County Community Garden). These models were selected based upon their location and population served, type of volunteer system provided, and the role AgriLife Extension plays in supporting the project. A narrative summary of these garden projects' background, implementation, maintenance, and results were provided.

An Urban Perspective: Dallas County, Texas – Coppell Community Garden. According to Lecca (2016), the Coppell Community Garden Corporation was established in 1998 as a 501(c)3 non-profit organization to oversee two community gardens in the city of Coppell, Dallas County, Texas. The city of Coppell is located in North Texas and has a population of 40,000. In 2003, a farmer's market was formed as part of this corporation. The all-volunteer organization was a grassroots effort to cultivate a healthy community and make a difference in the lives that were touched. In 2015, the name of this community garden was changed to the Coppell Sustainable Food Organization to better

reflect the two organizations that it oversees. The vision of this organization was to facilitate a community where people were engaged in sustainable living practices which positively affect global change. Their mission was to create a community setting for volunteers to learn and practice organic gardening methods and grow fresh nutritious produce which was donated to those in need. Since its inception, the two established garden locations have donated over 200,000 pounds of fresh produce to local families in need through Metrocrest Services, a local food pantry (Lecca, 2016).

Implementation. Two community gardens were established in Coppell, Texas as donation gardens. The first garden, Helping Hands Garden, was located on a 60 ft by 120 ft plot of city owned land. On that plot, 24 beds were laid out in 4 ft by 20 ft sections. Each plot was edged with cedar boards that were constructed by a local Eagle Scout troop. In addition to the garden beds, a handicapped-accessible raised bed, a pavestone path, picnic tables, a worm bin, an arbor, a composting area, two built-in tool sheds, a rain barrel catchment system, and a sidewalk to a local elementary school for students to walk to the garden to tend their plots was also implemented.

The second community garden, Ground Delivery, was established on a plot of land 75 ft by 240 ft and owned by the Post Office. Twenty-four individual garden beds, 4 ft by 30 ft, were installed by a local Boy Scout troop. In addition to the raised vegetable beds, this garden featured a compost area, arbor,

mulched pathways, a worm bin, a variety of fruit trees, bulletin boards, herb beds, and picnic tables.

Funding to establish the garden project was received from many community organizations: The city of Coppell donated \$1,100 for compost and utilized the service of the city attorney to draw-up the non-project organization paperwork. Neighborhood businesses provided mulch, irrigation materials, lumber and a shed. Volunteers used personal garden tools while a foundation donated \$3,000 for start-up costs. Additional civic organizations and churches provided other services.

Maintenance. According to Lecca (2016), building a garden was the easy part; sustaining and expanding the output year after year was harder. Having a core group of volunteers for the community garden was the key to success. Advertising for volunteers through local media and distribution of flyers has been successful for this garden project. In addition, weekly volunteers, such as teens needing to fulfill community service requirements, scout troops looking to earn merit badges, church groups and businesses and youth groups all participated in this effort. In anticipation of these volunteers, a list of ongoing chores was created so that their time was effectively utilized.

The busiest day of the week at the garden project was Saturday, when vegetables were harvested, and the produce is picked up by Metrocrest Services for distribution at local food pantries (Lecca, 2016). A designated garden leader

was assigned for each Saturday to ensure the necessary chores were completed and guidance and direction were provided as to what needed to be done that day.

The gardening season began in February of each year when all existing and new volunteer gardeners sign up for their plot. Gardeners were limited to one garden bed, must read and sign an adopt-a-plot agreement, pay a \$10 administrative fee, understand the mission of the garden, and the 10-12 hours per month time commitment. Gardeners attended an orientation session where they learned about the garden philosophy, organization and expectations. They were also provided gardening information, a planting guide, harvest record forms, pest control guidelines, a spreadsheet on chores required, and their assigned work schedule for common areas.

Results. The goal of Coppell Community Garden program was to donate food to the needy with all gardeners agreeing to donate at least 80% of their harvest each week. The majority of the harvest goes to Metrocrest Services food pantry. Since inception, this garden project has donated over 200,000 pounds of fresh produce. Each year, all garden beds were adopted, and a waiting list was established to fill beds as a plot became available. Coppell residents were given priority on the plot wait list. Annually, the organization logged nearly 9,000 adult and youth volunteer hours. Monthly classes and seminars, for the public and garden volunteers, on organic gardening, landscaping, pest management and

other plant specific topics were provided at the gardens by local AgriLife Extension agents. Extension agents served on the board and provided information on research-based gardening, implementation and as experts in this area. Figure 14 below summarizes the of pounds of vegetables harvested and number of volunteer hours provided on an annual basis from this garden project.

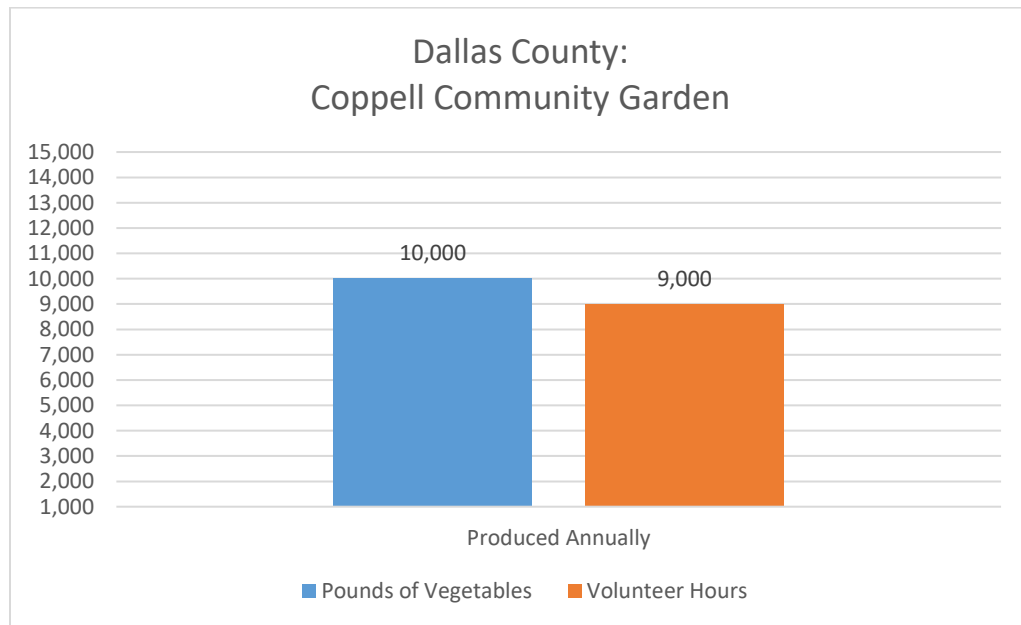


Figure 14. Pounds of vegetables and volunteer hours annually.

A Suburban Perspective: Smith County, Texas - Smith County Jail Community Garden. The Smith County Jail Community Garden was located in the city of Tyler, Smith County, Texas. Tyler is in East Texas and has a population of 107,000. The garden project was established in 2010 to provide a

program to keep prisoners occupied while teaching them skills and to produce fresh vegetables for the East Texas Food Bank. Since its creation, the garden has produced more than 150,000 pounds of produce for the East Texas Food Bank (Grissom, 2013).

Implementation. The original four-acre garden project was developed by Sheriff J.B. Smith, Judge Sam Griffith of the Court of Appeals for the 12th District and the Smith County Texas A&M AgriLife Extension Service agriculture agent. In 2013, a second garden, the East Texas Food Bank Garden, was established on a five-acre plot of unused Flint Baptist Church land. The goal for this expansion was to provide produce to supplement the 150,000 meals the food bank provides participants in their region (Grissom, 2013).

Maintenance. The garden was maintained by Smith County inmates under the supervision of a sheriff's deputy. The chance to work outdoors was an incentive for inmates to maintain good behavior. In addition, inmates that tended the garden received three days' credit on their sentence for each day of work. The AgriLife Extension agent in Smith County was responsible for providing technical support, such as conducting soil samples, preparing the land through volunteer-based Master Gardener program, directing crop rotation and post-harvest cover crops.

Results. Both of these four- and five-acre community garden projects benefit 26 counties in East Texas by growing, harvesting, and delivering fresh

vegetables to the food bank, which in turn distributes them to senior nutrition centers and soup kitchens across the area. To date, the Smith County Jail Community Garden has harvested over 150,000 pounds of fresh produce, and inmates have logged over 8,000 hours of community service hours through garden work (K. Hansen, personal communication, Smith County AgriLife Extension office, 2018) (Figure 15).

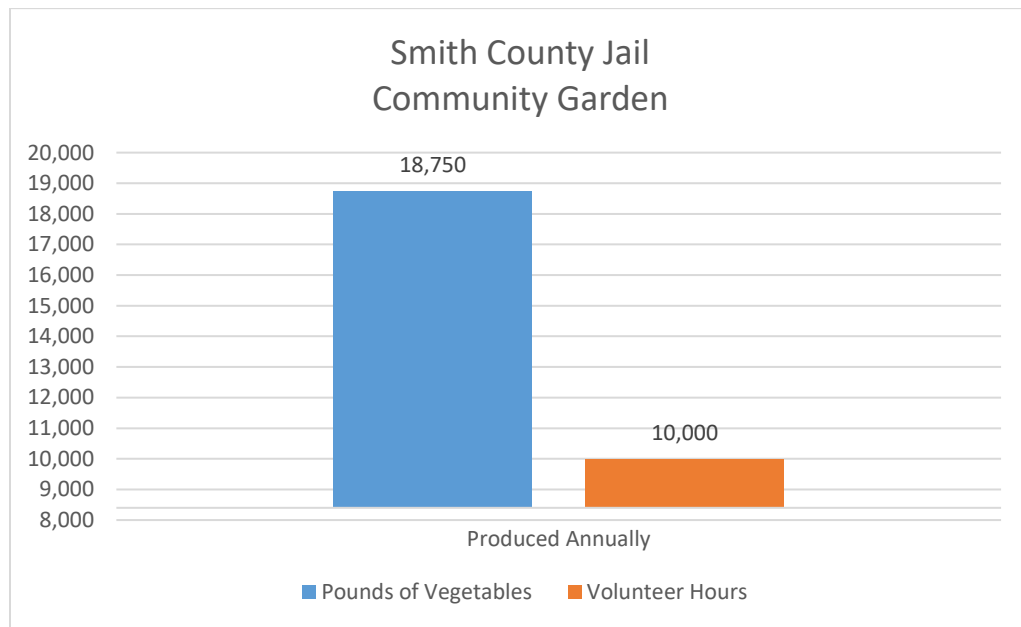


Figure 15. Pounds of vegetables and volunteer hours annually.

A Semi-Suburban Perspective: Bell County, Texas - Killeen

Municipal Court Community Garden. One of the best volunteer-based AgriLife Extension community garden models can be found in Killeen, Texas, according

to the researcher. The Killeen Municipal Court Community Garden was located in Bell County, Texas. The city of Killeen is in Central Texas, has a population of 138,000, and it is the home of Fort Hood, one of the largest U.S. military installations in the world. This community garden was established in 2008 to provide community service opportunities for non-dangerous youth offenders in partnership with the Killeen Municipal Court and the Texas A&M AgriLife Extension Service, Bell County Master Gardener Association (Labry, 2014).

According to Labry (2014), the objectives of the garden project were threefold:

1. Provide an opportunity for the Municipal Court Judge, the Teen Court, and the Bell County Master Gardener Association to offer life-changing community service and educational opportunities for young people who appeared before and were fined by the Killeen Municipal Court.
2. To develop a “demonstration garden” that could educate garden visitors about plant selection for the Central Texas area.
3. To produce a variety of vegetables and fruits for delivery to area food banks and senior nutrition centers.

Implementation. The city of Killeen allocated space for the garden on city property and the Bell County master gardeners provided startup funds for supplies. Local individuals and businesses donated fencing materials, equipment, a storage building, bedding plants and shrubs. Boy and Girl Scouts volunteered time at the garden to earn service badges.

This community garden featured seven raised beds with herbs and vegetables that do well in the Central Texas area, square foot beds to demonstrate various gardening techniques and landscaping possibilities, and a half-acre traditional row garden that has produced over 80,000 of vegetables for distribution to food banks and senior nutrition centers in the Killeen area since its inception (Labry, 2014).

Maintenance. The Bell County Master Gardener Association (BCMGA) is the crucial source of support and stability that holds the project together and keeps it all running smoothly. Approximately 15 adult volunteers provide six hours each Saturday to water, weed, harvest the vegetables and work with a group of up to fourteen juvenile offenders at one time. The BCMGA provided a cadre of volunteers who were properly background checked to be mentors and teachers to the youth conducting community service payback. Volunteers provided the garden tasks and guided the young people as they worked in the assigned areas. Team volunteer leaders of each bed developed their own strategy and job schedule to accomplish these tasks with the youth on assigned days provided by the court (Labry, 2014).

Bell County Master Gardener Association leaders provide annual project goals and access financial needs to local businesses in the Killeen area. Each garden bed requires an annual \$500 for establishment and sustained funding for

plants and soil amendments. In addition to maintenance of the garden area, the court provides weekly site mowing, edging and weeding of the grounds.

Results. Giving people food to eat is the successful end result of the gardening project. Hundreds of pounds of vegetables harvested each season were shared with a variety of local food banks, soup kitchens, and senior centers. Since the garden was established in 2008, over 80,000 pounds of fresh produce has been harvested and provided to recipients of food assistance in the Bell County area. Annually, the organization logs nearly 5,000 adult and youth volunteer hours. Monthly classes and seminars on organic gardening, landscaping, pest management and other plant specific topics were provided at the gardens by local AgriLife Extension agents (Labry, 2014) (Figure 16).

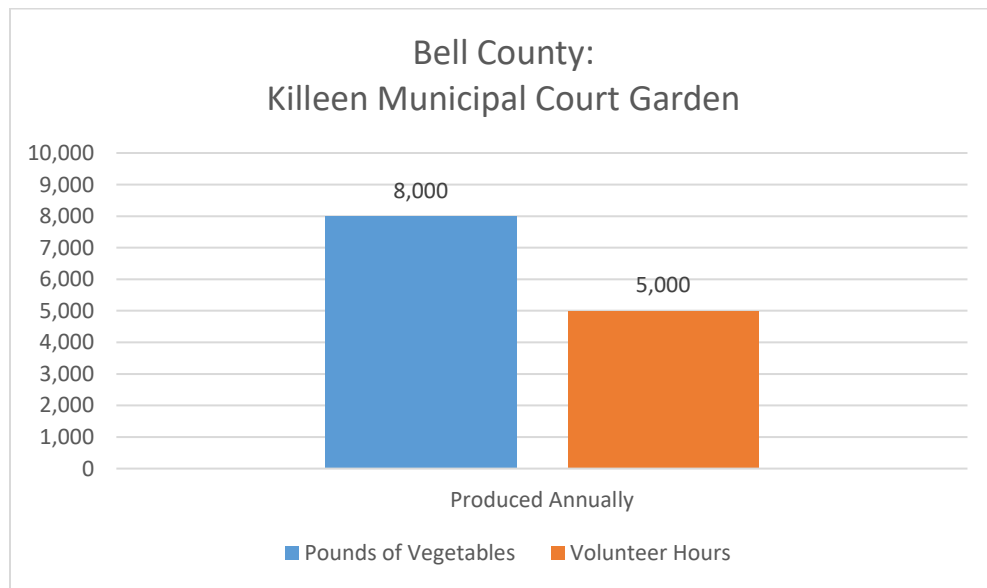


Figure 16. Pounds of vegetables and volunteer hours annually.

A Rural Perspective: Shelby County, Texas – Shelby County

Community Garden. To further explore the option of using a community garden as means to supplement current food assistance programs in Shelby County, Texas by providing nutrition sites fresh vegetables, a traditional row garden and a raised bed garden were established by county AgriLife Extension agent, Jheri-Lynn McSwain. Local government and civic organization support, volunteer engagement, and vegetable yields from a three-year period were measured. Both community garden models were established in the city limits of Center, Texas. The traditional row garden was utilized from the 2015 to 2017 growing seasons and the raised bed garden model was established in the fall of 2017 and is currently producing vegetables. The change from traditional row to raised bed gardening was spurred by two occurrences:

1. The Shelby County AgriLife Extension office was relocated to a former elementary school campus in Center, Texas during August 2017. Because space was available at the new location, it was decided by the Commissioner's Court to also relocate the community garden to the same place.
2. The purpose of the relocation was to provide more volunteerism oversight by the researcher (AgriLife Extension agent) at the new facility.

Yield data on pounds of produce harvested was collected from both the traditional row and raised bed garden models and provided below. In addition, service hours contributed by volunteers at both sites were also collected for this study.

Implementation - traditional row garden site description and plot size. A 7,310 sq ft plot of land was provided at no cost by the county. Community volunteers, AgriLife Extension 4-H youth and at-risk youth provided volunteers to tend the garden located on the grounds of the local rodeo arena. The highly visible garden was used to advertise the program to the public, provide hands-on gardening experience to volunteers and grow fresh produce for the local senior nutrition site for distribution through their congregate meal site. Originally, the Shelby County Community Garden project was located on the grounds of the Jim Booth Rodeo Arena located on Highway 7 in Center, Texas, on the north side of the facility. The garden plot was approximately 7,310 sq ft (170 ft x 43 ft). Traditional row gardening was utilized to produce vegetables in the spring (March to July) and fall growing cycle and (August to December). Vegetables were harvested and weighed on a digital scale in order to determine pounds produced and distributed to the senior nutrition site in each growing season.

Traditional row garden maintenance. A garden plot soil sample comprised of ten random shovels of soil was collected on February 24, 2016

from the designated area. The samples were dry-mixed in a five-gallon bucket and a one-pound measure was placed in a soil sample bag and then delivered to the Soil, Plant, and Water Analysis Laboratory at Stephen F. Austin State University for analysis. The sample yielded the following: Soil pH - 6.82, Nitrogen - 5 ppm, Phosphorus - 7 ppm, Potassium - 142 ppm, Calcium - 2,689 ppm, and Magnesium - 741 ppm. Annual soil samples were collected in the same manner as listed above and submitted for analysis and to determine which amendments, if any were recommended. After the soil analysis, the garden plot area was broken on February 18, 2016 and tilled on March 5, 2016 to incorporate 12 yards of mushroom compost into half of the plot (3,500 sq ft), and re-tilled prior to initial planting on March 19, 2016. This tilling was done to incorporate compost into the soil to provide deficient nutrients as was determined from the soil analysis. Garden preparation was completed by a local volunteer using a Kubota L3800 38 HP tractor and 65 in. disc tiller. AgriLife Extension agents planted the vegetables (seeds and transplants) throughout the growing season. Shelby County trustees from the Sheriff's office maintained the grassy borders of the garden plot by mowing and weed-eating on an as-needed basis. Youth and adult volunteers provided community service hours to water, weed, and harvest the vegetables with volunteer oversight managed through the county AgriLife Extension office.

Implementation - raised bed garden site description and plot size.

Twelve raised garden bed boxes were constructed from 8 in. x 2 in. x 12 ft pine lumber. The boards were cut to 6 ft wide and screwed together with two 12 ft board lengths to make each garden box. The garden was highly visible to the public and assists in marketing the program. In addition, the garden allowed for hands-on gardening experiences to volunteers and facilitates the growth of fresh produce for the local senior nutrition site. Data was collected from spring and fall vegetable trials to assess best varieties that grow in this region of Texas.

As previously mentioned, the Shelby County Community Garden project was moved to the AgriLife Extension office grounds located in Center, Texas. The area used to set-up the garden boxes was 150 ft x 30 ft (4,500 sq ft). Intensive, square foot gardening has been utilized to produce vegetables in the spring and fall growing cycles. Vegetables were collected and weighed on a digital scale in order to determine pounds produced, harvested, and distributed to seniors during each growing season.

Raised bed garden maintenance. The 6 ft x 12 ft garden beds were set on top of weed barrier and filled with commercially bagged soil and a mixture of mushroom compost. Garden preparation was completed by hand shovel by a local volunteer. Youth from the Texas A&M AgriLife 4-H program and the Shelby County Junior Chamber of Commerce provided service hours to water and maintain the garden. In addition, Shelby County trustees from the Sheriff's office

maintain the grassy borders of the garden plot by mowing and weed-eating on an as-needed basis. Other civic organizations or individuals, youth or adults that desired to provide community service hours were able to contact the county AgriLife Extension office to arrange a time and responsibility to complete.

Results. This raised bed community garden model is in its first year of establishment. Since its original location at the rodeo arena in 2016, over 1,500 pounds of fresh produce was harvested and provided to recipients at the Shelby County Senior Nutrition Site, in addition, 250 adult and youth volunteer hours have been logged. Two home gardening classes (6 lesson series) have been conducted with limited resource audiences by local extension agent (Figure 17).

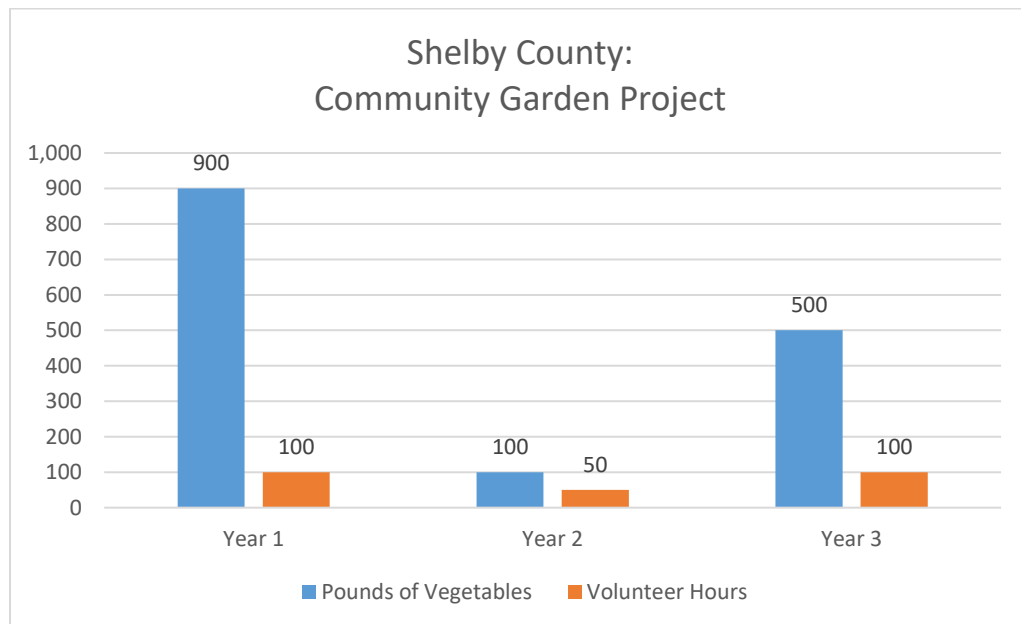


Figure 17. Pounds of vegetables and volunteer hours annually.

Conclusions. Each of these four community garden models is distinctive in their structure, oversight and make-up of their volunteer organizations; however, they all share one commonality: the desire to provide fresh produce to those in need and to supplement the diet of disadvantaged individuals in their areas. In these models summarized, all have proven sustainability through the use of volunteers and under the guidance or direction of county AgriLife Extension agents using research-based information. Use of these types of community garden models will hopefully provide additional evidence that volunteerism, partnered with local organizations and agencies can help to bridge the nutritional gap for those that were hungry in Texas.

Chapter 5: Discussion

Introduction

This chapter is devoted to providing a critical discussion of the findings and initial analysis when set against the existing literature as discussed in Chapter 2. Past research does not address in what manner a community garden could improve food security issues nor does research address the quality of life provided through senior adult nutrition assistance programs. Although use of community gardens to supplement food assistance programs for adults that were food insecure and the issues of poor nutritional health and life satisfaction in senior adults had been previously studied, there was a lack of research that connected the three areas. Existing research does suggest that community gardens in the U.S. have the potential to enhance the quality of life of all participants (Birky, 2009). By exploring the topics of importance surrounding food security and nutrition, county AgriLife Extension agents could learn how to engage adult and youth volunteers to produce vegetables high in nutritional value, address food insecurity issues, and increase fresh vegetable consumption in rural senior adults that receive food aid. In addition, food nutrition site directors could receive a better understanding of the issues surrounding senior adult nutrition and food insecurity from food assistance participants.

The overall aim of this three-phase mixed method study was to determine the feasibility of using a community garden as a supplemental food assistance tool for congregate meals sites and food pantries. This possibility was examined from gaining a better understanding of food aid programs in the county, exploring the perceptions and reality of food security by site directors and senior adults, and probing the possible limitations or challenges site directors face in either storing or providing fresh vegetables. In addition, case studies of Texas community garden models in an urban, suburban, semi-suburban, and rural environment were reviewed to provide the framework of program goals, implementation, and results of these food assistance projects for sustainability and to assess how AgriLife Extension plays a role. The establishment of partnerships between extension county agents, adult and youth volunteers, and local civic organizations were gauged in these case studies as to how best utilize a designated community space to benefit food insecure individuals. Lastly, the health outcomes, social connections, and psychosocial benefits of employing these collaborations were presented.

The following three theories were explored and utilized to support the overall aim of this study: 1) In 2013, Loria proposed that community gardens have the potential to foster health, quality of life, ecological sustainability, civic engagement, cultural preservation, and social capital with human communities, 2) Another study that was examined was the theory suggested by Fitzgerald and

Spaccarotella in 2009, in which they speculated that vegetable gardens may be particularly advantageous for low-income groups who do not identify fresh fruits or vegetables as a staple food, perhaps because of perceived costs, and when price is a strong determinant of food choice, and 3) The final model investigated, was conducted in 2010 by Sommerfeld, McFarland, Waliczek, and Zajicek (p. 712) in which they stated, "Community gardens offer a viable low-cost option to increasing access to fresh produce in areas where residents struggle to acquire adequate amounts of fresh fruits and vegetables for a healthy diet." They go on to explain the relationship between fruit and vegetable consumption and gardening as, "...older adults report that factors such as ownership of a garden at some point, experiences with foods eaten from a garden (past or present), early exposure to the taste of fresh fruit and vegetables, the availability of fresh produce, and eating with others can enhance fruit and vegetable consumption of this population." As a result of this study, additional sustenance was added to help collaborate the study by Mead (2008), in which he stated, "The literature has failed to address community gardens as a means to supplement senior adult food assistance programs."

Phase 1: Quantitative Study - Trends in Senior Adult Food Security

This section of the chapter addresses whether or not the data gathered and analyzed serves to prove or disapprove the hypotheses as initially set out in Chapter 3. The four hypotheses (H₁ through H₄) tested through one-way ANOVA

indicated there were no significant differences between life satisfaction and age, life satisfaction and level of education, food security and age, or food security and level of education.

H₁: There are differences in life satisfaction among different age groups for the 2018 congregate meal participants.

H₂: There are differences in life satisfaction among different levels of education for the 2018 congregate meal participants.

H₃: There are differences in food security among different age groups for the 2018 congregate meal participants.

H₄: There are differences in food security among different levels of education for the 2018 congregate meal participants.

The three hypotheses (H₅ through H₇) tested through the cross tabs procedure indicated there was a strong negative association between life satisfaction and food security, a weak association between life satisfaction and have grown a vegetable garden, and there was a strong positive association between life satisfaction and number of times per day vegetables were consumed.

H₅: There is an association between in life satisfaction and food security for the 2018 congregate meal participants.

H₆: There is an association between in life satisfaction and have grown vegetable garden for the 2018 congregate meal participants.

H₇: There is an association between life satisfaction and time per day vegetables are consumed for the 2018 congregate meal participants.

The findings of this study reflected that of the 2018 congregate meal site participants sampled ($n = 83$), about two-thirds were female and one-third were male. All adults surveyed were in the age range of 60 to 89 years with a slight majority in their 70s and with the fewest people in their 80s. Ethnicity, race, and level of education were consistent with U.S. Census Bureau data of 2018 that reflected over three-quarters of the residents in Shelby County, Texas were white and non-Hispanic and over half of the population have a high school degree, with the remaining two-thirds having received some college or technical school education, and lastly, a third of the respondents indicated they have a college degree.

In surveying the trends in food assistance received by senior adults in a rural environment, it was discovered from the sample that all respondents reported that they participated in the congregate meal program and a very high majority (three-quarters) also shopped for their own food. The remaining quarter received their food from either a food pantry, growing it themselves, having someone else do their shopping, utilizing a farmer's market or receiving food through the Meals on Wheels program. On average, these senior adults sampled, utilized three diverse resources to obtain food. Three-quarters of the sample participated in the congregate meal program provided at the Shelby County Senior Nutrition Site and the remaining one-quarter stated they received food assistance from the Joaquin Nutrition Site.

By exploring the relationships between food assistance, satisfaction of assistance received, quality of life, food security, vegetable consumption, and gardening experiences the following was discovered: 1) almost all respondents indicated when they participate in the congregate meal program they received a serving of all five main food groups (protein, vegetable, fruit, dairy and grain products) as determined by the U.S. Department of Health and Human Services (2015), 2) of the vegetables prepared and served at the congregate meal sites, a high majority of respondents indicated that they were either cooked, reheated and/or came from a can or were previously frozen, 3) the remaining sample indicated they received vegetables that were considered raw, uncooked or fresh, and 4) on average, the sample received vegetables prepared and served in three distinct manners; however, meals served with fresh vegetables were prepared on average a little more than one time per week.

One key affirmative relationship emerged regarding the low quantity of vegetables consumed by senior adults and the minimal provision of vegetables provided or served at food assistance sites. Both senior adults and nutrition site directors indicated that few servings of vegetables were consumed by respondents on a daily basis and in addition few servings were provided by sites to be consumed. The question then remains, "Why does this occur?" In making a case in the importance of vegetable consumption, one only needed to review the literature. Numerous studies, as were outlined in Chapter 2, and summarized

below, have shown that vegetable [and fruit] consumption is imperative for positive nutritional health. In addition, the 2015 - 2020 Dietary Guidelines for Americans recommended that adults over the age of 51 consume between 1.5 - 2.0 cups of fruits and 2.5 - 3.0 cups of vegetables each day (in order to maintain nutritional health). The guidelines also placed an emphasis on consuming a variety of fruits and vegetables and specify that fruits, vegetables, and legumes (dry beans and peas) may reduce the risk of several chronic diseases.

Compared to people who eat few fruits, vegetables, and legumes, people who eat higher amounts as part of a healthy diet were likely to have reduced risk of chronic diseases, including stroke and perhaps other cardiovascular diseases, type 2-diabetes, and cancers in certain parts of the body (mouth, throat, lung, esophagus, stomach, and colon-rectum). Studies also reflect that fiber in fruits, vegetables, and legumes was important as diets rich in fiber-containing foods may reduce the risk of heart disease. Fiber was also important for regularity since constipation may be a problem for older adults, it was important for senior adults to consume foods rich in fiber.

Nutrition was recognized as one of the major determinants of successful aging, defined as the ability to maintain three key behaviors: low risk of disease and disease-related disability, high mental and physical function, and active engagement of life (Nicklett & Kadell, 2013). Nutrition was also linked to the function and quality of life for older adults. Fruit and vegetable consumption

during older adulthood was associated with reduced likelihood of chronic disease. A number of studies offer support to the linkage between fruit and vegetable intake during older adulthood and cardiovascular health. Nicklett and Kadell (2013) identified a number of studies that found dietary characteristics were protective against hypertension, coronary heart disease, atherosclerosis, and stroke among older adults. This research also suggested fruit and vegetable intake in older adulthood was protective against the development or exacerbation of several kinds of cancer for men and women.

Evidence also emerged regarding the relationship between diet and osteoporosis. Numerous studies have linked vitamin D and calcium consumption to improved bone mineral density. Additional research suggests that a diet rich in magnesium, potassium, vitamin C, and vitamin K (acquired from consuming a variety of fruits and vegetables) may also aid in the prevention of bone loss in both sexes (Nicklett & Kadell, 2013). Emerging research (Nicklett & Kadell, 2013) suggested that fruit and vegetable intake in older adulthood can prevent against the onset or exacerbation of cognitive impairment, falls or walking disability, and other geriatric-associated conditions. In addition, their research has begun to examine the role of fruit and vegetable consumption in the aging brain. This study also indicated that fruit and vegetable intake was protective against cognitive decline and related conditions. Several prospective studies found that participants who consumed greater levels of fruits and vegetables

scored higher on cognitive and neuropsychological evaluations and showed improvements in verbal fluency, memory, and rate of learning from such dietary changes. In addition, a Mediterranean-style diet that was rich in nuts, oils, fruits, and vegetables has also been shown to be predictive of good heart health and of cognitive benefit for risk reduction of Alzheimer's disease and dementia (Nicklett & Kadell, 2013).

In looking at the satisfaction of the quality and temperature of food received by food assistance participants at congregate meal sites, over half indicated they were sometimes satisfied with approximately one-fourth indicating they were either "always satisfied" or "never satisfied." In quality of life, the majority of respondents indicated that their quality of life as a whole was either good or somewhat okay with less than 10% indicated their quality of life was either "bad" or "very good." When examining the life satisfaction index, which combined four quality of life questions into one index ranging from 1 to 5, over half of the respondents ranged in the neutral area, signifying they neither agree nor disagree with their satisfaction with life. Increasingly, health was viewed as not only the absence of infirmity and disease but also as a state of physical, mental, and social well-being. Quality of life measures permit researchers to compare the status of different groups over time and assess the effectiveness of public health interventions and programs. However, many of the existing quality of life indexes do not directly address contribution of diet. Very few studies have

explored the interrelationships among dietary measures in older adults or the nature of intervening variables (Drewnowski & Evans, 2001). According to Amarantos, Martinez, and Dwyer (2001), quality of life was a concept with multiple dimensions that included the subjective sense of physical and/or mental well-being. In its broadest and most inclusive sense, it was sometimes referred to as “life satisfaction.”

Food security was addressed with respondents equally indicating by one-third that they having enough food before money ran out was never a concern and the same number said that they never had a situation where their food did not last and they had no more money. There was a difference in the number of respondents indicating they sometimes could not afford to eat a balanced meal. This number reflected almost one-half of the sample. The food security index, which combined three questions on purchasing food into one index ranging from 1 to 4, one-third were ranked “never true” and one-third were ranked “sometimes true.” This reflects data reported in 2014 in a study by Feeding America that stated, “Between 2001 and 2012, the percentage of adults age 60 and older who were food insecure increased by 63%.” In the last portion of the quantitative section, researcher surveyed the 2018 respondents to inquire past gardening experience during the last five years with growing vegetables or raising fruit. Over half indicated they had not grown vegetables and three-quarters indicated they had not raised fruit. On the subject of participating in an educational

program on gardening or being provided the opportunity to garden at congregate meal sites, over three-quarters of the respondents did not desire this type of program.

Phase 2: Qualitative Study - Perceptions of Nutrition Site Directors

In the qualitative portion of this study, the researcher interviewed four nutrition food site directors to examine if there were any limitations or challenges they experienced in providing fresh vegetables to food assistance recipients. When reviewing the data collected in this portion, three consistent themes emerged: 1) food assistance recipients face challenges engaging in food aid programs, 2) food site directors have limitations in storing fresh vegetables, and 3) food site directors experience challenges in serving fresh vegetables to food assistance participants. The commonalities between all four sites for their clientele included issues with transportation and/or having funds to purchase fuel, the limitations on the quantity of food they receive, and special dietary needs not always able to be met. Similar trends were revealed between all four sites when discussing challenges directors face in storing fresh vegetables. All directors indicated they had limited freezer and refrigerator space and building space in which they could add additional storage for produce. Similar restrictions were noted in a study by Stevens, Grivetti, and McDonald (1992) in which they found that food banks and pantries face significant challenges in trying to meet the nutritional needs of food insecure populations. They also found that a lack of

refrigeration and storage space was one of the key factors that limited pantries' ability to stock healthy foods, including fresh produce.

Food site directors also all stated that fresh vegetables have a limited shelf life and desired to reduce plate waste at their sites. Both congregate site directors indicated that when they did receive donated produce, it was usually in large quantities that could not be served in a timely manner before spoilage. The last theme that developed was in regards to challenges in distributing and/or serving fresh vegetables by food site directors. In this theme, the congregate meal sites and food pantries were closely aligned with the type of food assistance provided. Both congregate meal site directors voiced time limitations in preparing fresh vegetables. At one site, the kitchen staff was hired part time and at the other site, the staff were all volunteers, thus limiting their potential work hours. The food pantry site directors also faced a unique challenge in that they were restricted by guidelines set forth by the food bank in which they purchase reduce-cost food to only provide commercially prepared food to their clientele. If they received any donations of fresh produce, they were not permitted to include it in the food boxes containing food purchased from the food bank. Both site directors indicated that they have received donated produce; however, in order to comply with food bank guidelines, they placed it on a table for food aid recipients to take if they desire. All four directors indicated that they had limited resources in which to provide food assistance to their clientele, and

thus, was a challenge that they would all like to be addressed by the local community.

These challenges were a reality for food site directors, and it was confirmed by Stevens, Grivetti, and McDonald (1992) in a study that suggested diet quality can be poor among food pantry clients. Nutrient intake would possibly improve for seniors if the home-delivered meals policy were structured to allow for more individualized meals or if the standards for nutrient intake were based on the senior adult population's special requirements. However, food banks and pantries face significant challenges in trying to meet the nutritional needs of food insecure populations. They find that a lack of refrigeration and storage space is one of the key factors that limit pantries' ability to stock healthy foods, including fresh produce.

Phase 3: A Review of Texas Community Gardens in Four Differing Population Areas

In the case study comparison of community gardens in four differing population areas in Texas, the literature and research conducted through this study supported the claim that community gardens in Texas have the potential for sustainability through the collaboration between Texas A&M AgriLife Extension Service, local government, and volunteers. A thorough review of the literature in Chapter 2 substantiated the statement that there were many benefits of community gardens and green spaces in urban, suburban, and rural

environments in general. In 2009, Fitzgerald and Spaccarotella found that community gardens have the potential to foster health, quality of life, ecological sustainability, civic engagement, cultural preservation, and social capital within human communities. However, according to a study by Draper and Freedman (2010), research on community gardens in the south was minimal, including Texas, where few studies have been conducted. A positive fact that was affirmed through this study and the researcher's ability to successfully grow and harvest produce for the majority of the year only goes to substantiate Draper and Freeman's 2010 study. These authors stated (p. 458), "The majority of Texas community gardens were able to operate year around with two different growing seasons (cool and warm seasons) while in the north winter months were too cold for this type of seasonal gardening. Therefore, it is important to include Texas in community garden literature and research."

In an effort to provide county AgriLife Extension agents with the tools necessary to establish a successful community garden that has the potential to supplement food assistance programs, researcher has provided implementation information below on the garden model utilized in this study.

A Model Community Garden. By reviewing literature and previous research on sustainable community gardens, a model should be selected that includes the components of partnership between local government entities (city, county, and/or state), use of volunteers, use of knowledge and possible

organization through AgriLife Extension, and establishment of a steering committee or board to ensure transparency and interpretation. In addition, roles and responsibilities for participants in the project should be determined in the planning stage. Table 28 outlines proposed tasks and responsibilities for AgriLife Extension and local government.

Table 28

Proposed/Suggested Tasks and Responsibilities

County AgriLife Extension Agents	County Commissioners Court
Develop and plan garden site in conjunction with a planning committee.	Provide the land to establish the community garden.
Seek sponsorships from local businesses, civic organizations or grants to fund the project.	Provide water to maintain the garden.
Recruit a volunteer coordinator to oversee garden management.	Provide trustee personnel as needed to maintain garden grounds.
Recruit volunteers to plant, water, maintain and harvest the produce.	
Plan for distributing the produce to local food banks and nutrition sites.	
Provide annual interpretation to stakeholders.	

As was experienced by researcher in management of the Shelby County Community Garden at the rodeo arena location, it was discovered to be imperative to the success of the garden that it was easily accessible to volunteers, to harvesting and growing the produce, and also to be sustainable as

a garden. Both youth and adult volunteers were engaged in this community garden project. Youth, from local Texas A&M AgriLife Extension 4-H clubs, service organizations such as the Junior Chamber of Commerce or Future Farmers of America chapters, juvenile probationers, local church youth groups and others could be utilized in this community service project. Adult volunteers, such as garden club members, Master Gardener groups, local civic organizations, and retired individuals may also be utilized successfully as outlined in the case studies of community gardens examined in Chapter 4.

The ideal situation for community service payback was outlined in the Killeen Municipal Court Garden review. In this program, the Bell County Master Gardeners hosted youth from a county-operated juvenile justice program monthly at the site where they completed community service hours by maintaining, watering, weeding and harvesting produce. Researcher plans to implement this type of program in 2019 and to collect data on the results for future study. In addition, trustees from the Sheriff's office could be utilized to maintain the grassy borders of the garden plot by mowing and weed eating on an as-needed basis. A volunteer garden project leader could be used on a rotational basis to meet each Saturday at the garden from 8:30 to 11:30 a.m. to oversee garden tasks, provide instruction to adult and youth volunteers, and to harvest, weigh and log yield data. Harvested produce can be distributed, on a rotational basis, to food pantries and nutrition sites within the county. This community garden model

could be implemented in most any city or town that has a volunteer program in place. In Shelby County, a local garden club was utilized in lieu of a Master Gardener set of adult volunteers. Additionally, the Killeen Municipal Court garden model incorporated the use of both traditional row and raised bed gardens to produce vegetables. Depending on funding, soil type, and land space, the community garden model may be most feasible when incorporating only one type of bed. However, if one of the purposes of the garden project were to demonstrate various garden techniques, then multiple beds should be used.

Starting a Community Garden. According to ACGA (2008), there were four key steps in establishing a community garden. The first step was to form a planning committee of key stakeholders for this project. Next, choose a site then prepare and develop the site. Third, determine how the garden should be organized and set-up, if insurance would be needed or required, and what should be included in the garden bylaws. The last step was to determine how the community garden would be managed and troubleshoot potential problems that may arise.

Step 1: Form a planning committee. The first step in forming a planning committee was to determine if there really is a need and desire for a garden. The following should be explored with the planning committee:

- What kind of garden will be established - vegetable, flower, trees, a combination?

- Who will the garden serve - kids, seniors, special populations, people who just want an alternative to home food production?
- If the project is meant to benefit a particular group or neighborhood, it is essential that the group be involved in all phases.
- Organize a meeting of interested people.
- Choose a well-organized garden coordinator.
- Form committees to accomplish tasks such as: Funding and Resource Development; Youth Activities; Construction; Communication.
- Approach a sponsor. A sponsor is an individual or organization that supports a community garden. Site sponsorship can be a tremendous asset. Contributions of land, tools, seeds, fencing, soil improvements or money were all vital to a successful community garden. Some community gardens can provide most of their provisions through fees charged to the membership; but for many, a garden sponsor is essential. Churches, schools, citizens groups, private businesses, local parks and recreation departments were all potential supporters.
- Make a list of what needs to be done.
- Find a garden site.
- Obtain lease or agreement from owner.

- Decide on a mailing address and central telephone number(s). Try to have at least three people who were very familiar with all pertinent information.
- If your community garden has a budget, keep administration in the hands of several people.
- Choose a name for the garden.

Step 2: Choose a garden site.

- Identify the owner of the land.
- Make sure the site gets at least 6 full hours of sunlight daily if growing vegetables.
- Do a soil test in the fall for nutrients and heavy metals.
- Consider availability of water.
- Try and get a lease or agreement which allows the space to be used at least for three years.
- Consider past uses of the land. Is there any contamination?
- Is insurance something you need to consider?

Prepare and develop the garden site.

- Clean the site and gather your resources.
- Develop your design. Include plans for a storage area for tools and other equipment, as well as a compost area.

- Lay out garden to place flower or shrub beds around the visible perimeter. This helps to promote good will with non-gardening neighbors, passersby, and municipal authorities.
- Organize volunteer work crews and plan a work day.
- Decide on plot sizes, mark plots clearly with gardener's names.
- Have a rainproof bulletin board for announcing garden events and messages

Step 3: Determine how the garden should be organized.

- Were there conditions for membership (residence, dues, agreement with rules)?
- How would plots be assigned (by family size, by residency, by need, by group such as, youth, elderly, etc.)?
- How large should plots be or should there be several sizes based on family size or other factors?
- How should plots be laid out?
- If the group charges dues, how would the money be used? What services, if any, would be provided to gardeners in return?
- Would the group do certain things cooperatively (such as turning in soil in the spring, planting cover crops, or composting)?
- When someone leaves a plot, how would the next tenant be chosen?

- How would the group deal with possible vandalism?
- Would there be a children's plot?
- Would the gardeners meet regularly? If so, how often and for what purposes?
- Would gardeners share tools, hoses, and other such items?
- How would minimum maintenance (especially weeding) be handled both inside plots and in common areas (such as along fences, in flower beds, and in sitting areas)?
- Would there be a set of written rules which gardeners were expected to uphold? If so, how would they be enforced?
- Should your group incorporate and consider eventually owning your garden site?

Insurance. According to ACGA, 2008, it was becoming increasingly difficult to obtain leases from landowners without public liability insurance. Garden insurance was a new thing in 2008 as many insurance carriers and their underwriters were reluctant to cover community gardens. It helps if you know what you want before you start talking to insurance agents.

Setting up a new gardening organization. Many garden groups were organized very informally and operate successfully. Leaders "rise to the occasion" to propose ideas and carry out tasks. However, as the work load expands, many groups choose a more formal structure for their organization.

A structured program was a means to an end. It was a conscious, planned effort to create a system so that each person could participate fully and the group could perform effectively. It's vital that the leadership be responsive to the members. Structure would help an organization to last; it would promote trust; it would help your group grow and create new opportunities for leaders to develop.

If your group was new, have several planning meetings to discuss your program and organization. Try out suggestions raised at these meetings and after a few months of operation, you'll be in a better position to develop bylaws or organizational guidelines. A community garden project should be kept simple as possible, whether large or small.

Bylaws were rules which govern the internal affairs of an organization. They were required when you form a non-profit corporation, but were useful even if your group is a club or a group of neighbors. Many battles were won simply because one side has more pieces of paper to wave than the other. It's helpful to look over bylaws from other similar organizations if you are incorporating. Guidelines and rules were less formal than bylaws, and were often adequate enough for a garden group that has no intention of incorporating.

Organizational considerations.

- What was your purpose? What were your short and long-term objectives?
- How were decisions to be made? Who chooses leaders and how?

- How would work be shared? Who does what?
- How would you raise money? Membership dues, fund raising, grants, sponsors?
- Were you open to change? Flexibility was important when goals and members change.
- Do you want to be incorporated or act as a club?

Step 4: Managing the community garden. In order to offer a high quality community garden program, good management techniques were essential. Having written rules was very important with older groups as well as new gardens, since they spell out exactly what was expected of a gardener.

Guidelines and rules. Listed below were suggested guidelines and rules by ACGA (2008):

- I will pay a fee of \$___ to help cover garden expenses. I understand that (percentage) of this will be refunded to me when I clean up my plot at the end of the season.
- I will have something planted in the garden by (date) and keep it planted all summer long.
- If I must abandon my plot for any reason, I will notify the manager.
- I will keep weeds down and maintain the areas immediately surrounding my plot if any.

- If my plot becomes unkempt, I understand I will be given 1 week notice to clean it up. At that time, it will be reassigned or tilled in.
- I will keep trash and litter cleaned from the plot, as well as from adjacent pathways and fences.
- I will participate in the fall clean-up of the garden. I understand that the deposit will be refunded only to those who do participate.
- I will plant tall crops where they will not shade neighboring plots.
- I will pick only my own crops unless given permission by the plot user.
- I will not use fertilizers, insecticides or weed repellents that will in any way affect other plots.
- I agree to volunteer ____ hours toward community gardening efforts. (include a list of volunteer tasks which your garden needs).
- I will not bring pets to the garden.
- I understand that neither the garden group nor owners of the land are responsible for my actions. I therefore agree to hold harmless the garden group and owners of the land for any liability, damage, loss or claim that occurs in connection with use of the garden by me or any of my guests.

Considerations in starting a community garden project. Vandalism was a common fear among community gardeners. However, the fear tends to be

much greater than the actual incidence. Below were some methods to deter vandalism provided through this study:

- Make a sign for the garden. Let people know to whom the garden belongs and that it was a neighborhood project.
- Fences could be of almost any material. They serve as much to mark possession of a property as to prevent entry, since nothing short of razor-wire and landmines would keep a determined vandal from getting in. Short picket fences or turkey-wire would keep out dogs and honest people.
- Create a shady meeting area in the garden and spend time there.
- Invite everyone in the neighborhood to participate from the very beginning. Persons excluded from the garden were potential vandals.
- Involve the neighborhood children in learning gardens. They can be the garden's best protectors.
- Plant raspberries, roses or other thorny plants along the fence as a barrier to fence climbers.
- Make friends with neighbors whose window overlook the garden. Trade flowers and vegetables for a protective eye.
- Harvest all ripe fruit and vegetables on a daily basis. Red tomatoes falling from the vines invite trouble.

- Plant potatoes, other root crops or a less popular vegetable such as kohlrabi along the sidewalk or fence. Plant the purple varieties of cauliflower and beans or the white eggplant to confuse a vandal.
- Plant a "vandal's garden" at the entrance. Mark it with a sign: "If you must take food, please take it from here."

Incorporating a children's garden area. Children included in the garden process become champions of the cause rather than vandals of the garden. Therefore your garden may want to allocate some plots specifically for children. The "children's garden" can help market your idea to local scout troops, day cares, foster grandparent programs, church groups, etc. Consider offering free small plots in the children's garden to children whose parents already have a plot in the garden.

People problems and solutions. Angry neighbors and bad gardeners pose problems for a community garden. Neighbors complain to municipal governments about messy, unkempt gardens or rowdy behavior; most gardens can ill afford poor relations with neighbors, local politicians or potential sponsors. Therefore, choose bylaws carefully so you have procedures to follow when members fail to keep their plots clean and up to code. A well-organized garden with strong leadership and committed members can overcome almost any obstacle.

Common problems faced by community gardens. Understanding the challenges associated with community gardens provides organizations the opportunity to be more successful in future garden establishment and development. Previous researchers found that generally, in order for community gardens to be successful, they must have strong bureaucratic support, access to space, available money and resources, steady participation among gardeners, and a strong and willing leader to organize (Armstrong, 2000). While challenges to gardening were naturally tied to site-specific characteristics, the primary themes of community garden troubles included: sustained interest and participation by gardeners, access to necessary materials, garden funding and support, garden design and access, and secured land tenure.

It is easy for a new gardener to begin a plot with vigor and excitement without fully realizing the true extent of work involved in the gardening process that takes place through all seasons. Community gardens were based on volunteerism, so they were only successful when the volunteer members remain active and present. Drake and Lawson (2015) surveyed community gardeners across North America and asked gardeners to discuss issues they had with forming and maintaining their community gardens. In their study, gardeners cited declining volunteerism and participation as the number one problem they encountered in community gardening – which supports previous findings by Milburn and Vail (2010). However, lack of gardening interest was more often

associated with smaller garden organizations than larger ones due to a combination of garden politics, disagreements, and poor leadership (Drake & Lawson, 2015).

A feature of successful community gardens is access to appropriate and necessary building materials, including uncontaminated soil and water. Urban soils may contain toxins or heavy metals that threaten the health of plants (Pickett et al., 2001). For that reason, it is often necessary to bring in outside soil and compost in order to successfully grow uncontaminated produce. Access to water is also vital for a community garden to survive. In Drake and Lawson's 2015 study, surveyed community gardeners said their top challenge in gardening is getting water to their garden site.

Gardening materials were of little use if a garden organization lacks funding. Money allows for both the preparation of a garden location, as well as the provision of garden facilities, like plant boxes or a tool shed. Support from outside organizations and institutions were often necessary for garden survival. A staggering one percent of garden organizations in the U.S. partner with outside organizations (Drake & Lawson, 2015). Supporting organizations may be nongovernmental organizations, churches, nonprofits, schools, or local governments. Even if a partnership were obtained, the relationship between the garden and partnering organization were not always healthy (Milburn & Vail, 2010). Often, the services would be first offered free of charge; however, after a

period of time, the outside organizations may begin to request payments with the threat of service termination (Saldivar-Tanaka & Krasny, 2004).

Even if a garden has support and funding, the design, placement, and accessibility of the garden could ensure its success or doom it to failure (Drake & Lawson, 2015). Community gardens that were centrally located within neighborhoods encounter more success. A central location makes it easier for volunteers to access their garden from their home (Drake & Lawson, 2015).

Perhaps the most pervasive barrier to community garden success was that of the right to open space. The city and city planners decide who has a right to what areas within a city. In places with healthy community gardening organizations, local government supported these projects by providing them open space within the city, providing leases for land parcels, or willfully dedicating certain areas to urban gardening (Drake & Lawson, 2015). A lack of support in a community can easily kill a community garden project.

Study Limitations

The limitations of this study were as follows:

1. Small participant sample from a single rural county in Texas.
2. As this study was conducted in May 2018, participants frequenting the food assistance sites during other times of the year were not represented in the sample.

3. Food assistance site directors indicated that they may be unable to process and distribute fresh produce if given to them from a community garden project for a variety of reasons, such as:
 - a. Food bank restrictions on the distribution of fresh fruit and vegetables.
 - b. Lack of funding to purchase fresh fruit and vegetables.
 - c. Lack of refrigeration, freezer and storage space.
 - d. Food recipients and/or staff's lack of knowledge about how to cook or prepare fresh produce.
 - e. Pantry and/or congregate staff who do not have the time or expertise to encourage fresh vegetable consumption.
4. All four site directors indicated they would like AgriLife Extension to provide monthly nutrition and food preparation programs for their clientele. As a county AgriLife Extension agent, I could see that these types of programs could easily be incorporated and scheduled at the congregate meal sites. This would appear to be a challenge to provide at the food pantries as their clientele filter in and out at various times to receive food assistance (boxes) throughout the week. At the food pantries, the directors indicated they would like programs provided on grocery shopping on budgeting for their clients.

Recommendations for Future Research

1. Conduct a food security survey of a larger sample to include food pantry recipients and Meals on Wheels participants.
2. Expand the food security survey to include questions that cover the entire range of the severity of food insecurity as based upon the USDA 2018 model.
3. Explore other avenues, such as the farmers market, as a contributor of fresh fruit and vegetables to food assistance sites.
4. Survey Meals on Wheels and congregate meal site participants as to the social, emotional and mental benefits received from food assistance programs.
5. Survey a sample of senior adults that participate in a congregate meal program to explore the reasoning behind the quantity of vegetable servings consumed being less than the daily recommended amount.
6. Conduct a plate waste observation study to determine if vegetables were served at congregate meal sites and if so, what portion was consumed?

Conclusions

Rural, aging home-based seniors experience the food environment differently than those living in high-population urban and suburban places. Although food is abundant in the United States, as indicated by escalating

obesity rates and increasing diabetes diagnoses, food insecurity barriers in senior citizens continues to rise as the life expectancy of this aging population increases, mobility decreases, and the financial inability to purchase fresh vegetables rises. As this population ages and access to food becomes more difficult, seniors often rely upon food networks such as senior nutrition sites, soup kitchens, or Meals on Wheels to meet their daily nutritional needs.

Over the past few years, food insecurity has increased dramatically, leading to increased demand at food banks and pantries. Food insecurity rates increased with the economic crisis in 2008 and have remained high since then. According to the USDA, 14.5% of U.S. households were food insecure during 2013, meaning that at some point during the year, household food intakes were reduced and families were not able to provide the amount of food they typically would eat. One of the main drivers of food insecurity is poverty, so for change to be meaningful it must address the financial struggle that millions of people in the U.S. face. That struggle not only affects the ability to access enough food, as evidenced by the tradeoffs often made between paying for food and other basic essentials like medicine and utilities, these needs were closely intertwined and directly meeting one need may only free up enough resources to barely meet another.

The literature suggested that older adults face unique challenges and barriers in obtaining, preparing, and consuming fruits and vegetables. These

barriers exist at the individual- and group-environmental levels. Older adults with declining health, functional limitation, loss of appetite, and dentition problems tend to eat fewer fruit and vegetables. The communities in which older adults reside could provide opportunities for or impose barriers on fruit and vegetable consumption. Social support was a protective factor, since company provides incentive to eat, and assistance breaks down barriers to acquiring and preparing food. Increased knowledge about the benefits of fruit and vegetables—as well as what constitutes a healthful meal—was associated with higher levels of consumption; however, the barriers confronted by older adults can outweigh the perceived benefits.

Charitable-funded and government subsidized food assistance programs have been established in the U.S. to help senior adults that were homebound, live in a food desert area, or had limited resources to meet their daily nutritional needs. In this study, the Meals on Wheels program, congregate nutrition sites, food banks and pantries, along with private and community-based organizations were examined and discussed as to resources available to senior adults. According to Sharkey (2004) and Keller (2006), older adults were at heightened risk for poor nutritional health, which is associated with increased burden of disease and disease-related complications, functional decline, increased severity of disability, and diminished quality of life. To address this issue, at a county level, four food assistance programs operate in Shelby County, Texas. A typical

client is female, aged 70-90 and living on an annual income of \$10,000-\$14,000 (Shelby County Outreach Ministry, personal communication, March 1, 2016).

Hot meals meet rigorous national nutrition standards, but many Shelby County seniors still lack access to a variety of locally grown fresh vegetables.

Community gardens were defined and their existence in American history from the early 19th through 20th centuries was explored in this study. The economic and environmental benefits of community gardens in an urban and rural environment were provided. The potential health benefits for garden recipients and the basis of additional food source at a low cost were outlined, as were common difficulties associated with a community garden explored. By examining the topics of importance surrounding food security and nutrition, county AgriLife Extension agents can learn how to engage adult and youth volunteers to produce vegetables high in nutritional value, address food insecurity issues, and increase fresh vegetable consumption in rural senior adults that receive food aid. In addition, food nutrition site directors can receive a better understanding of the issues surrounding senior adult nutrition and food insecurity from food assistance participants. Food access may be improved in areas where community engagement is strong, and where local organizations join in providing solutions to decrease barriers of food access by creating informal alternatives, such as community food-bank gardens and use of volunteer engagement.

Collaboration among university, community, government, and nonprofit partners focused on hunger prevention can produce positive, important results. The partnership between AgriLife Extension programs and community food pantries is a rich array of collaborative and sometimes innovative efforts ranging from public relations campaigns, research efforts to document community health, or program design (Paynter, 2013). Collaboration between public and private partners in the food assistance network is critical to reducing hunger. Access to safe, nutritious, and affordable food is a public health concern that is best addressed through a multi-sector, multi-prong approach. AgriLife Extension programs across the U.S. provide community-based responses to the fight against hunger and can use their considerable resources to partner with governmental and nonprofit actors to boost participation in senior nutrition programs to take full advantage of the dollars already appropriated for hunger relief for senior adults.

In the end, a collective effort, involving state and local governments, charitable food providers, advocates for the older adult population, and policymakers, will be required in order to meet the needs of the vulnerable older adult population. Access to fresh vegetables, increased gardening knowledge and civic engagement, touches people's lives in a number of ways. Taken together, this is a way that people can participate directly in food production and community development – relevant to AgriLife Extension professionals in urban,

suburban, and rural areas across the U.S (Drake & Lawson, 2015). Given the role that AgriLife Extension professionals have in supporting efforts to establish financial viability and social connections at the household and community levels, it is critical that a more informed understanding of feasible approaches to alleviating hunger and food insecurity become the norm among AgriLife Extension educators.

The results of this study show how use of a dedicated project coordinator, volunteers, and a limited amount of community resources could potentially reduce food insecurity and improve the overall health of senior citizens in a rural environment through implementation of a community food-bank garden. Through continued research it is possible that community gardens in Texas could be sustainable through Texas A&M AgriLife Extension Service oversight, local government support, and volunteerism. In addition, it may be probable that a community garden could be utilized as a low-cost supplemental food assistance tool in providing a more resilient and food-secure system for rural senior adults through the direct integration of food production and food consumption. It is my hope that this dissertation will not only act as another academic interpretation on food security in the U.S. but that it will also shed new light on how a community garden can be a successful means of supplementing food assistance programs and improve food security for rural senior adults.

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Appendix A

Consent to Participate in Research

Informed Consent for Participation in Research

“Bridging the Gap: Community Gardens as a Supplement to Senior Adult Food Assistance Programs”

You are being asked to be a subject in a research study for a dissertation project through Stephen F. Austin State University, College of Forestry and Agriculture. This study will help local food assistance site directors learn about food insecurity attitudes in senior adult participants. Your participation is appreciated. Please read, sign and date this form. We encourage you to ask any question you might have prior to commencing this survey.

Your participation in this research is voluntary. If you decide to participate, you are free to withdraw at any time. You may also refuse to answer any questions you do not want to answer and still remain in the study. You have a right to ask questions about the research project, obtain a copy of the results, and have your privacy respected throughout the process.

The results of this study will be to determine if use of a community garden, through volunteer engagement, will produce adequate vegetables to supplement food assistance programs and improve food security and nutrition of rural senior adults. The data will be collected through a one-on-one, structured questionnaire format. The session will last approximately 10 minutes. Throughout the analysis process and reporting process, your identity will remain confidential.

I have read and understand the above information. I have been given an opportunity to ask questions and any questions I had were answered to my satisfaction. I agree to participate in this research. I have been given a copy of this form.

Signature of Participant

Date

Printed Name

Person Collecting and Analyzing Information

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Appendix B

Food Insecurity Data Collection Instrument

Client ID: _____

Date: _____

Data collector name: _____

Location: _____

Project: "Bridging the Gap: Community Gardens as a Supplement to Senior Adult Food Assistance Programs"

1. How do you receive your food? *Check all that apply.*

- Shop at a store for my own food
- Shop at farmer's market for my own food
- Receive food from the Meals on Wheels program
- Participate in a congregate meal program (senior nutrition site, soup kitchen, etc.)
- Receive food from a food bank/pantry
- Family member, friend or a health service shops for me
- Grow or raise my own food
- Other
- Not sure

2. Do you participate in congregate meals, such as meals at a senior nutrition site, church or a soup kitchen?

- No If NO, skip to question 9.
- Yes If YES, continue with question 3.
- Not sure

3. How many meals do you receive each week from a congregate meal site?
- 1
 - 2
 - 3
 - 4
 - 5
4. What type of food do you receive from congregate meal sites? *Check all that apply.*
- Meat or other protein (such as beef, pork, chicken, brown beans, eggs, peanut butter)
 - Dairy (such as milk, cheese, yogurt, pudding)
 - Grains (such as bread, rice, pasta)
 - Fruit
 - Vegetables
 - Dessert (such as cookies, cake, pie, Jello)
5. If you receive vegetables from congregate meal sites, how are the vegetables served?
Check all that apply.
- Frozen
 - Canned
 - Cooked
 - Reheated
 - Fresh (such as not cooked or raw)
6. In how many meals per week do you receive **fresh** vegetables from congregate meal sites?
- 0
 - 1
 - 2
 - 3
 - 4
 - 5

7. How satisfied are you with the quality of food provided through a congregate meal site?
- Never satisfied
 - Sometimes satisfied
 - Always satisfied
8. How satisfied are you with the temperature of food delivered through a congregate meal site?
- Never satisfied
 - Sometimes satisfied
 - Always satisfied
-

For Questions 9-10, please tell me how many times each day you eat any kinds of vegetables during the **last month**.

9. Generally speaking, how many times a day do you eat vegetables? *Include any kind of vegetables – fresh, canned or frozen.*
- 0 If 0, skip to question 11.
 - 1
 - 2
 - 3 or more
10. Each time you eat any kind of vegetables, how much do you usually eat?
- Less than ½ cup
 - About ½ cup
 - About 1 cup
 - More than 1 cup

I would like to ask you some questions about your quality of life. Please check one box. There are no right or wrong answers. Select the response that best describes you.

11. Thinking about both the good and bad things that make up your quality of life, how would you rate your quality of life as a whole?

- Very bad
- Bad
- Somewhat okay
- Good
- Very good

Please indicate the extent in which you agree or disagree with each of the following statements.

12. I enjoy my life overall.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

13. I am happy much of the time.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

14. I look forward to things.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

15. Life gets me down.

- Strongly disagree
 - Disagree
 - Neither agree nor disagree
 - Agree
 - Strongly agree
-

For Questions 16-18, please tell me whether the statement was **never** true, **sometimes** true, **often** true, or **always** true for you in the **last 12 months**.

16. I worried whether my food would run out before I had money to buy more.

- Never true
- Sometimes true
- Often true
- Always true

17. The food I bought did not last, and I did not have enough money to get more food.

- Never true
- Sometimes true
- Often true
- Always true

18. I could not afford to eat balanced meals.

- Never true
 - Sometimes true
 - Often true
 - Always true
-

For Questions 19-26, please tell me about your gardening experiences.

19. Have you grown a vegetable garden in the last five years?

- No If NO, skip to question 21.
- Yes If YES, continue with question 20.
- Not sure

20. If yes, how often have you grown a vegetable garden?
- One time each year
 - Two or more times a year
 - Not sure
21. Have you grown or raised fruit trees or berries in the last five years?
- No If NO, skip to question 23.
 - Yes If YES, continue with question 22.
 - Not sure
22. If yes, how often have you grown fruit?
- One time each year
 - Two or more times a year
 - Not sure
23. Would you like someone to show you gardening techniques?
- No
 - Yes
 - Not sure
24. Would you like someone to help you create and plant a garden?
- No
 - Yes
 - Not sure
25. If a raised bed garden was available to you at the Senior Nutrition Site, would you garden there?
- No
 - Yes
 - Not sure
26. If a raised bed garden plot was available to you at the community garden, would you garden there?
- No
 - Yes
 - Not sure

Please answer the following questions about yourself:

27. What was your age at your most recent birthday? _____

28. Gender:

- Male
- Female

29. Check the race you identify with most:

- American Indian or Alaska Native
- Asian
- Black or African American
- Native Hawaiian or other Pacific Islander
- White

30. Ethnicity:

- Hispanic or Latino
- Not Hispanic or Latino

31. Check the highest level of school you have completed.

- Less than high school
- High school graduate, diploma or GED
- Some college or technical school
- Bachelor's degree
- Graduate or professional degree

Thank you for your participation!

Appendix C

Food Assistance Site Director Interview Form

Client ID: _____

Date: _____

Data collector name: _____

Location: _____

Project: “Bridging the Gap: Community Gardens as a Supplement to Senior Adult Food Assistance Programs”

General Background

1. Tell me what you know about the history of this food assistance site.
2. How long have you been part of this organization?
3. How long have you been the site director?
4. What are the goals of this food assistance program?
5. What are the benefits that you think participants receive from participating at this site?
6. What kinds of groups of people generally receive assistance from this site?
7. What are the criteria for receiving food assistance at your site?
8. How often do participants receive food assistance per month?
9. Do you feel the participants are representative of the residents in this area in terms of their demographics?

Food Products

10. What types of **Protein** based food products are served/prepared/delivered/provided at your site? Check all that apply.

- (1) Frozen
- (2) Dry packaged
- (3) Canned
- (4) Cooked
- (5) Reheated
- (6) Fresh (such as not cooked or raw)
- (7) Not applicable

11. What types of **Grain** based food products are served/prepared/delivered/provided at your site? Check all that apply.

- (1) Frozen
- (2) Dry packaged
- (3) Canned
- (4) Cooked
- (5) Reheated
- (6) Fresh (such as not cooked or raw)
- (7) Not applicable

12. What types of **Vegetable** based food products are served/prepared/delivered/provided at your site? Check all that apply.

- (1) Frozen
- (2) Dry packaged
- (3) Canned
- (4) Cooked
- (5) Reheated
- (6) Fresh (such as not cooked or raw)
- (7) Not applicable

13. What types of **Fruit** based food products are served/prepared/delivered/provided at your site? Check all that apply.

- (1) Frozen
- (2) Dry packaged
- (3) Canned
- (4) Cooked
- (5) Reheated
- (6) Fresh (such as not cooked or raw)
- (7) Not applicable

14. What types of **Dairy** based food products are served/prepared/delivered/provided at your site? Check all that apply.

- (1) Frozen
- (2) Dry packaged
- (3) Canned
- (4) Cooked
- (5) Reheated
- (6) Fresh (such as not cooked or raw)
- (7) Not applicable

Perceptions about Food Assistance

15. What are some challenges participants face in partaking in this site's programs?

16. What are some challenges you face as a site director in **storing fresh produce**?

17. What are some challenges you face as a site director in **preparing/serving fresh produce**?

18. Would food site participants be interested in learning to garden?

19. Is there a place to establish a garden at your food site?

20. Would your food site be interested in receiving fresh produce for participant consumption or distribution?

Final Thoughts

21. Is there anything your local county Extension office could provide to help with food insecurity and/or education at your food site?
22. Do you have any questions or comments for me?
23. Is there anything else you would like to add about this food site?

Please answer the following questions about yourself:

24. In what year were you born? _____
25. Gender:
 - (1) Male
 - (2) Female
26. Fill in the circle of the race you identify with most:
 - (1) American Indian or Alaska Native
 - (2) Asian
 - (3) Black or African American
 - (4) Native Hawaiian or other Pacific Islander
 - (5) White
27. Ethnicity:
 - (1) Hispanic or Latino
 - (2) Not Hispanic or Latino
28. Fill in the circle of how many years of school you have completed.
 - (1) Less than high school
 - (2) High school graduate, diploma or GED
 - (3) Some college or technical school
 - (4) Bachelor degree
 - (5) Graduate or professional degree

Thank you very much for your participation in this study.

Appendix D

Traditional Row Garden Data Collection Instrument

Date	Vegetable	Pounds	Delivery Site

Delivery site codes:

- A – Meals on Wheels
- B – Shelby County Senior Nutrition Site
- C – Joaquin Nutrition Site
- D – Shelby County Outreach Ministry Food Bank
- E – Tri-County Community Action Group Food Bank

Appendix E

Raised Bed Garden Data Collection Instrument

Date	Vegetable	Pounds	Delivery Site

Delivery site codes:

- A – Meals on Wheels
- B – Shelby County Senior Nutrition Site
- C – Joaquin Nutrition Site
- D – Shelby County Outreach Ministry Food Bank
- E – Tri-County Community Action Group Food Bank

Appendix F

Volunteer Data Collection Instrument

Date	Name	Organization <small>(Leave blank if none)</small>	Youth or Adult	# of Hours

Appendix G

Respondent Contact Log

Date	Time	Name and ID	Gender	Response

Vita

Jheri-Lynn (O'Donnell) McSwain graduated from Midway High School, Waco, Texas in 1982. She then entered Texas A&M University at College Station, Texas and received the degree of Bachelor of Science in wildlife and fisheries science in May 1989. During the next year, she was employed to conduct a field study as a fisheries biologist in Portland, Oregon. After staying home to raise her two children, she entered the Graduate School at Baylor University in Waco, Texas and received the degree of Master of Science in education in December 1998. While pursuing her M.Ed. degree she began her career as an elementary teacher and then school director at the Montessori School in Temple, Texas. She entered Texas Tech University at Lubbock, Texas to pursue a degree of Master of Science in horticulture and graduated in May 2012. In 2013, she began working for Texas A&M AgriLife Extension Service as a county extension agent in family and community health in Center, Texas. She was admitted to Stephen F. Austin State University in January 2015 to pursue the degree of Doctor of Philosophy in forestry and graduated in August 2018.

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This dissertation was typed by Jheri-Lynn McSwain.