

EXPLORING THE ROLE OF COMMUNITY GARDENS IN ADDRESSING FOOD INSECURITY AT NEW
MEXICO STATE UNIVERSITY

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ABSTRACT

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Dr. Christopher Brown, Chair.

The study explored how community gardens contribute to addressing food insecurity at New Mexico State University. The researcher premised the study on three research questions which sought the views of the participants on the role of international and domestic students in the community garden, how New Mexico State University's role as MSI/HSI/Land Grant institution influences the community garden on campus, and how the New Mexico State University Community Garden may help in addressing food insecurity issues. The research employed an exploratory research design, utilizing a qualitative approach. Data collection involved conducting semi-structured interviews with twenty (20) participants, enabling the capture of their unique perspectives and insights relevant to the study. The thematic approach was used in

analyzing the data. The study's findings revealed that both domestic and international students bring diverse ideas to harness the growth and development of gardening activities in the garden. Also, MSI/HSI/Land Grant institution does not influence community gardening activities at NMSU. The Seidel Engineering Leadership team from the College of Engineering provided logistical support to the NMSU Community Garden, managing supplies and equipment. Simultaneously, the Art Department offered training sessions to volunteers, equipping them with gardening knowledge and skills. Finally, the NMSU Community Garden does not have a significant impact in addressing food insecurity. Future research can delve into various aspects to enhance the effectiveness of community gardening activities at NMSU. One avenue is to investigate the optimal structure of a garden office, exploring its organization and operations. Additionally, examining successful educational programs from other institutions can provide valuable insights that can be applied at NMSU. Moreover, exploring the potential partnerships between community gardens and community organizations can shed light on effective collaboration strategies. By conducting research in these areas, we can gain valuable knowledge to improve the outcomes of community gardening initiatives at NMSU. It is further proposed that the Central Administration at NMSU work with the College of Agricultural, Consumer and Environmental Sciences to formalize the garden as an NMSU supported activity and then invite the NMSU community to be more involved.

Keywords: food insecurity, community garden, students, enhanced support, university, partnerships

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LIST OF ABBREVIATIONS

Acronym	Definition
MSI	Minority serving institution
HSI	Hispanic serving institution
FOA	Food and Agricultural Organization
NMSU	New Mexico State University
LFC	La Semilla Food Center
CES	Cooperate Extension Service
FI	Food insecurity
RDA	Recommended Dietary Allowance
USA	United States of America
DUG	Denver Urban Gardens
PPM	Potato Patch Movement
UNICEF	The United Nations Children’s Fund
CSA	Community Supported Agriculture

CHAPTER ONE

INTRODUCTION

1.0 Background to the study

Humans have a fundamental need for food that must always be satisfied. Consequently, accessing an adequate amount of food is considered one of the fundamental human rights (Prosekov and Ivanova 2018). Food plays a crucial part in the survival of a nation as one of the fundamental human rights and requirements. Withal, economic instability would result from a food supply that falls short of demand. Aside from that, food insecurity may also lead to other social and political upheavals. Cole, Augustin, Robertson and Manners (2018) defined food security as the availability of enough food that is safe, of adequate variety, nutritious, balanced, and inexpensive and does not violate one's religious or cultural convictions. This makes it possible to experience a sustainable, healthy, vibrant, and productive life.

Further, Luan, Cui and Ferrat (2013) asserted that over one in seven individuals need more sources of protein and energy, despite a significant rise in the food supply in Africa over the preceding 50 years. According to the Food and Agricultural Organization (FOA) (2015), food security is a state in which all individuals within a specific geographic location have continuous access to enough, safe, and nourishing food that suits their nutritional requirements and dietary preferences for a life of physical activity and good health. Bruinsma (2017) posits that food security denotes a state where a nation's food supply can meet all of the needs of its population.

Consequently, Rehima, Belay, Dawit and Rashid (2013) mentioned that food security comprises four dimensions. These dimensions are accessibility, availability, stability, and quality of food. Nonetheless, numerous nations and organizations, including educational institutions, have expressed concern about the issue of food security.

A study conducted by Nazmi, Martinez, Byrd, Robinson, Bianco, Maguire and Ritchie (2019) revealed that higher education institutions are faced with issues of food insecurity, especially with regards to having access to fresh foods other than junk and processed foods which pose a lot of threat to the well-being of students in higher educational institutions. In addressing food insecurity in schools, Meza, Altman, Martinez and Leung (2019) proposed community gardening as a sure way of improving food insecurity in schools. Subsequently, Hagedorn, Pampalone, Hood, Yura, Morrow, and Olfert (2020) advocate for community gardening in higher education institutions as a sustainable method to manage school food insecurity. A study conducted by Hadi (2020) among students pursuing undergraduate studies at the NMSU's College of Education revealed that New Mexico State University is challenged with food security issues, specifically concerning access to fresh foods and well-balanced diets. A 2020 study, Hadi further recommended community gardening as a sustainable way of managing and improving access to fresh foods in the university.

According to Nettle (2016), a plot of land or parcels of land cultivated by a group of individuals, individually or collectively, is known as a community garden. Barron (2017) also added that a community's collaborative effort to grow foods specifically for consumption is

known as “*community gardening.*” McGuire, Morris and Pollard (2022) assert that community gardening has played a crucial role in reducing and improving issues of food insecurity across the globe. While community gardening has proven helpful in mitigating food insecurity issues worldwide and is likely to yield similar results at New Mexico State University, it is essential to evaluate how much community gardening has helped advance food security at New Mexico State University.

1.1 Problem Statement

Food insecurity is a global problem that has worsened recently because of increased commodities and food prices. New Mexico State University has not been spared from food insecurity, as faculty, staff, and students on all NMSU campuses face food insecurity. All of these groups take advantage of Aggie Cupboard’s Pete’s Pantry at New Mexico State University to meet their food needs. Information found on Aggie Cupboard’s website (<https://aggiecupboard.nmsu.edu/impact.html>) showcases how students, staff, and faculty members actively utilize and benefit from the services provided by Pete’s Pantry. This study aims to explore the contribution community gardens provide in alleviating food insecurity at NMSU and the extent to which the development of Community Garden at NMSU has addressed and reduced food insecurity.

1.2 Research Objectives

1. To examine the role of international and domestic students in the NMSU Community Garden.

2. To investigate how the status of New Mexico University as an MSI/HSI/Land Grant institution influences the Community Garden on campus.
3. To explore how the New Mexico State University Community Garden helps in addressing food insecurity issues.

1.3 Research Questions

1. What role do international and domestic students play in the community gardening?
2. How does New Mexico State University's role as MSI/HSI/Land Grant institution influence the NMSU Community Garden?
3. Does the New Mexico State University Community Garden help in addressing food insecurity issues, and if so, how? If not, why not?

1.4 Delimitation of the Study

The research is restricted to the members of the Community Garden at New Mexico State University. In terms of methodology, I adopted a qualitative approach at the expense of other methods. The exploratory research was also considered among different designs, and the study in terms of population is delimited to only 20 members of the Community Garden at New Mexico State University.

1.5 Significance of the Study.

The study's importance stems from the fact that it will serve as a knowledge base for other researchers. The research will aid policymakers, management, and stakeholders at New Mexico State University in formulating and implementing policies pertaining to food insecurity.

Additionally, the NMSU Community Garden will potentially be informative for other similar institutions. The findings of this study will also guide NMSU to improve community gardening activities. Finally, it will help enhance NMSU's Community Gardening activities and help improve food insecurity and access to fresh food by students at New Mexico State University.

1.6 Organization of the rest of the study.

The study is presented in five chapters. Chapter One of the study comprehensively covers the background, problem statement, goal and research questions, importance, delimitation and organization of the study are captured. Chapter Two reviews the related literature on the constituent(s) of community gardens and explores their connection to food insecurity. Numerous sources, such as books, journals, and newspapers with relevant information on the topic, were reviewed in the following areas: the concept of community gardening or gardens, forms or types of community gardens, problems associated with community gardening, and strategies to improve community gardening. A conceptual framework was developed to explain the key concepts and variables of the study. Chapter Three of the study highlights the methods, focusing on study design, population, sample, tools, data gathering process, and data analysis process. Chapter Four presents' findings, discussions, and a summary of the results. Lastly, Chapter Five closes with the significant findings, conclusion, and suggestions for topics for further research.

CHAPTER TWO

LITERTURE REVIEW

2.0 Introduction

This chapter is dedicated to reviewing similar studies undertaken by other researchers on the research problem with the aim of evaluating what they have and have not accomplished in addressing the issue at hand. It also presents a range of studies of community gardening. The review is organized under the following headings: Concept of community gardens and food insecurity, types of community gardens, challenges confronting Community Gardening and the contribution of Community Gardens to reducing food insecurity.

2.1 Conceptual Review

2.1.1 *Defining Community Gardening*

Nettle (2016) defines *community gardening* as the organization of a small urban plot of land for the purpose of producing food and/or flowers that will benefit the general public. Barron (2017) posits that the importance of community gardening to enhance local food security and expand access to greenery, open space, and leisure and recreational activities is acknowledged globally. According to McGuire et al. (2022), community gardens serve as venues for various community events and as places to grow conventional fruits and vegetables. In addition, Ghose and Pettygrove (2014) stated that community gardening is utilized to advance social, economic, cultural, and environmental conditions, as well as to solve local problems within these disadvantaged communities.

From the discussions above on the concept of community gardeners, community gardening is a dedicated parcel or parcels of land used for cultivating crops for consumption, beautification, and medicinal purposes by the community engaged in the garden.

2.1.2 Defining food insecurity.

Food is said to be insecure when the available food is unable to satisfy the needs and wants of people in a given region (Gundersen and Ziliak 2015). According to Niles, Bertmann, and Neff (2020), food insecurity is the lack of access, affordability, and availability of appropriate food for entities within a state, community, or home. Additionally, according to Cady (2014), food insecurity is when individuals occasionally lack sufficient physical or financial means to access safe and nutritious food that fulfils their nutritional needs and supports an active and healthy lifestyle. From discussions held on food insecurity, food insecurity can be classified under four pillars - access, availability, utilization, and stability. Food insecurity can be summarized as the scarcity of nutritious foods for human consumption, which further means that food insecurity happens when the available food cannot meet people's demands.

2.2 Four Pillars of Food Security

The foundation of food security rests upon four essential pillars: the availability of food, access to food, the utilization of food, and the stability of food sources (Bartelmeß et al. 2022). Each component is crucial in ensuring food security for individuals and communities.

2.2.1 Food Availability

Food availability, as a pillar of food security, encompasses the presence and accessibility of an adequate quantity and variety of food within a specific area or population (Barrett 2010). While national and global food availability is essential, it requires supportive policies addressing earnings, pricing, and infrastructure (Moffat et al. 2017). Assessing food security comprehensively involves considering the resilience of nations, subnational areas, communities, and individual families in achieving food security (Babu et al. 2014). To gather information on food availability, analysts often utilize food balance sheets at the country, region, or subregion level (Babu et al. 2014). These sheets estimate the quantity of food available by combining domestically produced food, accounting for any stock changes, and imported food (Babu et al. 2014). However, it is important to note that financial statements primarily provide a national-level perspective and do not reveal consumption patterns or household food security status (Babu et al. 2014).

Surveys become valuable tools to gain insights into these aspects by capturing individual and household perspectives on food availability and consumption patterns (Babu et al. 2014). Surveys allow for a more comprehensive understanding of food security at a micro-level. They can explore various dimensions of food availability, such as access to diverse food sources, meal frequency, and adequacy of food quantities (Babu et al. 2014). Surveys provide a more accurate picture of food security by collecting data directly from individuals and households. Assessing food availability within the food security framework involves considering national and household-level perspectives. While food balance sheets provide an overview of food availability, surveys play a crucial role in capturing the experiences and perspectives of

individuals and households, thereby providing a more comprehensive understanding of food security at a micro-level (Moffat et al. 2017).

2.2.2 Food Access

Food access is crucial to ensuring food security (Babu et al. 2014). It encompasses market access and household purchasing power, determining whether a family can afford an adequate and nutritious diet. Household income and food prices are key factors influencing food access. Access to food and resources is a prerequisite for economic participation, highlighting the importance of food access in promoting overall well-being (Valenzuela-Antelo et al. 2019). Difficulties accessing food can indicate a lack of resilience in the face of unexpected events, such as unemployment, price rises, or asset losses (Alonso et al. 2018). Measuring food access is a complex task involving factors such as food markets, infrastructure, and economics. Assessing food access may require examining family spending habits, residential care configurations, changes in food availability over time, socioeconomic variables, calorie intake, and consumption of essential food items (Babu et al. 2014).

Surveys enable the estimation of food intake, dietary composition, and available nutrients at individual and household levels, facilitating a more profound comprehension of food access (Babu et al. 2014). It is crucial to recognize that mere access to food does not automatically ensure food security for households or individuals. Even if physical access to food is present, a factor such as affordability can still lead to food insecurity (Renzaho and Mellor 2010). Therefore, a comprehensive food security assessment requires considering various dimensions, such as food availability, food access, food utilization, and food stability. Assessing

food access involves considering multiple factors and conducting surveys to gather insights into consumption patterns and affordability (Renzaho and Mellor 2010). By addressing barriers to food access, we can take significant strides towards achieving food security for all.

2.2.3 Food Utilization

Food utilization, which is an essential component of food security, pertains to the way in which food resources are employed. It involves effectively utilizing available food resources, encompassing aspects such as feeding habits, food preparation, dietary diversity, and intra-household food distribution (Prosekov and Ivanova, 2018; Wheeler and Von Braun, 2013). The well-being of a population is measured by how effectively they utilize food, as it directly impacts the absorption of nutrients by the body and the resulting health benefits derived from these essential substances (Berry et al. 2015). When considering food utilization, an essential factor to consider is the quantity and quality of food consumed in relation to fulfilling nutritional and energy requirements (Babu et al. 2014). Various methods, including dietary recalls such as the 24-hour food diary, food frequency questionnaires, and food records, can be utilized to estimate the quality and quantity of food intake. These tools facilitate the calculation of nutrient composition, enabling comparisons with daily dietary guidelines (Babu et al. 2014). While protein and other nutrients are significant components of a balanced diet, energy intake is paramount in maximizing nutrition (Babu et al. 2014). Thus, understanding the amount of food consumed concerning energy needs is critical when evaluating food utilization.

Food utilization, an integral pillar of food security, is closely associated with individuals' and populations' overall health and well-being. We gain valuable insights by assessing the

effective utilization of available food resources through indicators such as feeding habits, food preparation, dietary diversity, and intra-household food distribution (Berry et al. 2015).

Optimizing food utilization contributes to the absorption of nutrients and the subsequent health benefits derived from these essential elements.

2.2.4 Food Stability

Food stability serves as a vital pillar of food security, ensuring the safety and reliability of the food supply. The security of food supplies can be undermined by various factors, including weather volatility, price variations, political instability, and economic stagnation, as emphasized by UNICEF (2018). The stability of food supply at the national, regional, and global levels plays a vital role in ensuring a safe and dependable food system. Conflict can significantly disrupt food stability, leading to the uprooting of families, looting of property, loss of lives, and the collapse of businesses (Babu et al. 2014). Such conflicts also impact animal welfare and hinder people's ability to access milk, meat, and livestock, thus directly affecting their capacity to provide for themselves (Abbade 2017).

Measuring food stability differs from assessing food access, utilization, and availability. The unexpected nature of most wars and weather disasters leaves little room for proactive planning and foresight, contributing to the challenge of quantifying food stability (Abbade 2017). However, while each aspect of food security can be measured independently, a comprehensive understanding of a family's ability to meet its food needs is achieved by assessing all four dimensions together. While data on food availability can provide insights into national consumption trends, it cannot capture individual eating habits (Babu et al. 2014).

2.3 Forms of Community Gardens

Community Gardens can be located in communities, schools, hospitals, and places of communal dwelling (Bradley 2019). There are various forms of community gardens. Every community garden can be classified as a neighbourhood, school, institutional, residential, or demonstration garden. While these classifications provide useful information about community gardens, it should be noted that they can sometimes overlap.

2.3.1 Neighborhood Gardens

People's first thoughts when they hear "*community garden*" often go to neighbourhood gardens. According to Lovell, Husk, Bethel and Garside (2014), neighbourhood gardens are types of Community Gardens where each neighbor often tends to own a small plot of ground inside a larger tract of privately owned or publicly owned land, where they cultivate both food and ornamental plants. Gardeners typically rent individual plots for a small annual fee, and the gardens themselves can be found in or near areas of low and high population density (fig 2.1)



Source: Field Survey (2023). Figure 2.1: Illustrates a neighborhood garden, the NMSU Community Garden.

2.3.2 Residential Gardens

Residents of affordable homes, apartment buildings, and assisted living facilities commonly share residential gardens (Barron 2017). These gardens are mostly tended to by residents living on the premises, and they are very similar to the community gardens that are common in residential areas, in which individuals have access to either individual plots or shared plots (Guitart et al. 2015) as indicated in (fig. 2.2).



Figure 2.2: Residential Garden in Los Angeles (Davis 2021)

2.3.3 Institutional Garden

Community gardens owned and maintained by private or governmental institutions, such as churches, hospitals, or government agencies, are called institutional gardens (Amber et al. 2019). These gardens are typically a component of a more extensive program that provides participants with various beneficial services. Services offered in this context can encompass a wide range of support, including mental or physical rehabilitation (as illustrated in Figure 2.3),

skill development for employment, and gardening spaces for low-income families.



Figure 2.3: Beltsville Garden (Chris 2011) is an example of an institutional garden.

2.3.4 Demonstration Gardens

In most cases, demonstration gardens are accessible to members of the general public. They are utilized in instructional and recreational contexts (fig. 2.4). As mentioned, the gardens are typically used for gardening lessons, native flora excursions, or hands-on learning areas. They may support lectures on agronomy topics, including pollinators, plantings, internal vegetable gardening, and water management (Zhang 2021). In addition, the gardens are often

visited by native plant enthusiasts.



Source: (Davis 2021). Figure 2.4: Shows a demonstration garden, Descanso Gardens, in Los Angeles, California.

Leveraging on the discussions held above on the types of community gardening, the review revealed that many sorts of community gardens serve peculiar purposes and uses.

2. 4 The Practice of Community Gardening in the United States

In the United States, community gardens have a long history. Around the early 1900s, in response to increasing poverty and unemployment, some city governments took action by establishing community gardens. A notable example was in Detroit, where the mayor encouraged the use of vacant lots for growing vegetables, thus becoming a pioneer in the urban

agriculture movement (Hartsfield and Henderson 2009). This movement became known as the Potato Patch Movement (PPM).

The National War Garden Commission was established in 1917, under the direction of Charles Lathrop Pack and supported by the US Congress, further promoted the idea of utilizing idle land for planting Liberty Gardens (Wolschke-Bulmahn 1992). The government provided education on gardening and food preservation techniques, such as canning and drying, to ensure a secure food supply for the nation (Wolschke-Bulmahn 1992). Community gardens started to emerge across both rural and urban areas of the United States and Canada, with a focus on parks, school yards, chic homes' front yards, and even window boxes. The campaign organized by the Commission utilized posters with slogans like "Every War Garden is a Peace Plant" and "Put the Slacker Land to Work" (Wolschke-Bulmahn 1992).

Also, during times of crisis, such as World War I, the Great Depression, and World War II, ensuring food security became paramount. Victory Gardens gained popularity during these periods as a grassroots movement to promote self-sufficiency and increase food availability (Hartsfield and Henderson 2009). Millions of Americans participated in urban agriculture, with about 20 percent of the population engaged in the production of millions of tons of produce annually through the planting of Victory Gardens in the 1940s (Hartsfield and Henderson 2009).

While community gardens experienced a decline and repurposing of their properties in the post-World War II era of economic recovery, they saw a resurgence in the 1960s and 1970s due to grassroots organizing efforts (Lawson 2005). In recent years, community gardens have gained popularity again as a response to the economic crisis, the housing market collapse in the

2000s, and a growing desire among Americans to live healthier and more environmentally responsible lives (Lawson 2005). The revival of community gardens allows individuals to have a partial divestment from the conventional American food system. It fosters a deeper connection to the sources of their food, leading to the consumption of healthier organic produce.

2.5 Challenges of Community Gardens

If organizations and people are aware of the challenges often encountered when establishing and maintaining community gardens, they will have a better chance of being successful in the future (Corrigan 2011). However, they must overcome several complex challenges before community gardens can help support other food security initiatives. According to Saldivar-Tanaka and Krasny (2014), community gardens require a strong administrative foundation, availability of space, funds, and resources, as well as constant participation from growers and a stout and enthusiastic spearhead to lead the organization. Despite the fact that gardening difficulties are inherently linked to specifics of each location, emerging themes can be identified among the most common complaints voiced by community gardeners: gardeners' inability to maintain interest and participation, a lack of resources, poor garden layout, inadequate funding, and an inability to legally own the land on which their gardens are located.

It is easy for beginner gardeners to dive into their first plot with enthusiasm and energy without fully appreciating the commitment required to maintain a garden throughout the year. Volunteerism is the backbone of community gardens; therefore, their continued success depends on the involvement of their members. (Denver Urban Gardens 2012) community gardeners across North America were polled by Drake and Lawson (2015), who sought to learn

about the challenges people faced while attempting to establish and maintain community gardens. Their findings corroborate those of Milburn and Vail (2010), who found that dwindling volunteerism and participation were the most pressing issues facing community gardens. However, garden politics, conflicts, and bad leadership are more common in smaller garden groups than in bigger ones (Drake and Lawson 2015). The reason for this is that larger gardens, which have access to financial resources, capital, and necessary materials, often have a structured governance system with a board and officers in place. This organizational structure and resource availability contribute to a smoother operation, reducing the likelihood of conflicts arising within the garden community.

Another challenge of productive community gardens is clean water and soil availability. The viability of plants could be jeopardized by the presence of toxins or heavy metals in urban soils (Pickett et al. 2011). A community garden can only thrive with easy access to water. Community gardeners cited obtaining water as their primary gardening difficulty in a survey conducted by (Drake and Lawson 2015).

A garden site can be prepared with sufficient funds, and garden facilities, such as planters and a shed, can be purchased. Unfortunately, the costs associated with maintaining a garden can be rather high. In Denver, for instance, Denver Urban Gardens (DUG) predicts that creating a communal garden will cost, on average, \$20,000, but actual costs may be substantially greater than what a community can give (Denver Urban Gardens 2010). Because of this, gardens frequently require assistance from various outside groups and establishments to ensure their continued existence. Less than 1% of U.S. Garden groups do not work with other groups (Drake and Lawson 2015). Non-governmental groups, religious institutions, charitable

organizations, educational institutions, and municipal governments are all potential backers. Often, the services are initially provided for free.

Even with funds, a garden's layout must be considered; where it is located and how accessible it is can ensure the garden's success or consign it to failure. There is more success for community gardens when they are situated in the middle of their respective neighborhoods (Denver Urban Gardens 2010). Due to its strategic positioning, garden members have enhanced accessibility to their plots from their homes. According to Emerson (2015), when a garden is conveniently located where participants can walk, it is more likely to foster heightened engagement and active involvement. The best gardens are those that can be easily reached on foot.

Moreover, another challenge is the issue of crime and vandalism. The safety of urban community gardens is frequently jeopardized by criminal activity. A handful of strategies that have shown promise in reducing criminal activity and vandalism can be implemented. For example, Brown and Carter (2003) suggest securing gardening equipment, regularly collecting rubbish, and growing less popular crops in areas visible to people outside the garden. Fencing can serve as a deterrence against criminal activity, especially when combined with prickly plants in a garden. The garden layout should not obstruct sightlines but encourage them, as this will increase safety for everyone on both sides of the fence. A notice encouraging the general public to utilize the garden's space as a meeting area should be posted to discourage unwanted visitors from scavenging for food. Interested people should be told how they can participate by reading those notices. For fear of theft, some gardeners sow extra vegetables. As a deterrent, some gardens include "vandal's gardens" outside the entry, complete with a sign reading, "If you need

to take food, please take it from here” (Nettle and Claire 2010). Although many people in the general public and charity groups are interested in gardening, few have the expertise to do so successfully. The success of a garden dramatically depends on the gardener’s knowledge, such as when to plant which types of plants and how far apart they should be. Small amounts of land are typical for community gardens; increasing productivity is crucial for reducing food insecurity.

The primary obstacle that hinders the flourishing of vibrant community gardens is the limited availability of open space rights. Cities and those who plan cities establish who can live where and the configuration of land uses in urban areas. A city’s municipal government may provide community gardens with free or low-cost use of public property, land leases, or even outright land dedication in regions with thriving community gardening groups (Hess and Winner 2017; Drake and Lawson 2014). “When community gardens are pitted against other important land uses, such as an affordable housing project, a health clinic, or a soccer field, they often do not fare well,” writes Denver Urban Gardens (2012, p.23). Having no local backing might be fatal for a community garden group. From the discussions on the challenges confronting community gardening activities, we see that most community gardeners faced land procurement, soil fertility, financial constraints, and climate changes, to mention a few.

2.6 Roles and contributions of Community Gardens

Community gardening has come a long way from its humble beginnings as a means of increasing and bettering access to locally grown food. Personal well-being, child education, city and neighbourhood aesthetics, social dynamics, cultural understanding, food security, and the ability to solve other urban concerns are all enhanced (Lawson 2017; Alaimo et al. 2018; Teig et

al. 2019; Draper and Freedman 2020)—the role of community gardens in enhancing health, social capital, and economic benefits are discussed below.

2.6.1 Health benefits

Community gardening has benefits for both physical and mental health that are distinct from one another (Teig et al. 2019). Researchers have found that gardening and time spent in nature can calm the mind (Maller et al. 2015; Fuller et al. 2017; Teig et al. 2019). More people in rural and urban areas who participate in community gardens eat more fruits and vegetables (Barnidge et al. 2013), and similar outcomes are observed among younger individuals and in community gardens (Parmer et al. 2009). In Denver, Colorado, Litt et al. (2011) conducted a survey, and they discovered that while only 37% of home gardeners ate fruits or vegetables at least five times per day, 56% of community gardeners did. The study by Litt et al. (2011) highlights the contribution that community gardens make to expanding access to fresh produce, which significantly impacts health.

2.6.2 Social capital

Community gardening encourages social connection and a sense of belonging, motivating people to participate. Compared to planting one's private backyard, community gardening encourages neighborly interactions, social growth, and a sense of belonging to something greater than oneself (Teig et al. 2019). Community gardens have been shown through several social processes to increase social capital (Comstock et al. 2010). Enhanced social capital has two positive effects on health: it increases collective effectiveness and social cohesion, essential for maintaining a healthy lifestyle (Teig et al. 2019). In their review, Draper

and Freedman (2010) found social behaviors to support the expansion of community gardens. A community garden was found to be both a cause and an effect of increasing social capital (Glover 2014). The garden investigated by Glover (2014) brought people together. Community gardening is a leisure activity that strengthens social networks (Glover and Parry 2015). Gardeners benefit from cultivated and sustained social interactions through their participation (Glover et al. 2017). Martin et al. (2014) finalized that very high levels of social capital correlate with a stronger sense of domestic food security. Increased food security is more likely in households where at least one person is active in a group that fosters the development of social capital.

2.6.3 Community development and improvement

Community gardeners frequently report having gained a better appreciation for the importance of a cleaner and healthier environment, which can enhance the local society's economic environment (Bauermeister et al. 2010). For instance, the beauty of a neighborhood can contribute to a cleaner urban environment by removing blights like vacant lots and abandoned industrial areas. Urban greening has been shown to enhance environmental health and people's perceptions of their quality of life. By transforming vacant lots or neglected spaces into vibrant green areas, community gardens enhance the neighbourhood's aesthetic appeal and improve the overall quality of the environment (Birch and Wachter 2018). Environmental pollution, such as CO₂ emissions, decreases when fossil fuel reliance is reduced. In an urban environment, gardens offer an original and affordable technique to purify water. The farm conserves "grey water" to be used again (Birch and Wachter 2018). Urban heat islands may be

reduced in urban areas by having community gardens. Through vegetation and green spaces, community gardens contribute to cooling the surrounding environment (Roberts 2011).

2.6.4 Economic benefits

Community gardening offers numerous benefits, and one of its most apparent advantages is the cost savings it provides to both the growers and the locations where the gardens are situated. Community gardeners and their families tend to feed from the produce of their garden, reducing the financial burden of procuring all foods from the market (Hanna and Oh 2012). Some community gardeners sell produce from their gardens (Hanna and Oh 2012). Within the San Francisco Bay Area, several communal gardens have been dubbed “entrepreneurial gardens” by Guitart et al. (2015). The income generated from the sale of their agricultural products helps alleviate poverty within families, and this positive effect can extend to have impacts at the national level (Sempik 2011).

2.7 Empirical review of Community Gardens

A research conducted by Galhena et al. (2013) found that urban, rural, developed, and developing communities alike have all advocated for community gardens to ensure their residents' continued access to healthy food. Hence, community gardens and their impact on ensuring access to healthy food have been the subject of academic inquiry.

Boone and Taylor (2016) investigated whether or not food sovereignty might be achieved through community gardens and, if so, why farmers are reluctant to adopt biodiverse community gardens. In-depth interviews were conducted with twenty-two people (twelve men and ten women) from four cooperative societies in the Estelli and Somoto municipalities of

Northern Nicaragua. To round out the information gathered from the participants, researchers also spoke with project management team members. The majority of farmers (90%) believed that growing their own food improved the quality of their diets and allowed them to save money by not buying groceries (Boone and Taylor 2016). According to Arimond et al. (2011), agriculture interventions improve nutrition by expanding food access and availability through local production.

Boone and Taylor (2016) reported that farmers were discouraged from growing their own food despite the advantages of a diverse diet because of the high price of supplies, the necessity of building walls surrounding gardens to keep out domesticated animals, the erratic nature of rainfall, and the lack of adequate acreage. According to in-depth investigations, farmers discovered that growing coffee was more cost-effective since it needed less work. Afterwards, farmers buy home supplies using the cash they earn from exporting the coffee (Boone and Taylor 2016). Similarly, Arimond et al. (2011) noted that farmers who implement agricultural interventions face challenges because farming inputs like seeds, human resources, insecticides, and herbicides are expensive. Based on in-depth interviews, Boone and Taylor (2016) found that market prices for vegetables are below production costs, especially considering the high expenses of transporting the produce to the markets. The low price at which vegetables sell could dissuade farmers from considering gardening for financial reasons. Farmers also said they needed to learn what they were doing when it came to growing vegetables and that adjusting their schedules and budgets to make room for backyard gardens would be difficult (Boone and Taylor 2016).

Preschoolers' dietary intake, food access, and food variety were studied by Selepe and Hendriks (2014) in Eastonside, South Africa, and they found that community gardens positively affected all three. Caregivers recorded their children's food intake and dietary diversity over 24 hours. Before commencing the experiment, an examination of dietary intakes indicated that except for protein, which exceeded the Recommended Dietary Allowance (RDA), and vitamin A, which surpassed the RDA, the usual nutrient intakes were below the recommended levels for sufficient nutrition. Selepe and Hendriks (2014) found that towards the end of the research, participants were eating twice as much nuts and legumes as they had been before. Fish and egg consumption among children increased by roughly 25%, while consumption of other and dark green vegetables increased by 25%. Alterations in consuming vitamin A-rich foods such as milk, beef, organ meats, seeds, nuts, legumes, and vegetables were statistically significant, as determined by paired t-tests. In addition, Selepe and Hendriks (2014) found that house gardens had a direct, favorable effect on dietary diversification. According to researchers, gardening advocacy has been shown to promote vegetable consumption (Hotz et al. 2012; Low et al. 2017; Hagenimana et al. 2011).

Gardening's effects on vegetable consumption, food security, and family ties were studied by Carney et al. (2012). Carney et al. (2012) attribute the study's success to the collaboration and trust between the community and researchers. Community gardens were also the focus of research by Zoellner et al. (2012), who looked at their effects on a population with healthcare disparities. In this study, local civic, religious, healthcare, educational, small business, and municipal government groups worked with research academics at Virginia Tech to develop a coordinated community campaign to fight obesity. Zoellner et al. (2012) found that community

gardeners and individuals who consume locally grown food actively embraced the concept of community gardening. Based on a study undertaken by Zoellner et al. in 2012, parents who took part in the research demonstrated a higher level of performance compared to the average population in tests assessing their attitudes, beliefs, and consciousness toward gardening. This indicates that these parents exhibited a greater knowledge, understanding, and positive mindset related to gardening.

The potential for future communal gardens that might lead to better overall health was brought to light by partnerships between the community and the academic team. However, Zoellner et al. (2012) identified time and inconvenience as drawbacks of the study concerning community gardeners and individuals who consume locally grown food. This was evidenced by the fact that few people from the neighbourhood actively participated in the qualitative study conducted by Zoellner et al. (2012) due to their busy schedules.

Community gardening has been studied extensively; nevertheless, most studies have focused on its positive effects on social interactions and collective efficacy. One way that this study on community gardens is unique is that it focuses on food security. However, despite similar studies being conducted in Philadelphia (Meenar and Hoover, 2012; Grewal and Grewal, 2011; and the Columbia River Gorge Latino community (Carney et al. 2012), no other studies have explored the role of community gardens on food insecurity at other higher education institutions, and there have also been no systematic investigations regarding access to food security within the field of Community Gardens at NMSU. Therefore, the need for the study exists.

2.8 Summary of chapter

This chapter discussed pertinent literature which deals with the subject matter of community gardening and food security. The first part of the review looked at issues regarding community gardening, which includes the meaning and various types of community gardening. The discussion extensively covered the challenges faced by community gardening and the benefits derived from the community. In the empirical review, several studies on community gardening and food security were discussed. A gap I found in my research was the absence of any previous studies on the relationship between community gardening and food security conducted at New Mexico State University. Consequently, this study aims to fill this void by examining the contribution of community gardens in addressing food insecurity, specifically within the context of New Mexico State University.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter details the procedures used to get precise data on how community gardens at New Mexico State University are helping to combat food insecurity. A description of the study area, research design, study population, sampling methods, data collection techniques, ethical considerations, and data analysis methods are some of the topics covered in this chapter.

3.1 Study area description

The research occurred at New Mexico State University (NMSU) in Las Cruces, New Mexico. Las Cruces is situated in the southern region of New Mexico, close to the Texas border. New Mexico lies in the southwestern region of the United States. It shares its eastern border with Texas, its western border with Arizona, and its northern border with Colorado. To the south, New Mexico is bordered by Mexico. NMSU is a Carnegie high research activity land grants institution (Johnson 2013). Within New Mexico, NMSU is situated in the Mesilla Valley, surrounded by the stunning natural landscapes of the state (Waltemeyer 2008). The geographic coordinates of NMSU's campus pinpoint its precise location on the Earth's surface. The university coordinates are approximately latitude 32.2804° N and longitude 106.7457° W (Waltemeyer 2008). These coordinates place NMSU in the southwestern region of the US, specifically in the southern part of New Mexico. The NMSU campus covers a significant land area, providing ample space for academic buildings, facilities, and the community garden. Main campus spans approximately 900 acres, encompassing various departments, research centers, student housing, and recreational spaces. The university serves a diverse student population

from various socioeconomic backgrounds, including a significant number of first-generation college students (Johnson 2013). Despite being located in an agriculturally rich region, food insecurity remains a pervasive issue on NMSU's campus.

The Community Garden on the NMSU campus is located within the university grounds, providing students, faculty, and community members with a dedicated space for sustainable agriculture and community engagement. NMSU Community Garden can be seen in Fig 2.5.

Las Cruces and New Mexico State University Community Garden

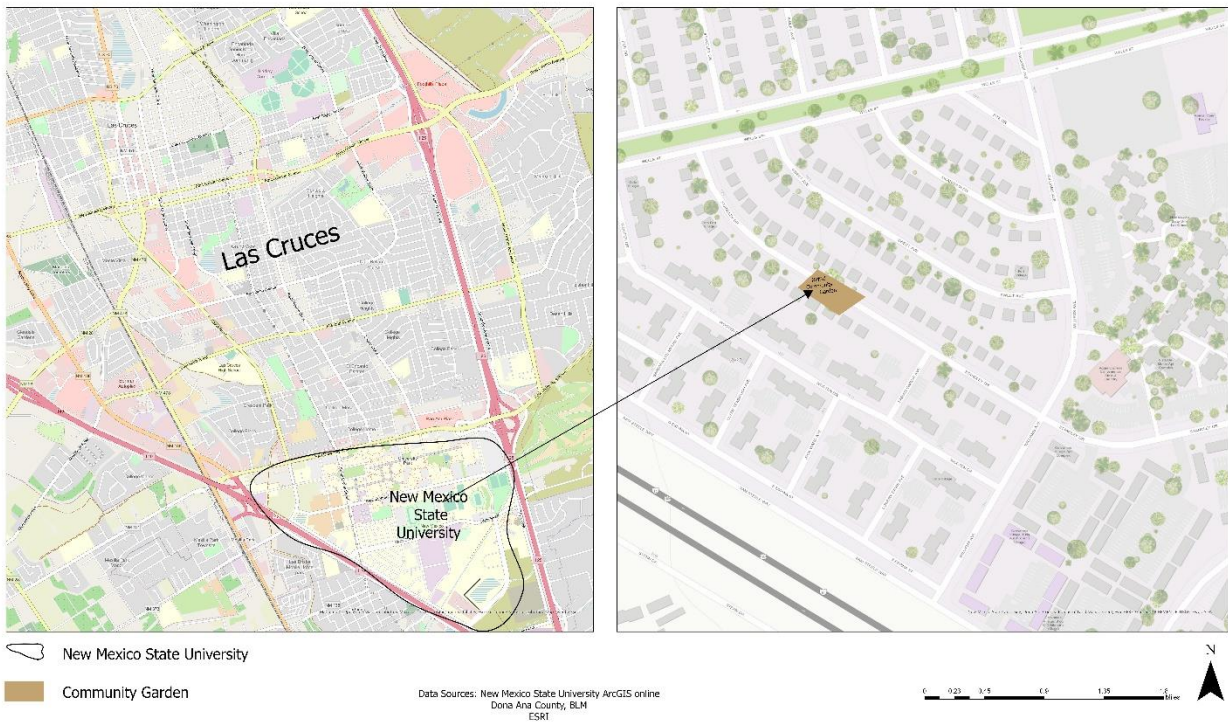


Figure 2.5: Shows Las Cruces and New Mexico State University Community Garden

3.2 Research Design

There are three approaches researchers widely use in conducting research. These include qualitative, quantitative and mixed methods. All these three approaches have their

philosophical underpinning (Dammak 2015). Nonetheless, this study will adopt exploratory and qualitative approaches. This study will adopt the interpretive philosophical paradigm as its foundation. Interpretivism emphasizes the interpretation of social phenomena through the lens of individuals' lived experiences, cultural backgrounds, and social values concerning community gardening and food insecurity (Hussai and Nasseef 2013). To achieve the objectives of this research, the study will employ an exploratory research design to investigate and understand how Community Gardens, specifically at New Mexico State University, address food insecurity.

3.3 The Qualitative research

Qualitative research refers to the assessment of data whereby the researcher examines instances in their cultural and social environment over a predetermined period to emphasize how events occur over time in a particular area under study (Goffin et. al 2012). Qualitative research focuses on people's interpretations and experiences about their world, shaped by their social values and cultural background. The rationale for using a qualitative study is that it enables the researcher to gain an understanding of a particular group's mentality (as to why they behave in the manner they do) and to acquire in-depth information for the research (getting a clear depiction of the entire situation) (Nayak and Singh 2015). This study adopted the qualitative approach because it allows the researcher to interview community garden participants about their experiences on how community gardens address food insecurity. Interviews provide unique advantages that set them apart from other research methods. Through direct interaction and engagement, interviews offer researchers the opportunity to gather detailed and in-depth insights. The ability to ask follow-up questions and explore participant perspectives allows for a more comprehensive understanding of the subject matter.

Interviews also offer an opportunity for participants to express their thoughts and recount their experiences using their own language and perspectives, uncovering valuable nuances and individual viewpoints. This personalized and qualitative approach enriches the research findings, capturing intricate details that quantitative methods may miss.

Qualitative research further assists in studying human activities and interactions within their spatial and social context (McGuirk and O'Neill 2016). Further, the qualitative study harnesses the researcher's knowledge of the intricate interactions between people and the environment (Dowling et al. 2016). As a researcher, studying complex and context-specific phenomena in community gardens and food insecurity is beneficial to my understanding of the subject (Kitchin and Tate 2013).

3.4 Exploratory design

This exploratory study employed a qualitative research approach to understand how community gardens address food insecurity at New Mexico State University. The study utilized purposeful or deliberate sampling to select participants who possessed relevant experience and expertise in community gardens and those who had firsthand experience with food insecurity. Through semi-structured interviews (see appendix A for interview guide), the study aimed to capture the rich and nuanced perspectives of the selected participants. These interviews served as a vital source of data, allowing for in-depth exploration and analysis. By employing thematic analysis, I examined the collected interview data, enabling the identification of key themes and patterns that emerged from participants' narratives.

One of the significant strengths of this research design lies in its capacity to uncover comprehensive explanations for the diverse processes at play within community gardening. By engaging participants with practical knowledge and personal experiences, the study sought to illuminate the intricate dynamics that contributed to the efficacy of community gardens in mitigating food insecurity. Furthermore, this research design enabled an investigation into how these processes impacted the multifaceted nature of food insecurity.

Overall, this exploratory study adopted a rigorous qualitative approach, strategically utilizing purposeful or deliberate sampling, semi-structured interviews, and thematic analysis to explore the multifaceted relationship between community gardens and food insecurity at New Mexico State University. By revealing these insights, this research adds to our comprehension of the extent to which community gardens are a transformative force in addressing food insecurity and fostering food justice within the university community.

3.5 Population

The population for this study included members and volunteers of New Mexico State University's Community Garden. As of July 2023, the NMSU Community Garden had a membership of 47 individuals, with 38 domestic students and 9 international students. The garden had 25 active workers, and the total number of plots was 15. According to Gould (2015), "population" refers to a collection of items or variables, such as people, things, or even specific criteria, that interest researchers in generalizing their findings. The information gathered from this data can inform researchers and practitioners interested in similar community gardens or studying similar populations.

3.6 Sampling Procedure

Twenty (20) participants were included in this study, constituting 43% of members of the NMSU Community Garden. Sampling is the term used to describe the process of choosing a specific number of research units from a predefined population (Teye 2012). The study employed purposive and convenience sampling approaches to ensure the inclusion of individuals with relevant knowledge and expertise. The rationale behind using purposive sampling was to target members of the Community Garden at New Mexico State University who were actively engaged in the community garden. These individuals were perceived to possess the necessary knowledge and insights required for the research; by intentionally selecting participants from this specific group, the study aimed to gather in-depth information and perspectives on community gardening and its impact on addressing food insecurity.

Additionally, convenience sampling was utilized to choose the twenty participants for the study. This method was driven by factors such as proximity, availability, and the willingness of individuals to participate in the research (Sedgwick 2013).

3.7 Data Collection Instruments

The researcher conducted participant observation and in-depth interviews. The participants' opinions were solicited using a semi-structured interview guide (see Appendix A). Interviews enabled the researcher to investigate how community gardens and food insecurity affected people's lives and perspectives, and they proved to be essential tools in human geography research on both topics. In-depth and nuanced information from interviews could guide practice and policy to reduce food insecurity and support community gardens. Interviews

were the right choice for the research questions as they provided rich and nuanced data that are useful in answering these questions. Interviews helped identify patterns and themes in the data that guided initiatives to combat food insecurity and promote community gardens. The in-depth interview allowed me to collect information on various community gardens and food insecurity issues, as highlighted by Davies, Hoggart, and Lees (2014). In light of those mentioned earlier, the study used this strategy to allow participants to express a wide range of thoughts and ideas on the subject matter. Utilizing a semi-structured interview guide enabled the researcher to delve into the diverse viewpoints of participants, facilitating a deeper understanding of their perspectives (Iphofen and Tolich 2018).

Additionally, the interviews facilitated the exploration of a wide range of participant understandings and revealed significant facets of the phenomenon being studied (Bettez 2015). While providing new opportunities for additional inquiries, semi-structured interviews enabled the interviewer to concentrate and focus on the research questions (Deakin and Wakefield 2014).

Furthermore, research design provided flexibility in which questions were asked and how they were asked. The interview guide was developed based on the fact that participants could verbally answer questions of particular importance. The interviews conducted were designed to be flexible and adaptable to various situations, ensuring they could be easily administered. Despite interviews taking more time, being quite expensive, and providing less anonymity than other methods, they were chosen because they allowed respondents to react verbally to items of particular interest and the researcher to observe the non-verbal behaviors of participants (Jamshed 2014). By utilizing interviews in this research, there was ample

opportunity to explore the complex interplay between community gardens and food insecurity at New Mexico State University from the participants' perspectives. This method allowed for a more personalized and contextual understanding of the topic, capturing the voices and experiences of those directly involved.

The interview guide consisted of four parts. Part A covered the introductory questions; Part B explored the respondents' views on the role of international and domestic students in community gardens. Part C examined the role of New Mexico State University as an MSI/HIS/Land Grant institution in influencing community gardens on campus. Part D explored respondents' views on the role of the NMSU Community Garden in addressing food insecurity. The interview guide can be found in appendix A for reference.

3.8 Data Collection Procedure

The researcher submitted a proposal to the NMSU Institutional Review Board (IRB) for ethical clearance and approval of the research protocol, and the proposal was approved. Refer to appendix C for the IRB approval. The researcher received the green light to move to the field to collect the data. Each interviewee had to complete an informed consent form. The consent form outlined the study's goals and objectives, advised participants on the expected questions during the interview, explained how their interviews would be recorded and archived, and listed any risks and advantages of participating in the study. Additionally, interviewees were given the option to decide whether their identifiers should be published in the final report of the research. The principal investigator sought interviewee consent directly from them. Paper copies of completed consent forms were kept in a secure file in the Principal Investigator's office

on campus, and participants were provided with a copy for their records. For further details, please refer to appendix B where the consent form can be found.

The researcher ensured the anonymity and confidentiality of the participants, adhering to all protocols concerning research work; this meant that no data were associated with any names, and all data were kept anonymous. Participants had interview sessions that lasted for 30 to 40 minutes. The interviews were conducted in person at the NMSU Community Garden. Conducting in-person interviews at the NMSU Community Garden was not only crucial for my research but also beneficial for the participants. Having the interviews take place directly at the garden allowed participants to feel a stronger connection to the space and share their experiences in a more authentic and meaningful way. Being in the garden environment sparked memories, emotions, and sensory responses that may have been difficult to capture in a different setting. Moreover, the familiarity and comfort of the garden setting created a safe and relaxed atmosphere, encouraging participants to openly express their thoughts and engage in deeper discussions. Overall, having the interviews at the NMSU Community Garden added a layer of personal significance for the participants and enriched the overall quality of the research data.

3.9 Data Analysis

The thematic approach to data analysis was adopted in this study. The analysis was undertaken in three phases by the researcher:

First, the interviews were recorded using an audio recorder. This allowed for the preservation of the participants' spoken words, ensuring that no details or nuances were missed

during the transcription. The use of an audio recorder served as a reliable and efficient method for capturing the interviews in their entirety. Using an audio recorder, the researcher could focus on actively engaging in the interview and maintaining a productive conversation with the participants. The audio recorder acted as a reliable tool, capturing the participants' responses and expressions without requiring extensive note-taking during the interview. Recording the interviews also provided the opportunity for the researcher to revisit and reanalyze the conversations at a later stage. It ensured that the researcher had access to the original audio source, enabling them to cross-reference and verify the accuracy of the transcriptions during the analysis phase.

After the interviews were conducted, the researcher embarked on a crucial step of assembling the collected interview notes and transcribing the interviews. This process was pivotal in organizing and analyzing the data, facilitating a deeper exploration of the research objectives. To begin with, the researcher carefully reviewed and organized the field notes taken during the interviews. These field notes were detailed accounts of the interactions, observations, and contextual information gathered during the interview sessions. By revisiting and organizing these notes by hand, the researcher gained a comprehensive understanding of the interview dynamics and the nuances captured during the conversations.

Transcribing the interviews was also an essential task undertaken by the investigator. This involved manually converting the recorded audio files into written text, ensuring an accurate representation of every spoken word, pause, and expression. The process required active listening and meticulous attention to detail to accurately capture the nuances of participants' responses and non-verbal cues.

During the transcription process, careful consideration was given to accurately representing the participants' words and ensuring the transcription reflected the interviews' tone, emphasis, and overall context. This attention to detail was vital in preserving the integrity and accuracy of the data for subsequent analysis. Once the transcriptions were complete, the researcher embarked on the analysis phase. The analysis phase involved a systematic and in-depth examination of the transcribed interviews to identify patterns, themes, and critical insights. The transcriptions became the primary data source, which allowed comprehensive exploration of participants' perspectives and experiences. The researcher transcribed the interviews, and the transcripts were examined multiple times to identify repeated patterns in the data (Terry et al. 2017).

The researcher employed various techniques to analyze the transcribed interviews effectively. This included reading and rereading the transcripts, highlighting and annotating significant points, and identifying recurring themes or ideas. Through this immersive process of transcription, the investigator sought to understand the participants' perspectives and extract meaningful insights. The researcher applied coding techniques to categorize and organize the data. Codes were assigned to specific segments or passages within the transcriptions representing meaningful concepts or themes relevant to the research objectives. Some of these codes were #RQ1T1#, #RQ1T2#, #RQ1T2#. Through the coding process, patterns, relationships, and connections within the data were able to be identified and examined, allowing for a deeper exploration of the research questions. Details of the coding scheme are provided in the discussion of results in Chapter 4. The researcher remained open to new insights and emerging themes throughout the analysis. The iterative nature of the process involved revisiting and

refining codes, comparing and contrasting responses across interviews, and seeking convergence or divergence in participants' perspectives. This rigorous approach ensured a comprehensive and nuanced analysis of the transcribed data.

Finally, similarities and disparities were drawn from the reviewed literature to gain insights and connect with the study's findings. This involved examining the collected data, such as interview transcripts, field notes, and other participant behaviors, and comparing them to the existing body of knowledge.

Ethical Considerations

Conducting research to understand community gardens' role in addressing food insecurity at New Mexico State University required a solid commitment to ethical considerations. The researcher prioritized ethical principles, including obtaining informed consent, ensuring confidentiality and privacy, promoting voluntary participation, minimizing potential harm, and maintaining transparency and accountability. The ethical measures implemented aimed to safeguard the well-being and rights of participants who were part of the study. By adhering to these principles, the researcher aimed to uphold the integrity and validity of the research while respecting the individual's dignity.

The concept of "ethics" pertains to justified ethical principles that guide appropriate human behavior. These principles are typically based on rights, duties, social responsibilities, justice, or other specific characteristics (Pillay 2014). Upon the researcher's arrival for the interview sessions, the participants were given sufficient time to review the interview guide. During the interviews, there was an emotional risk involved in discussing food insecurity with

participants. To address this, I prioritized creating a safe and supportive environment. I expressed empathy, ensured confidentiality, and emphasized the significance of their insights. I actively listened, validated their experiences, and provided resources for support. By addressing their emotional well-being throughout the interviews, I aimed to mitigate any potential distress and foster an environment where participants felt valued and heard. The respondents had the choice to answer the questions at their convenience and had the right to decline participation if they wished. To ensure the confidentiality and anonymity of the participants. The participants were given assurance that the information they shared would be treated confidentially and exclusively utilized for the study's intended purposes. Regarding data management, all collected data were securely stored in an encrypted file throughout the duration of the study. By following ethical guidelines, the researcher aimed to conduct the study responsibly and respectfully. Adhering to ethical research practices ensures the protection of participants' rights and well-being, while also advancing knowledge in addressing food insecurity and fostering sustainable community development.

Summary of the chapter

The chapter on research methodology offered a comprehensive outline of the methods, approaches, and procedures employed in the study. It discussed adopting a qualitative and exploratory research design to gain an in-depth understanding and identify patterns in how community gardens addressed food insecurity at New Mexico State University. The chapter also covered the population and sampling procedures, highlighting the use of purposive sampling. The research instruments, such as the interview guide and observation checklist, were discussed, along with the rationale for their selection. Ethical considerations were discussed,

including informed consent, confidentiality, and sensitivity to vulnerable populations. Lastly, the chapter outlined the data analysis plan, emphasizing transcription, coding, and identification of themes. The process of transcription, coding, and identifying themes was iterative and involved multiple rounds of analysis. The researcher constantly reviewed and refined the codes and themes, ensuring they accurately represented the data and captured the richness of the participants' insights.

CHAPTER FOUR

DISCUSSION OF RESEARCH FINDINGS AND RESULTS

4.0 Introduction

In this chapter, I will carefully review each research question and analyze how the collected data provide valuable insights into those questions. By thoroughly examining the data, I will present a comprehensive understanding of how they contribute to answering each research question. This analysis will help uncover significant patterns, trends, and correlations, offering meaningful findings and implications for the study.

4.1 Mapping research questions to emerging themes and coding

The researcher employed coding techniques as a fundamental step in the analysis process, which involved systematically categorizing and organizing the gathered data. The researcher assigned specific codes to various segments or passages within the transcriptions to begin the coding process, as seen in Table 1 below.

Key

RQ# represents research question, T represents Themes, therefore #RQ1T1# means Research Question 1 theme 1.

Research Questions	Emerging Themes	Coding
One: What role do international and domestic	<ul style="list-style-type: none">• Students' experiences• Participation• Departmental collaboration	<ul style="list-style-type: none">• #RQ1T1#• #RQ1T2#• #RQ1T3#

students play in the NMSU Community Garden?		
Two: How does New Mexico State University's role as MSI/HSI/Land Grant institution influence the NMSU Community Garden?	<ul style="list-style-type: none"> • University support • Incorporation into Curriculum • Community partnership • Addressing challenges 	<ul style="list-style-type: none"> • #RQ2T1# • #RQ2T2# • #RQ2T3# • #RQ2T4#
Three: Does the New Mexico State University Community Garden help in addressing food insecurity issues, and if so, how? If not, why not?	<ul style="list-style-type: none"> • Food quality and preference • Cultural disparities • Impact • Recommendations 	<ul style="list-style-type: none"> • #RQ3T1# • #RQ3T2# • #RQ3T3# • #RQ3T4#

Table 1: Showing assigned codes within the transcriptions.

4.2 RESEARCH QUESTION 1: What role do international and domestic students play in the NMSU Community Garden?

Community gardening is a collaborative effort that promotes community building through gardening. Community gardens are beneficial to food production and give individuals access to fresh foods (Egli et al. 2016). Similarly, community gardening practiced at New Mexico State University involves establishing and maintaining shared garden spaces where members of

the university come together to grow their own food. The study participants demonstrated extensive knowledge about community gardening at New Mexico State University and community gardening in general. They shared experiences they had gained from engaging in community gardening at NMSU and how it has impacted their lives, especially the fact that they could grow their own food. Participants also shared their views on the importance of community gardening to them and the community. Most participants referred to its ability to mitigate food insecurity and foster a sense of belonging among participants as the significant advantages of community gardening at New Mexico State University.

Excerpts from participants about how they engaged with community gardening note the following:

“I learned community garden at San Antonio, I learn how to network and work with people within the community, and we served churches, student centers, schools, golf courses, etc., that is how I garnered my knowledge on community garden. So, when I came here to New Mexico State University, I noticed they had a community garden, and I just wanted to be a gardener. My reason was that, here in Las Cruces in particular, the food was really expensive. My intention was to garden and to give myself some food” (#P8#, 2023).

“My experience has been learning how to run a Community Garden, how to be part of a student organization and how to learn how to grow my own food” (#P10#, 2023).

“As an international student, when I first arrived on campus, I quickly realized that food products were quite expensive. Determined to find a solution, I reached out to some friends and asked if there was any garden nearby. Fortunately, one of my friends informed me

about the NMSU community garden. Ever since joining the garden, I have thoroughly enjoyed being a member and experiencing the benefits firsthand. It has provided me with the opportunity to harvest fresh produce and significantly reduce my expenses on food. Being part of the community garden has not only improved my access to affordable food but has also connected me with other like-minded individuals who share a passion for gardening and sustainability” (#P17#, 2023).

“Joining the community garden was a spontaneous decision for me. I happened to stumble upon it while taking a walk near campus and was instantly drawn to the vibrant greenery and the sound of people working in the garden. Intrigued, I approached the gardeners, learned more about the project, and immediately knew I wanted to be part of it. It's been an enriching journey ever since” (#P11#, 2023).

“I joined the community garden after hearing about it from a friend. They mentioned how it provided a great opportunity to grow my own food and connect with nature, so I decided to check it out. I'm grateful that I took their advice because it has been a wonderful experience so far” (#P13#, 2023).

“The community garden came into my life at just the right time. I had been feeling a strong desire to connect with nature and learn more about gardening, but I didn't have the space or resources to do it on my own. When I learned about the community garden, it was like a dream come true. I wasted no time in becoming a member, and it has been an incredibly rewarding experience ever since” (#P8#, 2023).

Like many other universities, New State Mexico University admits international and domestic students, and each group plays a significant role in community gardening initiatives at the university. International and domestic students bring unique perspectives and experiences to the community gardening at New Mexico State University because of their different backgrounds. If we can increase the number of students participating in the garden, we will have a better potential impact. This can be achieved by sharing specific gardening skills and traditional gardening methods. According to Egil et al. (2016), the active participation of both domestic and international students will bring about food diversity. International students may propose and teach about domestic students' fruits and vegetables that are unique to their cultural cuisine, expanding the diversity of produce available within the university. Additionally, the participation of both international and domestic students may foster community engagement and create opportunities for intercultural learning.

Participants in the study expressed differing views regarding the roles of international and domestic students in community gardening at NSMU. As of Spring 2023, the total student population at NMSU was 19,307 according to the NMSU Census Enrollment Report website ([nmsu.edu](https://www.nmsu.edu)). In the same period, the NMSU Community Garden consisted of a total of 47 members, with 38 domestic students and 9 international students. Some participants believed that both international and domestic students could contribute positively to community gardening initiatives. However, it is important to note that some participants mentioned the relatively limited involvement of international students in garden activities compared to domestic students on campus. On the other hand, others observed an improvement in the participation of international students in gardening activities, which fostered collectiveness and

a sense of belonging among them. The following participant responses provide further insight into the roles of domestic and international students in the garden, reinforcing the preceding discussion.

Excerpts from interview sessions with participants concerning the roles of domestic and international students in the community garden note:

“I would say yes. At first, we had three international students, and the following semesters we had more international students, and it became more of a collective group. Also, the domestic students are also coming out to plant” (#P1#, 2023).

In terms of our garden days, international students have been the few people and sometimes, we have no international students at all. Members of the community garden are really a small group. One of our stuffs is specifically growing food for international students” (#P2#, 2023).

“In my experience, there appears to be a disparity in the level of engagement between international and domestic students in the community garden. While some international students do participate, the majority seem less involved, possibly due to factors like limited gardening experience” (#P9#, 2023).

“From my observation, it seems that the involvement of international students in the community garden is relatively low compared to domestic students. There could be various reasons for this, such as cultural differences, lack of awareness, or unfamiliarity with the concept of community gardening” (#P20#, 2023).

“I have noticed that the participation of international students in the community garden is not as prominent as that of domestic students” (#P12#, 2023).

“It seems that the community garden has not attracted significant involvement from international students. The factors influencing their decision not to join are yet to be determined” (#P6#, 2023).

According to Murakami (2016), community gardening fosters a sense of community among international and domestic students. Community gardening activities create opportunities for individuals to work together towards a shared goal and interact, socialize and build relationships with one another. Similarly, according to Twiss et al. (2003), community gardening fosters a sense of community and belonging among individuals who actively participate in gardening activities. This sense of community and belonging is developed through the shared experiences and collaborative efforts involved in tending the garden. Data from this study are consistent with previous research concerning how participants in community gardening create a sense of community among international and domestic students. Most participants are of the view that taking part in gardening activities gives individuals an excellent social experience, and this is particularly true for people who are introverts.

Below are excerpts from interview sessions that speak to how participating in the garden has fostered a sense of community between domestic and international students:

“I believe it has. Because the community garden has brought both international and domestic students together and allowed them a space to garden and work with others” (#P4#, 2023).

“I would say yes. There’s this love group of six of us that includes both international and domestic students who usually come to the garden days, and it has just been relaxing. Most of us are introverts so we see it exciting to get together and it gives us a social experience” (#P6#, 2023).

“Without a doubt! The community garden has played a significant role in fostering a sense of community among international and domestic students. It's a place where we can interact, share knowledge, and build relationships beyond our cultural backgrounds” (#P16#, 2023).

“Yes, the community garden has been a melting pot of cultures and backgrounds. I remember one instance when a group of international students introduced a traditional method of planting herbs, and everyone was eager to learn and try it out. It sparked conversations, curiosity, and a sense of togetherness that transcended our differences” (#P19#, 2023).

“Yes, the community garden has fostered a sense of community by hosting collaborative projects. For instance, we organized a garden cleanup day, where both international and domestic students joined forces to beautify the garden space. It created a sense of ownership and pride, knowing that we were all working towards a common goal” (#P11#, 2023).

“Definitely! I have personally experienced the sense of community at the garden when a fellow international student offered to teach me techniques for growing vegetables that are native to their country. We spent hours working side by side, exchanging stories, and building a friendship that extended beyond the garden” (#P10#, 2023).

Participants highlighted the importance of collaboration and outreach in fostering community gardening and encouraging international student participation. They recognized that by engaging with diverse groups and student organizations, such as the international student organization, the members of the community garden became more inclusive and attracted a broader range of participants. Participants emphasized the value of forming partnerships with various university departments to enhance the visibility and engagement of community gardening initiatives. For example, collaborating with the Art Department could lead to the creation of visually appealing garden installations or murals, adding an artistic touch to the space and attracting attention from students. Involving the Department of Plant and Environmental Sciences could provide valuable expertise in plant selection, cultivation techniques, and sustainable practices, enriching the gardening experience for all participants. The community garden could benefit from their guidance and resources by leveraging faculty support and expertise through these partnerships. Faculty members could offer workshops, lectures, or practical sessions on gardening techniques, nutrition, or environmental sustainability, further enhancing the educational aspect of community gardening. This

collaboration between students and faculty could create a supportive environment and enriches the overall experience for everyone involved.

Furthermore, participants highlighted the importance of bridge-building efforts between students and community gardening initiatives. The community garden could become a space where diverse cultural perspectives are celebrated and appreciated by actively involving international students and providing opportunities to share their unique gardening traditions and knowledge. This could encourage international student participation and promote cross-cultural understanding and appreciation among all participants. Below are some responses from participants that reflect the discussion.

Excerpts from interview sessions that speak to the potential of the garden in building bridges to specific departments note:

“I believe in reaching out and collaborating with groups, other student organizations like the international student’s organization. I also think different departments in the University will help in reaching that goal. Example is getting faculties in the Art department, Plant sciences, etc. to promote the location of the garden, and collaborate with the garden, and then we will reach a bigger part of this institution. We are working with the art department, and we are getting people from the department to garden with us. The soil sciences department can come up and do a workshop at the garden and test the soil to see how it works. There is a lot of research that can be done here” (#P9#, 2023).

“Hosting community events and social gatherings at the garden can be an effective way to draw more people in. By organizing activities like potluck dinners, live music

performances, or art exhibitions, we can create a vibrant and inviting atmosphere that appeals to a wide range of individuals. These events can serve as opportunities to showcase the beauty and potential of the garden while fostering connections and a sense of belonging among participants” (#P2#, 2023).

“Offering incentives or rewards for active participation in the community garden can be an effective way to motivate and attract more people. Implementing a system where participants earn points or credits for their contributions, which can be redeemed for gardening tools, seeds, or even discounts at local businesses, can serve as a positive reinforcement and encourage regular involvement in the garden” (#P4#, 2023).

“Faculty members can play a crucial role in increasing awareness and participation in the community garden among students. By actively promoting the garden during their classes or incorporating it into their course curriculum, faculty can spark students' interest and encourage them to explore the garden's offerings. Faculty can also organize field trips or practical assignments that involve visiting and working in the garden, providing students with hands-on experiences and fostering a deeper connection to the space (#P7#, 2023).

“Faculty members can serve as mentors or advisors for student-led gardening initiatives or research projects, further integrating the garden into academic pursuits and creating a supportive environment for students to engage with the garden. Their active involvement and endorsement can serve as a testament to the value and relevance of the community garden, attracting more students to participate and reap the benefits of this enriching experience” (#P15#, 2023).

The comments shared by participants in this study provide support for the notion that both international and domestic students have a notable role to play in community gardening at New Mexico State University. However, it is important to acknowledge that the findings of this study also highlight a lack of active participation, especially among international students, in community gardening activities on campus. This observation poses a challenge when attempting to categorize the specific roles of international and domestic students in the context of community gardening at NMSU.

While the participants emphasized the importance of collaboration and outreach to increase student involvement in community gardening, it is evident that more efforts are needed to bridge the gap and encourage a greater number of students, particularly international students, to actively engage in these activities. By addressing the barriers and challenges that hinder participation, such as language barriers, cultural differences, and lack of awareness, the university can create a more inclusive and welcoming environment for students from diverse backgrounds to embrace community gardening.

To enhance participation and maximize the impact of the community garden, the involvement of a faculty or administrative champion is crucial. Having a dedicated advocate from the university can facilitate the implementation of targeted strategies that effectively promote the garden's benefits to international and domestic students. This champion can be pivotal in raising awareness through campus-wide campaigns, engaging student organizations, and integrating community gardening into the university's curriculum. By actively fostering a

sense of belonging and emphasizing the importance of sustainable food systems, the champion can inspire students from diverse cultural and national backgrounds to engage in community gardening actively. This collaborative effort, led by a faculty or admin champion, can create a supportive environment that encourages widespread student participation, fosters cross-cultural connections, and enhances the overall success and impact of the community garden program.

4.3 RESEARCH QUESTION 2: To what degree and how does New Mexico University being an MSI/HSI/Land Grant institution influence the Community Garden on campus?

A university's status as a land grant institution gives it access to extensive land holdings which can be utilized for community gardening initiatives. According to Murakami (2016), land grant universities often collaborate with extension programs that serve as the bridge between the university and the local community. This gives land grant universities the opportunities to collaborate with community gardening groups to offer research-based information and techniques on community gardening. This research by Murakami finds land grant universities having access to extensive land makes it easier for them to engage in community gardening as compared to other universities that are not land-grant institutions. This aligns with the views of some participants regarding the influence of the status of New Mexico University as a land grant institution. Land grant institutions play a crucial role in society by providing practical education, conducting research, and engaging in outreach activities. These institutions contribute to agricultural advancements, sustainable land management, rural development, and food security. They offer educational programs that equip students with practical skills and address real-world challenges. Through research and extension efforts, land grant institutions bridge the

gap between academia and society, promoting knowledge transfer and fostering economic growth and social well-being in their regions.

Participants of the study acknowledged that the university could support the Community Garden at NMSU by virtue of their status as a land grant university, however, participants are not seeing evidence of this happening. Participants believe the status of the university as a land grant university could really help to incorporate community gardening activities into the university's curriculum. Participants also confirm that the university has incorporated some activities of the community gardening into some courses in the Art Department and College of Engineering. The Art Department built benches and created accessible garden beds to support community gardening in the university. While this shows that the university is implementing strategies to influence community gardening in the university, some participants of the university are of the view the university sometimes fails to support and may even impede the gardening activities in the university.

Excerpts from the interview sessions that reveal how garden members see NMSU, as an MSI/HSI/Land Grant institution, supporting the garden are presented below:

"Yes and No. Yes because in the Art Department they have incorporated it into their curriculum. They have a course, it's a public art course and they are helping beautify the community garden by making signage, building benches, and building an accessible garden bed. Sometimes, the University is the barrier to accomplishing things. They do not pick up our green matter when we request it, and we have not had much support as of

now. The university understands that we are here, and they support it that way, but I think we have a lot of resources they can bring in to help" (#P12#, 2023).

"I would say yes and no. We have had support from the Engineering Department where they come to support us in the garden and also to learn. We have also had the Art department come here too. The Art Department came here to collaborate with us, they do this to learn how to collaborate with other organizations in a professional setting. Student Housing also assisted us to get storage for the garden tools. However, I still feel the university does not recognize us much" (#P11#, 2023).

"I would say no. I strongly believe that the university should take ownership of the community garden and provide the necessary support and resources. As an institution with ample resources and expertise, the university can play a pivotal role in promoting and sustaining the garden. By allocating dedicated staff, funding, and administrative support, the university can ensure the long-term success and growth of the garden" (#P13#, 2023).

"The involvement of departments like Engineering and Art in the community garden has been encouraging. However, to further draw attention and participation, it would be beneficial for the university to actively collaborate with more departments, such as Environmental Sciences or Nutrition, which have a direct connection to the principles and practices of community gardening" (#P16#, 2023).

"I would say no. This is because since I started gardening with the NMSU Community Garden, I have not really seen the university come to our aid. Given the university's extensive resources, it is important for them to step up and actively support the community

garden. By providing financial assistance, infrastructure support, and technical expertise, the university can help enhance the garden's capacity and impact. This support would not only benefit the students but also contribute to the university's sustainability efforts and overall campus environment" (#P19#, 2023).

Partnering with community organizations involved in community gardening and partnering with other departments and school groups within the university is another way by which the university could positively influence the community garden. NMSU's status as a land grant institution enables them to leverage government agencies, non-profit organizations and, most importantly, school groups and departments to support community gardening activities in the university. Even so, only faculty and students in the Art Department and College of Engineering have engaged, and they face barriers due to some bureaucratic processes. The university should consider introducing specific classes supporting the community garden in response to student demands. One such course could be "Principles and Practices in community gardening and Community Supported Agriculture (CSA)," offering students valuable knowledge and skills related to sustainable gardening and the CSA model. Additionally, integrating community gardening into the university's system can raise awareness and encourage more students to participate in gardening activities. By incorporating community gardening and CSA into the curriculum and promoting their benefits, the university can foster greater student engagement and create a more robust culture of sustainability on campus.

Below are excerpts from the interview sessions concerning how NMSU could help support the community garden:

“Currently the community garden is working with the Art Department, and they have a public art course they are working on. So, they are utilizing the community garden as a learning experience where they come out and learn how to work with the community. We have also worked with the Engineering students’ organization; they were really a big help. They had a lot of engineering ideas like lighting, walls, etc., but again we are setback with the university because we have to go through the architect, and we have to plan those things out. And it is hard on our part because we are students, and we don’t fully understand that scope of it” (#P8#, 2023).

“The Art Department and Engineering Departments have been supportive” (#P3#, 2023).

“We appreciate the support we have received from certain departments like Engineering and Art” (#P13#, 2023).

The viewpoints expressed by the interwees in the research emphasize the potential role of the university in providing support and resources to further enhance community gardening at New Mexico State University. According to the participants, the university possesses valuable resources that can be effectively utilized to bolster the community gardening initiatives on campus. The majority of the participants firmly believe that it is crucial for the university to recognize the significance of community gardening and fully incorporate it into university activities. They argue that by officially acknowledging and integrating community gardening, the university can demonstrate its commitment to sustainable practices, food security, and student

well-being. This recognition could lead to increased visibility, institutional support, and a stronger sense of legitimacy for community gardening efforts. In addition to more actively recognizing the Community Garden, participants also suggest that the university should allocate resources to address the existing challenges and improve the overall effectiveness of Community Gardening activities. They propose that the university should provide financial support, allocate more spaces for gardening, and supply necessary tools, equipment, and materials. By investing in these resources, the university can facilitate the expansion and sustainability of community gardening projects, enabling them to flourish and benefit a larger segment of the university community. Furthermore, participants express the view that incorporating community gardening into the university's curricular and extracurricular activities can greatly enhance its impact. They believe that integrating community gardening into academic programs, research initiatives, and student organizations can foster interdisciplinary collaboration, experiential learning, and a deeper understanding of sustainable food systems. Such integration would not only enrich the educational experience of students but also strengthen the overall university-community relationship.

Excerpts from interview sessions with participants that provide suggestions for NMSU to actively support the community garden:

“I believe the university’s role in supporting the community garden is by recognizing it and for them to start treating it as the university, like the rest of the places the mow, but they don’t mow here. So, if the university allocates their resources to fix things, I think that would work and help us grow, because that is the kind of thing that hinders us from expanding the garden elsewhere. The community garden does not have the tools the

university has for maintaining the garden. We are limited to a few people. Again, the student organization helps but it is not a reoccurring thing. So, recognizing the community garden and implementing it within the university system” (#P7#, 2023).

“Granting us a larger land allocation for garden activities would be a transformative step for the university. With more space, we could expand the garden and create additional plots for students to cultivate their own crops. This would not only increase food production but also provide a greater sense of ownership and engagement among participants”(#P19#, 2023).

“We really need help to maintain the land. We had a wonderful community member who mowed for us for 4 months and in that time, we were really able to focus on growing food. So, we need the university to recognize us, so we become part of the University’s maintenance on campus” (#P5#, 2023).

“I am of the view that the university should take an active role in allocating resources to fix and enhance community gardening activities. This could involve collaborating with relevant university departments, leveraging their expertise and resources, and creating opportunities for students to engage in research or academic projects related to community gardening and food security” (#P15#, 2023).

“I strongly believe the community garden's potential for growth and expansion is closely tied to the support and resources provided by the university. By allocating their resources to address our challenges, such as providing necessary tools and equipment, the university can empower us to overcome limitations and achieve our goals. With their assistance, we

can attract more participants, enhance the garden's functionality, and create a sustainable and thriving community space" (#P20#, 2023).

The potential for land grant universities to support community gardening is evident, as they possess unique privileges such as access to land and the ability to foster collaborations with external organizations and various departments within the university. In the context of New Mexico State University, the findings of this study reveal that certain initiatives have been undertaken to support community gardening on campus. However, it is apparent that these past efforts have not yielded sustainable outcomes.

The participants of the study have clearly voiced their advocacy for more involvement and support from the university. They emphasize the need for additional recommendations and resources that can enhance community gardening activities within the University. Despite the existing initiatives, participants believe that the University has untapped potential to further support and strengthen community gardening.

The fact that participants are calling for more recommendations and resources indicates that the current level of support provided by the University is not sufficient to fully maximize the potential of community gardening. Comments from garden members highlight the importance of continued investment and commitment from the University to address the challenges the garden faces and facilitate the growth of community gardening initiatives. Furthermore, participants express the view that the University should actively seek collaborations with more departments within the University and engage with various school groups. By fostering interdisciplinary partnerships and engaging a broader range of

stakeholders, the University can create a more inclusive and holistic approach to community gardening. Collaborations with different departments and school groups can provide diverse perspectives, expertise, and resources that can contribute to the success and sustainability of community gardening efforts.

4.4 Research Question 3: To what degree does the New Mexico State University Community Garden help in addressing food insecurity issues?

The study's findings shed light on the limited impact of the New Mexico State University Community Garden in addressing food insecurity. The majority of participants strongly conveyed that the food grown in the gardens falls short in meeting the substantial food demands of students at the university. Therefore, it is necessary for the available food supply from the gardens to be increased in order to sufficiently meet the demands of the student population. The research emphasizes the urgent need for the New Mexico State University Community Garden to implement effective measures to address food insecurity concerning the availability, utilization, and access to food resources. This finding is in line with that of Boone and Taylor (2016), who, in their study, stated that community gardens do not address issues of food insecurity to a large extent since most of these gardens are purposely for household purposes and unable to meet the demands of the people in the community. Additionally, their findings revealed that farmers were discouraged from growing their own food despite the advantages of a diverse diet because of the high price of supplies, the necessity of building walls surrounding gardens to keep out domesticated animals, the erratic nature of rainfall, and the lack of adequate acreage. On the other hand, this finding is divergent from the findings of other

researchers that mentioned that community gardens address food insecurity since a section of people benefits from them.

Excerpt from the interviews concerning the degree to which the NMSU Community Garden helps address food insecurity of people at NMSU revealed:

“I believe it has a minimal role; however, the community garden still has an impact because we do get some students coming in. We have a presence here and we are contributing to the community, where it didn’t exist. If we can get more support, we will certainly have more impact”. (#P1, 2023#)

“Most crops produced in our school’s community garden is mostly, seasonal crops like egg plants, tomatoes, carrots, radishes, pepper, etc. Which are not produced on larger stock. Hence are rotated based on their seasons. As a gardener, per my experience, within some growing seasons, we have had 200 eggplants, and for like tomatoes you can be picking 60 tomatoes a day through growing seasons. In this regard, relating the yields from the gardens to the demands of the students is inadequate, yet unable to address food insecurity” (#P19, 2023#)

“Looking at the cross-cultural nature of our school, where we have students across continents in our school, each and every race and individuals with their peculiar choice of vegetables and fruits of preference for consumption. In this regard, I disagree New Mexico State University Community Garden addresses food insecurity. We largely depend on the grocery shops in and around the campus for our groceries. I have personally not benefitted

from any proceed from the garden since my stay in this for three (3) years now” (#P7, 2023#)

“Just a few people benefit from the Community Garden of New Mexico State University. Although we see the gardens in operation, we are yet to benefit from its proceeds since the gardeners and the school have specific people, they sell the produce too. Therefore, I can boldly say without mincing my words that New, Mexico State University Community Garden does not address food insecurity in the school” (#P11, 2023#)

From the discussions noted above on how New Mexico State University addresses community gardens, the study’s findings and the excerpts captured so far reveal that, to a larger extent, the University’s Community Garden does not address food insecurity.

In this chapter, data collected from the study using a qualitative approach has been presented. The results have been discussed in relation to the research questions that guided the study, and comparisons have been made with previous literature and the works of other researchers to identify common findings and variations in findings. The study also explored the participants' views on how the New Mexico State University Community Garden addresses food insecurity and how best to put in place measures to improve food insecurity on New Mexico State University campus.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter will present a comprehensive summary of the research findings, offering a concise overview of the key outcomes obtained from the study. Additionally, this chapter will outline valuable recommendations derived from the findings, focusing on actionable steps that can be taken to address the identified issues and enhance the effectiveness of interventions. Furthermore, the chapter will identify potential areas for future research, highlighting avenues that warrant further exploration and investigation to deepen our understanding of the topic.

5.1 Overall Summary

The study explored how community gardens address food insecurity at New Mexico State University. The researcher premised the study on three research questions:

- What role do international and domestic students play in the community gardening?
- How does New Mexico State University's role as MSI/HSI/Land Grant institution influence the Community Garden on campus?
- Does the New Mexico State University Community Garden help in addressing food insecurity on campus. If so, how? If not, why not?

The study adopted exploratory research design. The study employed a qualitative methodology, owing to the fact that it is presenting the views and opinions of participants on the impact of community gardens in addressing FI at NMSU. The population of this study constituted members and volunteers of the New Mexico State Community Garden. I conducted individual interviews with the twenty participants in the study using a semi-structured interview guide as a

means of eliciting their perspectives. All sampled participants took part in the interview as scheduled. Conclusions from relevant related literature were captured along to authenticate and help inform the findings of the study.

5.2 Key Findings

Based on the research question focusing on the role of international and domestic students in the NMSU Community Garden, the study uncovered significant findings that shed light on their involvement and contributions. It was revealed that both domestic and international students at New Mexico State University participate in various aspects of the community garden that includes planting, watering, monitoring, and the harvesting of the produce. Their diverse roles demonstrate their dedication and interest in gardening activities. However, the study also highlighted a noticeable difference in participation levels between domestic and international students. While domestic students comprise the majority of participants in the gardening activities, only a small number of international students actively engage or become members of the community gardens. This finding suggests that there may be barriers or factors that hinder the active involvement of international students in the community garden.

Also, one of the significant research findings is that the community garden has a notable impact on educating individuals about the intricacies of the food supply system. Through active participation in gardening activities, students and community members gain firsthand experience and knowledge about the process of growing and cultivating food. They learn about the various factors that contribute to a successful harvest, including soil quality, irrigation techniques, and pest management. This hands-on engagement fosters a deeper understanding

and appreciation for the complexities of the food supply system, which is often taken for granted in our modern society.

Another crucial research finding highlights the limitations faced by the NMSU Community Garden in terms of its area extent and the availability of resources, the current area of the NMSU Community Garden is approximately 1800sqft. The physical space allocated for the community garden restricts the scale and scope of its operations. With limited land available, there is a constraint on the number of plots and the amount of produce that can be cultivated. This spatial limitation poses a challenge to meeting the growing demand for fresh, locally grown food within the University community.

With reference to research question two, which aimed to investigate how the status of New Mexico University as an MSI/HSI/Land Grant institution influences the community garden on campus, the findings shed light on the extent of this influence. Surprisingly, the study revealed that the University's status as MSI/HSI/Land Grant institution does not significantly impact the community gardening activities at NMSU. However, despite this lack of direct influence, certain departments within the university have shown support and provided valuable contributions to the community garden. Two notable departments that have played a role in supporting the Community Garden are the Art Department and faculty and students in the Engineering College. Their technical expertise and knowledge have been instrumental in addressing various challenges related to irrigation systems, soil quality, and sustainable practices. By offering technical assistance and guidance, faculty and students in the Engineering College have played a significant role in enhancing the success and efficacy of the community garden. In addition, the Art Department has also shown support for the Community Garden at

NMSU. They have provided artistic and creative input, enhancing the aesthetic appeal of the garden through installations, sculptures, and murals. These artistic contributions not only beautify the space but also create an engaging and inspiring environment for the students and community members involved in the gardening activities. Furthermore, NMSU Housing and Residential Life has played a practical role by assisting the organization with storage for garden tools. This logistical support ensures that the necessary equipment and supplies are readily available for gardening activities, facilitating smooth operations and promoting the overall efficiency of the community garden.

Finally, with regards to research question three, which aimed to explore the perspectives of participants regarding how the New Mexico State University Community Garden addresses food insecurity issues, the findings unveiled a rather disheartening reality. It was revealed that, to a large extent, the New Mexico State University Community Garden falls short in effectively addressing food insecurity on campus. One significant finding highlighted that the yields from the community garden are insufficient to meet the demands of the students' food needs. The community garden enhances students' food supply but not to the point where it reduces the amount of food they need to buy. The quantity of produce harvested from the garden is not substantial enough to provide a significant impact in combating food insecurity among the student population. Furthermore, it was observed that the variety of crops cultivated in the garden is limited, focusing primarily on specific crops such as carrots, eggplants, cabbage, and the like. This narrow range of crops fails to cater to the diverse food preferences of the cross-cultural student body at NMSU, which consists of individuals hailing from different continents and backgrounds.

Given these findings, it is evident that the NMSU Community Garden's current efforts do not effectively address the underlying issue of food insecurity within the school. While the garden undoubtedly contributes to sustainable practices and provides some fresh produce, it falls short in providing a comprehensive solution to the diverse dietary needs and food preferences of the student population. Therefore, further measures need to be taken to address these limitations and develop more inclusive strategies that align with the specific challenges of food insecurity at New Mexico State University.

5.3 Conclusions

Based on the comprehensive findings of the study, several significant conclusions can be drawn. Firstly, it is evident that both domestic and international students play crucial and diverse roles within the NMSU Community Garden. Their active involvement in activities such as planting, watering, monitoring, and harvesting produce showcases their dedication and interest in the gardening endeavors. This demonstrates that the community garden serves as a platform that unites students from various backgrounds and encourages their active participation in sustainable practices.

Furthermore, the study reveals that the status of New Mexico University as an MSI/HSI/Land Grant institution does not exert a substantial influence on the community garden on campus. While the institution's status carries significance and conveys certain benefits in other areas, it does not play a prominent role in shaping the community gardening activities. Nevertheless, specific departments, the Seidel Engineering Leadership team from the College of Engineering and Arts departments, have stepped forward to provide technical, training, and

logistic support to the organization. This collaborative effort demonstrates the potential for departmental contributions, irrespective of the overall influence of the institution's status.

Lastly, the study concludes that the NMSU Community Garden is not able to effectively address food insecurity concerns at NMSU. Despite the efforts put forth, the yields from the garden are inadequate in order to fulfill the needs of the student population. Moreover, the limited variety of crops cultivated within the garden fails to accommodate the diverse food preferences of the cross-cultural student body. In this context, the Community Garden at New Mexico State University does not fulfill the dimensions pillars of food security – availability, affordability, food utilization, and accessibility. Given the complexity of the food security challenge and the scale of NMSU and the large number of people that comprise the campus community, this is not a surprising finding. This research has found and documented considerable promise in this regard, however, additional measures need to be implemented to bridge the gaps identified and develop comprehensive strategies that address the multifaceted challenges of food insecurity within the University.

The main limitation of my study is the potential bias introduced through self-reported data obtained from participant interviews. As participants were responsible for sharing their experiences and perspectives, there is a risk of social desirability bias, where individuals may present responses that align with societal expectations. Additionally, participants might selectively disclose information, leading to incomplete or skewed understandings of the effectiveness of how the community gardens addresses food insecurity. To mitigate these limitations, future studies could employ triangulation methods, combine multiple data sources, and incorporate more objective measures to enhance the validity and reliability of findings.

5.4 Recommendations

Summary of actionable recommendations

The summary of actionable recommendations, presented in Table 2, offers practical steps for implementing strategies and guidance to support the activities of the NMSU Community Garden. These recommendations aim to address the issue of food insecurity on campus by providing specific measures to promote and enhance the effectiveness of the garden.

1.	The University should provide enhanced support <ul style="list-style-type: none">• Th University should establish an office or designated department• NMSU should assign a paid staff person• NMSU should consider providing tools, seeds, fencing, fertilizers, and irrigation systems• The University should allocate large areal extent• NMSU should provide tools, seeds, fencing, irrigation and fertilizers
2.	Establish a closer collaboration between the NMSU Community Garden and Cooperative Extension Service (CES).
3.	Exploring and learning more about the successful community garden initiatives of Land Grant institutions: University of Arizona and the University of San Francisco
4.	Prioritize ongoing evaluation and assessment of the NMSU Community Garden program
5.	Implementation of educational programs and workshops focused on sustainable gardening practices and food production
6.	Foster robust partnerships with local organizations such as the La Semilla Food Center

Table 2: Shows actionable recommendations.

Based on the overview of the principal findings of this study, I offer several specific recommendations. To ensure the success of a university environment's community garden, it is highly recommended that the University provides enhanced support. This includes establishing an office or designated department responsible for overseeing and coordinating garden activities. Having a centralized office can serve as a hub for communication, organization, and collaboration among students, faculty, and staff who participate in the community garden. In addition to establishing an office, it is crucial to assign a paid staff person specifically tasked with coordinating the garden activities. This staff member can serve as a point of contact for participants, provide guidance and support, and ensure the smooth functioning of the garden. Their responsibilities may include organizing work schedules, coordinating volunteer efforts, managing resources, and overseeing maintenance tasks. A dedicated staff person helps to create a sense of stability, accountability, and continuity in the garden's operations. Also, assigning specific tasks to certain groups or individuals can enhance the efficiency and effectiveness of the community garden. By dividing responsibilities, participants can focus on areas that align with their skills and interests, ensuring that tasks are completed in a timely manner. This division of labor also fosters a sense of ownership and encourages active engagement among participants, leading to a more vibrant and productive garden community.

Moreover, to ensure the smooth functioning and productivity of the garden, NMSU should consider providing tools, seeds, fencing, and fertilizers. Supplying the necessary gardening tools is vital for participants to effectively carry out various tasks, such as planting, weeding, and harvesting. By providing tools such as shovels, rakes, hoes, and watering cans, NMSU can ensure that participants have the necessary equipment to maintain the garden and

contribute to its growth. Another crucial support NMSU can play is by providing a selection of seeds that are suitable for the local climate and cater to the preferences of the participants. This will enable them to grow a variety of fruits, vegetables, and herbs, enhancing the nutritional diversity and overall productivity of the garden.

Additionally, fencing is crucial for protecting the community garden from potential damage caused by pests or unauthorized access. By installing appropriate fencing around the garden area, NMSU can safeguard the plants and provide a secure environment for participants to engage in gardening activities. The provision of fertilizers is essential to support the healthy growth and development of plants in the community garden. NMSU can explore options for sourcing organic or sustainable fertilizers that align with the principles of environmentally friendly practices. The university can contribute to the garden's long-term success and productivity by supplying compost. Compost, being a nutrient-rich organic material, enhances soil fertility and promotes healthy plant growth. By providing compost, the university supports sustainable gardening practices and fosters a healthy garden ecosystem, ensuring the continued productivity of the garden for years to come.

Irrigation is also an important aspect of gardening, particularly in regions with varying water availability. NMSU should consider installing an efficient irrigation system, such as drip irrigation, to ensure adequate water supply for the plants. In this regard, NMSU could leverage its resources by connecting the irrigation installation to a class or program on irrigation. This would allow students from relevant disciplines to provide technical input, contributing to the design and implementation of the irrigation system. By linking the installation to an educational opportunity, NMSU can not only benefit from expert knowledge but also offer students

practical, experiential learning opportunities and a deeper understanding of sustainable irrigation practices. Additionally, regular monitoring of the garden should be prioritized to identify challenges like pest infestations or soil nutrient deficiencies. Monitoring progress, documenting yields, and collecting feedback from participants can inform future improvements and decision-making processes, ensuring the garden's ongoing success. Also, to ensure that the NMSU Community Gardens truly makes a substantial impact, it is recommended that resources be allocated so the garden has a larger areal extent. Larger gardens have the potential to cultivate a wider variety of crops and accommodate more participants, thereby maximizing their productivity and impact. Active engagement in the garden activities, such as regular planting, watering, weeding, and harvesting, is essential to ensure its success and sustainability. This active involvement fosters a sense of ownership and responsibility among participants, leading to increased dedication and commitment to the garden's goals.

The New Mexico Cooperative Extension Service (CES) offers a valuable platform for the NMSU Community Garden to leverage in order to achieve its goals more effectively. CES, as described on their website (extension.nmsu.edu) provides research-based knowledge and practical programs aimed at the betterment of life for New Mexicans. Due to its distinctive collaboration involving federal, state, and county entities within NMSU's College of Agricultural, Consumer, and Environmental Sciences, CES possesses resources and expertise that can greatly contribute to the success of the NMSU Community Garden. To fully utilize the potential of CES, it is recommended to establish a closer collaboration between the NMSU Community Garden and CES. This collaboration can take various forms, including knowledge-sharing sessions, joint workshops or training programs, and the involvement of CES experts in garden-related

activities. By tapping into the resources and expertise of CES, the NMSU Community Garden can benefit from evidence-based practices, innovative approaches, and a broader network of support. Moreover, CES can play a vital role in disseminating the successes and learnings from the NMSU Community Garden to a wider audience, including community members, other educational institutions, and relevant stakeholders. This can be achieved through CES's extensive outreach channels, such as educational events, publications, and online platforms. By strengthening the partnership with CES, the NMSU Community Garden can enhance its capacity to achieve its goals of promoting sustainable gardening practices, addressing food insecurity, and fostering community engagement. The collaboration will not only provide valuable resources and expertise but also foster knowledge exchange, amplifying the impact of the NMSU Community Garden beyond its immediate reach.

In addition, New Mexico State University (NMSU) can greatly benefit from exploring and learning more about the successful initiatives of Land Grant institutions like the University of Arizona (sustainability.arizona.edu) and the University of San Francisco (usfca.edu) who are successfully running large-scale community garden practices. Future research could dig more deeply into researching a larger number of universities who have had success in developing community gardens and extracting useful lessons learned. By implementing actionable ideas that our peers are advancing, NMSU can enhance the impact and effectiveness of its own community garden program. Some specific ideas that early research has discovered include:

- Firstly, NMSU can establish a dedicated community garden office or committee, an idea discussed previously. This office or committee would be responsible for overseeing the

planning, organization, and coordination of community garden activities. By centralizing these efforts, NMSU can ensure effective communication, collaboration, and efficient resource management within the community garden program.

- Secondly, NMSU should consider the implementation of educational programs and workshops focused on sustainable gardening practices and food production. These initiatives can include providing training sessions on organic gardening, composting techniques, and water conservation methods. By equipping participants with knowledge and skills, NMSU can empower them to actively contribute to the success of the community garden while promoting sustainable practices.
- Another actionable recommendation is to proactively foster robust partnerships with local organizations, businesses, and community groups to advance the growth and empowerment of the NMSU Community Garden. Notably, one local organization that holds great potential for collaboration is the La Semilla Food Center (LFC). By forming strategic alliances with these external stakeholders, the community garden can access additional resources, expertise, and potential funding opportunities, aligning with the mission and vision of LFC as described on its website (lasemillafoodcenter.org).

Collaborating with La Semilla Food Center offers distinct advantages to the NMSU Community Garden. La Semilla Food Center, as expressed on its website (lasemillafoodcenter.org) is committed to establishing robust connections and inclusive environments that empower young individuals and families to cultivate and prepare healthy food. Their emphasis on integrating food, health, and local economies strongly aligns with the objectives of the community garden program. By partnering with LFC,

the garden can tap into its wealth of experience, knowledge, and community networks to foster positive change. Furthermore, this collaboration can enhance community engagement by bringing together diverse stakeholders and fostering a sense of ownership and pride among participants. La Semilla Food Center's expertise in food-related programs and initiatives can contribute valuable insights, promoting knowledge sharing and best practices in sustainable gardening, nutrition, and culinary skills.

- Lastly, it is crucial for NMSU to prioritize ongoing evaluation and assessment of the NMSU Community Garden program. This will require implementing a systematic approach to gather feedback and data that can provide valuable insights into the program's effectiveness and impact. Conducting regular feedback surveys among participants and stakeholders will allow NMSU to gather their perspectives, suggestions, and overall satisfaction with the community garden. Administering feedback surveys to collect data on garden productivity is essential. By tracking and documenting the yields, crop variety, and overall productivity of the garden, NMSU can assess the program's success in meeting its objectives. One way to support the garden is by reaching out to local private sector firms for material donations. By doing so, not only can valuable resources be obtained, but it can also help identify any challenges or areas in need of improvement. This could involve optimizing soil fertility, implementing efficient irrigation systems, or addressing pest control issues. Such collaboration with the private sector can contribute to the overall success and development of the garden.

Participant satisfaction should also be a key consideration. Through surveys or interviews, NMSU can gather insights on participants' experiences, their level of engagement, and any specific needs or concerns they may have. This feedback will guide NMSU in making informed decisions to enhance the community garden program and ensure it remains responsive to the participants' needs. In order to guarantee the continued prosperity and durability of the community garden, NMSU must allocate essential resources. This includes providing adequate funding for garden maintenance, purchasing necessary tools and equipment, and ensuring access to water sources for irrigation. NMSU should also invest in educational materials, workshops, and training sessions to enhance participants' gardening skills and knowledge.

5.5 Suggestions for Further Research

To further enhance the effectiveness of community gardening activities at NMSU, future research should focus on key areas that can drive positive outcomes. Exploring the structuring of a garden office can provide insights into establishing an administrative hub that optimizes communication, coordination, and resource management within the community garden program. Additionally, conducting a broader review of other universities engaged in similar work would be beneficial. Exploring successful educational programs implemented by other institutions can offer valuable lessons and models that can be adapted to NMSU's context, fostering sustainable gardening practices, promoting food literacy, and encouraging community engagement. This research can provide a broader perspective and inspire innovative approaches to maximize the impact of the garden and its educational initiatives. Moreover, investigating

specific strategies for community gardens to partner with local organizations can unlock opportunities for resource sharing, joint programming, and collective impact, amplifying the reach and impact of community gardening efforts. By delving into these areas, future research can provide practical insights and guidance for enhancing the effectiveness and sustainability of community gardening at NMSU.

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APPENDIX A: INTERVIEW GUIDE FOR PARTICIPANTS

Part A -Introductory questions

1. What are your experiences with the community garden?
2. Tell me why the community garden is important to you?
3. Have you ever experienced or witnessed food insecurity on campus?

Part B -The role of international and domestic students in the community garden

4. Have you noticed any differences in the involvement or contributions of international and domestic students in the community garden?
5. What do you think could be done to encourage more international and domestic students to get involved in the community garden?
6. Do you think the community garden has helped to foster a sense of community among international and domestic students?

Part C – How does New Mexico State University’s role as MSI/HSI/Land Grant institution influence community garden on campus?

7. Have you noticed any efforts by the university to support the community garden or to incorporate it into the curriculum?
8. Can you describe any partnerships between the community garden and other departments or organizations within the university?

9. What could be done to further leverage the university's role to support the community garden and its efforts to serve the community?

Part D – Does the New Mexico State University Community Garden help in addressing food insecurity issues, and if so, how?”

10. Does the food you harvest prevent you from spending money?

11. What food products do you get from the community garden and how many times do you harvest from the community garden in a year?

12. What role do you think the community garden plays in addressing food insecurity in the wider community?

13. Have you noticed any challenges or obstacles faced by the community garden in addressing food insecurity?

14. What do you think could be done to improve the community garden's efforts to address food insecurity?

APPENDIX B: CONSENT TO PARTICIPATE IN A RESEARCH STUDY

KEY INFORMATION

You are being invited to take part in the following research study: Exploring the role of community gardens in addressing food insecurity at New Mexico State University.

Researcher(s):

The person conducting this study is Michael Atuahene Djan

WHAT ARE THE PURPOSES AND PROCEDURES OF THIS STUDY?

The purpose of the study will be exploring the role of community gardens in addressing food insecurity at New Mexico State University. Food insecurity is a real problem that affects many lives especially students, but they are often overlooked due to the misconception that most schools have an abundance of healthy food products. Food insecurity affects less advantaged populations and minorities more severely, making it harder for them to afford food and healthcare. Data will be gathered through participant observation and interviews with 20 New Mexico State University students.

By doing this study, the researcher hopes to learn and understand if and how the community garden alleviates food insecurity on campus for dissertation/publication/conferences/presentations. The outcomes may appear as books/articles, creative or digital works.

WHAT WILL HAPPEN TO YOU IF YOU ARE IN THIS STUDY?

- The interview would be in-person at the NMSU Community Garden.

- Once you arrive at the NMSU Community Garden, the researcher will explain the study to you and answer any questions you may have.
- The total time for the interview session is about an hour.

WHY ARE WE ASKING YOU TO PARTICIPATE FOR THIS STUDY?

You are being asked to participate in this study because you are a student at New Mexico State University, and you are over the age of 18. Your participation in the research will help us understand the situation of food insecurity and also help us explore the role of community gardens in addressing food insecurity at New Mexico State University.

WHAT IS THE DURATION OF THIS STUDY?

Your participation in this research will last for an hour for one meeting, which will be a onetime interview section. Participants are free to choose which day works for them. It will involve interviews.

WHAT ARE THE BENEFITS AND RISKS OF PARTICIPATION?

The Researcher cannot know if you will get any personal benefit from taking part in this study. However, there may be potential benefits for the public, such as: Aiding policy makers, management, and stakeholders at New Mexico State University in formulating and implementing policies pertaining to food insecurity. Additionally, the research will potentially be informative for other similar institutions.

The expected risks of participating are simply contemplating or talking about one's own behavior or opinions on eating habits, as well as learning more about the consequences of food

insecurity on our health, can cause stress and feelings of shame or humiliation, however, as a participant you are reminded that you can stop the interview at any point.

CONFIDENTIALITY

The Researcher will keep your name and other identifying information private to the extent that we can. The Researcher will make every effort to prevent anyone who is not on the research team from knowing that you gave us information, or what that information is. All data will be kept anonymous, and no names will be linked to any data collected as part of this study. Data in digital form will be stored on an external hard disk.

IF YOU HAVE QUESTIONS OR CONCERNS OR WANT TO WITHDRAW:

Participation in this study is strictly voluntary. If you decide to take part in the study, you may withdraw from the study at any time without penalty. The Principal Investigator (PI) at New Mexico State University, Department of Geography in charge of this study is Michael Atuahene Djan who may be reached at mdjan123@nmsu.edu. The faculty supervisor is Professor Christopher Brown. If you have any questions, suggestions or concerns about your rights as a participant in this research, contact the office of Research Integrity and Compliance at the New Mexico State University 575-646-7177 ovpr@nmsu.edu.

A copy of this form is available for you to keep.

APPENDIX C: IRB APPROVAL LETTER



INSTITUTIONAL REVIEW BOARD (IRB)
Office of the Vice President for Research
MSC 3RES
New Mexico State University
P.O Box 30001
Las Cruces, NM 88003-8001
Phone: (575) 646-7177, Email: ric_admin@nmsu.edu

Date: 04/06/2023

Research Team: Michael Atuahene Djan - Principal Investigator
Christopher P. Brown - Co-Investigator
Carol Campbell - Study Personnel

Committee Action: **EXPEDITED APPROVAL – New Protocol**

Approval Date: 04/06/2023

Protocol Number: 2301037484

Protocol Type: Expedited

Protocol Title: Exploring the role of community gardens in addressing food insecurity
at New Mexico State University

Funding Source:

Expiration Date: 04/05/2024

Review Type: Expedited

Review Category: (902)

The New Mexico State University Institutional Review Board has granted approval for the above referenced protocol. Your protocol was approved under expedited category (902) as outlined below:

Exempt Category 2 (2018): EDUCATIONAL TESTS, SURVEYS, INTERVIEWS, OR OBSERVATIONS OF PUBLIC BEHAVIOR. Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if at least one of the following criteria is met: (i) The information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects; (ii) Any disclosure of the human subjects' responses outside the research would not reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, educational advancement, or reputation; or (iii) The information obtained is recorded by the investigator in such a manner that the identity of the human subjects can readily be ascertained, directly or through

New Mexico State University

IRB

identifiers linked to the subjects, and an IRB conducts a limited IRB review to make the determination required by 45 CFR 46.111(a)(7).

All research must be conducted in accordance with the procedures outlined in your approved protocol.

If continuing review is required for your research, your project is approved until the expiration date listed above. The investigator will need to submit a request for Continuing Review at least 30 days prior to the expiration date. If the study's approval expires, investigators must stop all research activities immediately (including data analysis) and contact the Office of Research and Sponsored Programs for guidance.

If your study has not been assigned an expiration date, continuing review is not required for your research.

Note: Data collected during a period of lapsed approval is unapproved research and can never be reported or published as research data.

For the duration of the research, the investigator(s) must:

- Submit any change in the research design, investigators, and any new or revised study documents (including consent forms, questionnaires, advertisements, etc.) to the IRB and receive approval before implementing the changes.
- Use only a copy of the IRB-approved consent and/or assent forms. The investigator bears the responsibility for obtaining informed consent from all subjects prior to the start of the study procedures.
- Inform the IRB immediately of an Unanticipated Problems involving risks to subjects or others and serious and unexpected adverse events.
- Report all Non-Compliance issues or complaints regarding the project promptly to the IRB.

Please note that all research records must be retained for a minimum of three (3) years after the conclusion of the project. Once your project is complete, please submit a Request to Close.

If you should have any questions, please do not hesitate to contact the Office of Research Integrity and Compliance at 646-7177 or via e-mail at ric_admin@nmsu.edu. Please include your Protocol Number in all future correspondence. Best of luck with your research! Sincerely,

New Mexico State University

IRB

Chair, Institutional Review Board

New Mexico State University: FWA00000451

New Mexico State University