Promoting an Urban Utopia: The Role of Community Gardens on Community Vitality

Kayla Danielle Staley

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ABSTRACT

Promoting an Urban Utopia: The Role of Community Gardens on Community Vitality

Kayla Danielle Staley

April 19, 2019

INTRODUCTION: Community gardens are becoming more prevalent in urban environments in efforts to improve the physical, social, and environmental aspects of communities. There are known hypothesized benefits of community gardens about the physical and mental health of individuals who utilize them. However, the role of community gardens on community vitality as a whole has yet to be looked at substantially. The vitality of a community pertains to its ability to self-sustain, as well as promote a greater sense of well-being among its residents.

AIM: This study sought to explore relationships between community gardens and indicators of vitality over time when indicators of vitality are defined as median household income, educational attainment, the establishment of businesses and occupied housing units.

METHODS: A quantitative study design was conceptualized to allow quantitative data analysis of the United State Census Bureau data on the census tract level. Census tract data were obtained for each community garden and analyzed against the indicators of vitality, as defined by this paper, for each census tract that contained a community garden. Patterns and observations were made in an attempt to link the presence of community gardens and the potential role they have to play on the vitality of a community. County-level data were also analyzed for data relating to business and employment.

RESULTS: Results varied for each indicator of vitality for the community gardens within the sample population. All community gardens' census tracts experienced an increase in median household income from the last documented census to the most current datum in 2013. There were no direct associations between the presence of a community garden and the educational attainment of the residents within that census tract. There was an increase in total establishments within all counties included in the study from the last documented census to the most current data in 2013.

DISCUSSION: Overall, there is a loose association between the presence of community gardens and an increase in median household income per census tract. However, the presence of the community garden cannot be solidified as the sole or primary reason for this loose association, along with all other data analyzed. The research suggests that there is potential for a direct link between community gardens and the vitality of a community. However, there is room for further investigation of this topic, to solidify a useful tool to evaluate these potential benefits.
Promoting an Urban Utopia: The Role of Community Garden on Community Vitality

By

Kayla Danielle Staley

A Capstone Submitted to the Graduate Faculty of Georgia State University in Partial Fulfillment of the requirements for the Degree

MASTER OF PUBLIC HEALTH

Atlanta, Georgia 30303
Promoting an Urban Utopia: The Role of Community Gardens on Community Vitality

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In presenting this capstone as a partial fulfillment of the requirements for an advanced degree from Georgia State University, I agree that the Library of the University shall make it available for inspection and circulation in accordance with its regulations governing materials of this type. I agree that permission to quote from, to copy from, or to publish this capstone may be granted by the author or, in his/her absence, by the professor under whose direction it was written, or in his/her absence, by the Associate Dean, School of Public Health. Such quoting, copying or publishing must be solely for scholarly purposes and will not involve potential financial gain. It is understood that any copying from or publication of this capstone which involves potential financial gain will not be allowed without written permission of the author.

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Kayla Danielle Staley
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i. **INTRODUCTION**

The well-being of the human community is more widely accepted to be inextricably linked to the well-being of the earth (Okvat et al., 2011). Community gardens are being more frequently utilized to improve many aspects of communities not only in the United States but across the world. Community gardens have a long history as tools to improve the psychosocial well-being of those who utilize them (Armstrong, 2000). During both World Wars, community gardens began to be a staple for food supplies that didn't have to be transported long distances. From the beginning of the last century, they were called War Gardens or Victory Gardens in support of the war effort. These gardens were at their highest level of production in 1944 when 40% of the fruits and vegetables consumed in the United States were grown in community gardens (Al-Delaimy et al., 2017). As of recently, community gardens have increased by 19% within the United States resulting from the crash in the economy in 2008 (Al-Delaimy et al., 2017).

A community garden is a plot of land gardened collectively by a group of people who are living in an urban area. Although similar, it differs from a privately-owned garden or a community farm which is economically motivated and focused more on mass agricultural production. As defined by the American Community Garden Association, a community garden is somewhere people come together to grow plants and also share the benefits of doing so. Community gardens promote a feeling of individual ownership, identity, and pride; however, they benefit the culture of a community by encouraging different ways of thinking and create an environment to interact with people from many different backgrounds. Typically, these
gardens involve residents from the local community in which it is located, but it can also include individuals from other neighborhoods.

The inclusivity of community gardens has been hypothesized as a significant factor for bringing residents of a community together, thus why they have become more prevalent in several countries including the United States. In 2011 there were more than 18,000 community gardens in the United States and Canada, with numbers growing since then (Zick et al., 2013). It is difficult to accurately pinpoint the effect community gardens have on communities and their residents, but there have been associations between community gardens and social benefits to neighborhoods, in addition to nutritional, physical activity, and generational health benefits to participating gardeners (Zick et al., 2013). Further, community gardens have also indicated their presence can improve social capital by fostering intergenerational and cross-cultural interactions, creating a space to share food production knowledge, improving neighborhood aesthetics, lowering crime, and increasing property values (George et al., 2015).

Community vitality refers to the socio-economic capabilities of urban independence and also applies to the critical needs of the residents in the community. This can be seen through workforce development, community resource and economic development, health, and safety, as well as the overall expansion of the urban environment (NIFA, USDA). Community vitality is essential to public health in the same ways socio-economic status is essential to the individual. Community vitality has the potential to affect the overall functioning of a community, and lower community vitality and its indicators can negatively impact household income, educational attainment, poor health, poverty, occupation and ultimately affect the main societal aspects of the community. To date, no quantitative evidence supports an association
between community gardens human health. This capstone seeks to explore the need to continue studying the direct links that community gardens have to impact community vitality.

The resilience of communities can largely be affected by the implementation of community gardens. While no data are supporting a direct correlation between community gardens and the many indicators of community vitality within the realm of public health, the analysis of the trends as they relate to community gardens are important to consider.

Community vitality has not been associated with community gardens; however, published literature identifies the benefits of community gardens and their impact on fruits and vegetable intake, social interaction and social cohesion, physical activity, food insecurity, and food access, locally-sourced produce production, perceived wellbeing, mental illness, cost savings, youth impact, and community attitude.

An analysis was done on the role of community gardens in Atlanta, GA on the indicators of community vitality as defined by this paper. In 2016, Atlanta's population was 472,506 people, with a growth of about 1.86% from 2015. The median household income in Atlanta is $53,843, with a 7.24% growth increase. The poverty rate in Atlanta is about 22.4%, and the number of employed residents increased by 1.77% totaling over 235,000 employees. The population of Atlanta, GA is 50.3% Black, 37.7% White, and 4.89% Hispanic. The median household property value in Atlanta, GA is $262,600, which is 1.28 times larger than the national average and the homeownership rate is approximately 41.3%, which is lower than the national average of 63.1%. 
ii. REVIEW OF THE LITERATURE

The benefits of community gardens extend across several aspects of individual and communal levels of public health. They are supported by several studies involving the potential reach of community gardens and the effect they can bring to a community. Often community gardens are placed on low-value plots and are frequently publicly-owned that make them susceptible to short-term existence or quick turnover. One way to maintain the preservation of community gardens is to focus on the benefits they may offer the living environment and public health as a whole (Schram-Bijkerk et al., 2017). Aside from the aforementioned public health benefits, community gardens elicit increased healthy behavior which may prevent the development of chronic disease and associated health care costs (Schram-Bijkerk et al., 2017).

Fruits and Vegetable Intake

Personal consumption of fruits and vegetable is considered to be a main benefit and motivation of community garden participation. In a more qualitative study regarding participation in a community garden, produce grown by a gardener was felt to be superior and the basis of quality was reflected more by personal estimation of the gardener rather than any other defined criteria (Martin et al., 2017). Additionally, the taste of their produce was corroborated by their personal involvement in the production of the produce (Martin et al., 2017).

From the same study, one gardener was quoted as saying:

Proud! Proud to know that it was me who did it. Me who fed it, me who pampered it, that I’m the one who watched over it...and when you pick it, you’re proud! When you
see that you had a little sprout like so and little by little it grew like so, tic, tic, tic, and that you’re the one who brought it to the table.

In a study conducted by Schram-Bijkerk et al., adults with a household member who participated in an urban community garden consumed fruits and vegetables 1.4 more times per day than those who did not have a gardening family member. Further, they were 3.5 times more likely to meet dietary recommendations set by the same study and reported an increase in vegetable variety. Often times, the impact of the community garden has a positive association to fruit and vegetable intake on those who participated in the community garden when compared to those who did not participate in the community garden (Martin et al., 2017; Evans et al., 2015; Guitart et al., 2014; Al-Delaimy et al., 2017).

**Social Interaction and Social Cohesion**

Social interaction and social cohesion can reference the extent to which gardeners form relations with each other and offer each other mutual help and may also refer to overall perceived safety or property and violent crime rates (Guitart et al., 2014; Schram-Bijkerk et al., 2017). Due to it being a characteristic of a system rather than a personal trait, social cohesion refers to solidarity in groups or communities (Schram-Bijkerk et al., 2017; Armstrong, 2000). Okvat et al. found that the presence of green spaces like community gardens have been linked to fewer incidents of graffiti, other incivilities, and reductions in domestic violence. Elevated levels of social capital in local communities can influence health by the spread of the promotion of healthy norms and other health information and knowledge dissemination. It allows participants to be privy to the influence they have on their health and healthy behavior. Often times this leads to trust, cohesion, and mutual support (Schram-Bijkerk et al., 2017; Martin et
al., 2017; Hartwig and Mason, 2016; Guitart et al., 2014; Carney et al., 2012; Okvat et al., 2011; Al-Delaimy et al., 2017). From a study conducted by Martin et al., it was reported that all the gardeners recognized an improvement in their gardening skills and knowledge from the beginning of the study to the end of the study. The learning process fostered relationships and social interaction that enhanced the social and convivial links sought by gardeners. Socialization enforced the trading of the produce in the garden.

Additionally, non-commercial exchanges of garden-grown produce have a substantial symbolic value, emphasized by the personal involvement of the gardeners in the production process. Family and social relationships can be strengthened through community gardening, due to the practice of community members providing guidance and support to help with challenges of gardening and to ensure the optimal benefit of the community garden (Carney et al., 2011). The gardeners were found to have contributed to not only the community but added in small part to the quality of life in the neighborhood (Martin et al., 2017; Mangadu et al., 2016; Hartwig and Mason, 2016; Armstrong, 2000). One participant in a study conducted by Hartwig and Mason described her participation in the community garden as feeling like living in her own small country (referring to their local community). This same study, in particular, did have some participants who were from non-immediate neighborhoods surrounding the community garden, and those gardeners were found to have still benefited from the garden. This supports the idea that not all community gardens need to be immediately in one's neighborhood to help diverse communities as well as increase health benefits.

Another unique benefit on the social aspects of a community as a result of community gardens is the role they play on the social resilience of cities. Social resilience can be defined as
the capacity of communities to absorb and adapt to the shocks of change and disturbance (van der Jagt et al., 2017). Similarly, to previous research, social resilience can be reflected in a combination of contributing to healthy lifestyles, adequate occupational and social functioning, absence of psychopathology and quality of life. Measures such as knowing how to be self-sufficient in times of severe food crisis, safeguarding quality fertile land, spending time with people from different lifestyles or cultural backgrounds, as well as experience and practice with creative problem solving and teamwork also resulted from high social resilience (van der Jagt et al., 2017; Mangadu et al., 2016). In a study conducted by Carey et al., 92% of the participants encouraged other families to participate in a community garden after their experiences participating in a community garden program.

**Physical Activity**

Physical activity can be defined as any bodily movement produced by skeletal muscles that results in energy expenditure and is a fundamental means of improving people's physical and psychological health (Schram-Bijkerk et al., 2017; Carney et al., 2011, Okvat et al., 2011; Al-Delaimy et al., 2017). Physical activity within the community garden results from nearly all gardening activities. Gardening has been ranked a moderate to heavy intensity physical activity (Armstrong, 2000). Walking or cycling to the gardening plot may also add to the overall physical activity levels of participants within the community garden. Many studies have explored the link between physical activity and healthier diets within community gardeners and thus the potential for community gardens to combat obesity, heart disease and several types of cancer (Guitart et al., 2014, Al-Delaimy et al., 2017). In a study conducted by Schram-Bijkerk et al., urban gardeners frequently mentioned increased physical activity as a key benefit of urban
community gardening, and also noted higher levels of physical activity than their neighbors who
did not participate with the community gardens. The same results found in a study conducted
by Marsh et al. In a similar study that consisted of refugee gardeners, physical activity was
considered to be the top benefit of participation in a community garden (Hartwig and Mason,
2016).

Food Security and Food Access

According to Feeding America, Map the Meal Gap Study done in 2016, more than 1 in
every 5 Georgian kids live in a food-insecure household. It is estimated that 755,400 (or 1 in 7)
people in metro Atlanta turn to Food Bank partner agencies for food each year. As defined by
Evans et al., lack of consistent access to enough nutritious food to meet the needs of all
household members due to insufficient money or any other resources for food is known as food
insecurity. In 2012 food insecurity was experienced by approximately 17.6 million US
households. Individuals who are experiencing food insecurity are more likely to engage in
unhealthy dietary behavior and consume fewer fruits and vegetables (Evans et al., 2015; Carney
et al., 2011).

A vital component within food security is food access, which includes the spatial
proximity to food resources, affordability, cultural appropriateness, and nutritional adequacy of
available resources (Evans et al., 2015). With decreased food access, low-income individuals are
disproportionately affected by living in a community with limited availability of healthy foods,
specifically fresh fruits and vegetables (Evans et al., 2015; Al-Delaimy et al., 2017). According to
data provided by the United States Department of Agriculture (USDA), 23.5 million people
(about 20%) in the United States live in low-income communities more than 1 mile from a
supermarket. Further data supports that people living in low-income areas with restricted access tend to spend more time (19.5 minutes) traveling to a supermarket as compared to the national average (15 minutes) (Evans et al., 2015). Accessibility to fresh foods is a major contributing factor for participation in a community garden (Schram-Bijkerk et al., 2017). Naturally, community gardens thrive in the community in which its participants reside, thus combating the food access issue, as well as the promotion of healthy, fresh foods, combating food security. Although not a direct point for purchasing food, community gardens were often brought up by focus group participants in a study conducted by Evans et al., as a way to improve access to fresh produce.

**Locally Sourced Produce Production**

Though community gardens hardly ever feed entire communities, results from a study by Evans et al., suggests that community gardens and potentially school gardens can serve as avenues to both educate as well as create a higher demand for locally sourced and grown produce.

**Perceived Wellbeing**

Community gardens are more frequently being recognized as therapeutic landscapes with the potential to improve a vast variety of health outcomes (Marsh et al., 2018; Mangadu et al., 2016). As concluded by Martin et al., interviews from their study revealed that gardening was considered to be a significant indication of self-esteem and self-worth.

**Stakeholder Support**

Stakeholder support and consistent ownership have been seen to be critical for the implementation of school and community gardens (Mangadu et al., 2016). In a study conducted
by Carey et al., it was found that a community partner is essential to the success of the implementation of a community garden. The community partner can provide help to families to building skills for maintenance of healthy lifestyles. An academic community partner can also be critical to the success of a community garden by conducting research that can assist in the improvement of the health of US populations, particularly those in underserved and underrecognized settings (Carey et al., 2011).

**Mental Illness Benefit**

For centuries, it has been documented that being in contact with nature can be restorative and beneficial for psychological health (Schram-Bijkerk et al., 2017). Mental health improvements have been considered to be a main benefit of community gardens across several studies (Armstrong, 2000; Zick et al., 2013; Carney et al., 2011). Contact with nature (i.e., views of natural setting) can create a more peaceful, positive, and calm emotional state (i.e., decreased anxiety) for those with high levels of stress. A different perspective within the ideology that contact with nature has positive effects on one’s mental health is related to how attention to nature in itself is restorative (Schram-Bijkerk et al., 2017). In a study conducted by Zick et al., held on the campus of the Pennsylvania State Milton S. Hershey Medical Center, participants learned that gardens are regarded as valuable resources for individuals who have a mental illness, particularly those whose diagnoses carry a significant stigma.

Hartwig and Mason quoted a gardener describing why she participated in the community garden saying, “With me, because I have depression, when I go to the garden there is something that makes me feel good. I want to go everyday if possible.”

**Cost Savings**
Cost savings have been documented as a key benefit and motivation for participation in a community garden (Schram-Bijkerk et al., 2017; Okvat et al., 2011). In a study involving 83 community gardeners in San Jose, California, the estimate of cost savings of community gardens was based on the total number of pounds of produce grown in the garden. Average savings of harvested vegetables from the gardens was $1.53/lb, which was lower than the standard of $2/lb. (as reported by the National Gardening Association). As a result, gardeners saved an average of $435 per plot for that 4-month season (Algert et al., 2014). Mangadu et al., suggests that community gardens may also serve as a low-cost, high impact intervention strategy to improve communities' quality of life and potentially lower healthcare costs. Further, a study conducted by Hartwig and Mason which measured the amount of money participants spent before and after their gardens were harvested and ninety-two percent (92%) of gardeners shared that they spent less money on food during the gardening season. An additional question asked gardeners to estimate how much they saved with amounts ranging from $1-$10; $10-$25; $25-$50; $50-$100; and no savings. Majority of the gardeners indicated they had saved at least $25 during the harvest season. Further, in addition to the cost-savings benefits associated with locally sourced and grown produces, community gardens also create jobs and training opportunities, thus providing economic benefits for those who wish to sell their produce to local establishments or farmer's markets.

**Youth Impact**

Of the literature that exists on community gardens and health behaviors, the research was highly dedicated to studies on adolescents and children (Al-Delaimy et al., 2017). Most youth and their parents expressed an interest in eating the produce they harvested (Schram-
Bijkerk et al., 2017). A study conducted by Evans et al. proposed that the parents that participated in the study favored the idea of school gardens as a reliable option for increasing food access as well as creating a space for teaching children about healthy foods.

**Community Attitude**

Community attitude refers to the way a resident feels about the community in which they reside. Often, residents possess an enormous amount of pride for their neighborhoods, and that can lead to an increase in social cohesion, empowerment, and many supplemental effects. Empowerment does not just pertain to the individual; it can also refer to the participation in an active community (Al-Delaimy et al., 2017). Engagement such as this requires a certain level of responsibility, and literature suggests that empowerment through community is a known benefit of community gardening, due to its emphasis on active engagement, teamwork, and leadership in an attempt to reach collective goals (Al-Delaimy et al., 2017). In a survey given by Donna Armstrong to participants involved with community gardens in upstate New York, showed that having a community garden in a neighborhood was reported by coordinators to improve the attitude of residents toward their neighborhood for 51% of the gardens (Armstrong, 2000). A previous study stated gardens were created to increase attachment and passion to the community as well as to improve the natural aesthetic of the community to its maximum benefit, thus developing stronger ties to the area. Community gardens can provide gardening advice in addition to general skill development and avenues to several other organizations useful to gardeners and their families, thus using its platform in a positive way that can change the attitudes of those residents in which the community garden resides (Okvat et al., 2011).
iii. METHODOLOGY

The study design was conceptualized to allow quantitative data analysis. Data collection and additional analysis were conducted, then patterns within the data were identified to formulate results that meet the overall aim of the study to recognize the role of community gardens on community vitality in metro Atlanta, Georgia. Data points for each variable (indicator of vitality) and each year (1990, 2000, and 2013) were observed for each census tract with at least one community garden in it.

The sample population was selected based on a search for community gardens in metro Atlanta, Georgia. An additional search was done on the American Community Garden Association site to find more obscure community gardens, not documented by general searches. For this study, 37 community gardens were analyzed by the census tract each resides.

To identify the role of community gardens on community vitality in Atlanta, Georgia, the analyzation of indicators of vitality previously defined in this paper was conducted for each census tract in which a community garden resides. Evans and Stoddart framework for determinant of health was used to select the indicators of vitality. This framework is based on the interaction between determinant of health, in attempt to understand the health or well-being of a population outside the boundaries of the health care system (Evans et al., 1990). The idea that aspects of social and physical environments are directly linked to well-being and prosperity.

Census tract data obtained by the United States Census Bureau and utilized as the unit for analysis. As defined by the USCB, census tracts are small, relatively permanent statistical
subdivisions of a county or equivalent entity that are updated by local participants before each decennial census as part of the Census Bureau's Participant Statistical Areas Program. The primary purpose of census tracts is to provide a stable set of geographic units for the presentation of statistical datum. Generally, census tracts have a population size between 1,200 and 8,000 people, with an optimum size of 4,000 people. The Census Bureau uses suffixes to help identify census tract changes for comparison purposes. When a census tract is split, the split parts usually retain the basic number but receive different suffixes (i.e., if census tract 7 is split, the new tract numbers would be 7.01 and 7.02).

The community gardens were compiled from the American Community Garden Association Find-A-Garden database and search for community gardens within a 10-mile radius of Atlanta, Georgia. After compilation, a final list of 37 community gardens was analyzed. Each community garden’s address and zip code were documented and searched on USCB Census Explorer: People, Education and Income integrated map. This Census Explorer integrated map explores a wide range of American Community Survey (ACS) demographic topics, including median household income, labor force participation and percent of the population 65 and older statistics for states, counties, and census tracts. This edition of the Census Explorer also includes County Business Patterns (CBP) statistics at the state and county levels, including the total number of establishments, average employee pay, and information relating to the technology sector (United States Census Bureau). Each census tract number was documented for each community garden in which it resides.

The community gardens exist within 33 census tracts (Table 1). Data collected for all indicators of vitality for each census tract. The indicators of vitality measured by census tract
for each tract that contained at least one garden were total population, median household income in 2013, 2000 and 1990, household income over $150,000 in 2013, total establishments (county-level), total wage employees (county-level), average yearly employee wage in 2012 and 2013, population 25+, population 25+ and high school graduate or more, bachelor's degree or more, master's degree or more, population 16+, population 16+ and in labor force, total employed civilian population (16+), professional/scientific/technological industry workers, occupied housing units, owner-occupied housing units, population 65 and over, and foreign-born population.

Patterns within the data were observed by looking at data points for each year (1900, 2000 and 2013), and potential trends were documented and observed to see if there were any loose associations between the presence of at least one community garden and each indicator of vitality defined by this paper.

iv. RESULTS

Community Gardens

There were a total of 37 community gardens analyzed by the census tract they reside. Variables included total population, median household income in 2013, 2000 and 1990, household income over $150,000 in 2013, total establishments (county-level), total wage employees (county-level), average yearly employee wage in 2012 and 2013, population 25+, population 25+ and high school graduate or more, bachelor's degree or more, master's degree or more, population 16+, population 16+ and in labor force, total employed civilian population (16+), professional/scientific/technological industry workers, occupied housing units, owner-
occupied housing units, population 65 and over, and foreign-born population was collected to analyze the impact community gardens have on the vitality of the communities in which they reside. The community gardens analyzed can be found in Table 1.

**Income**

The most recent average median household income for the census tracts that have at least one community garden residing in it is $50,710.81. The community garden whose census tract had the highest median household income was Little Nancy Creek Park Community Garden, in census tract 100.02 and with a median household income of $148,838. The community garden whose census tract had the lowest median household income was Gilliams Community Garden, in census tract 76.02 and with a median household income of $12,439. About 30% of the community gardens reside in a census tract whose median household income falls below the Federal Poverty Guideline for that year. Although the majority of the community gardens reside in a census tract whose median household income is above the poverty line, only 32% of the same community gardens reside in a census tract where at least 15% of its population has a household income of at least $150,000. There are 20 community gardens founded in or before 2009 (at least ten years old). All of the census tracts in which the 20 community gardens that are at least ten years old reside, experienced an increase in median household income from the last completed census in 2000 (FIGURE 1).

FIGURE 1 (all expressed in 2013 dollars)
Overall there is an association between the presence of community gardens and an increase in median household income per census tract. However, the presence of the community garden cannot be solidified as the sole or main reason for this loose association. From 2000 to 2013 each community garden’s census tract experienced an increase in median household income.

**County-Level Data**

The census tracts for all community gardens reside in two counties of Atlanta, Georgia. 65% of the community gardens reside in Fulton County, and the remaining 35% of the community gardens reside in DeKalb County. The spatial scale for this data is very course due to the data only being available on a county level. From 2000 to 2013 there was a 6.4% decrease
in total establishments in DeKalb County, while in Fulton County there was a 7.2% increase in total establishments (FIGURE 2).

Also classified as a county-level datum is average yearly employee wage. For both Fulton and DeKalb Counties there has been an increase from the 2000 average yearly employee wage to the 2012 average yearly employee wage and the 2013 average yearly employee wage. In DeKalb and Fulton County, there was a 1.4% increase found in average yearly employee wage from 2012 to 2013, raising it to $49,514 and $64,546 respectively (FIGURE 3).

In DeKalb County, there was a 23% decrease in total wage employees from 2000 to 2013. In Fulton County, there was about a 9% decrease in total wage employees from 2000 to 2013 (FIGURE 4).

**Housing**

Of the census tracts with community gardens that are at least ten years old, 10 of them experienced a percentage decrease in owner-occupied housing units from 2000 to 2013. There was not datum for Wheat Street Community Garden due to the combination of census tracts in between 2000 and 2013. However, the remaining nine community gardens experienced an increase in owner-occupied housing units for their respective census tracts from 2000 to 2013 (FIGURE 5).

FIGURE 5
Longevity

There were three community gardens founded before 1999 (at least 20 years old). The longevity of these community gardens was analyzed using the indicators of vitality data from 1990, 2000 and 2013. Each of the census tracts that each community garden resides experienced an increase in median household income from 1990 to 2000 to 2013. Mother Clyde Memorial Community Garden had the lowest increase, 3%, in median household income from 1990 to 2013. Oakhurst Community Garden had a high increase, 77%, in median household income from 1990 to 2013 (FIGURE 6).
Educational attainment of the census tracts hosting community gardens that have been founded at least 20 years ago was observed in support of indication of community vitality. Lake Claire Community Land Trust Community Garden and Oakhurst Community Garden both increased in percentage of the population with a master's degree within their census tract from 1990 to 2013 by 15% and 21% respectively. Mother Clyde Memorial Community Garden decreased in the percentage of the population with a master's degree within its census tract from 1990 to 2013 by 1% (FIGURE 7).
Of the three community gardens that are at least 20 years old, the number of occupied housing units has fluctuated significantly between 1990 and 2013. Lake Claire Community Garden census tract increased by 10% in occupied housing units in 2000, and approximately 1% in 2013. Mother Clyde Memorial Community Garden census tract increased by 13% in 2000 and decreased by 25% in 2013. Lastly, the Oakhurst Community Garden census tract decreased by 3% in 2000 and increased by approximately 4% in 2013 (FIGURE 8).

FIGURE 8
v. DISCUSSION

Census tracts hosting community gardens were evaluated to consider the potential benefits of community gardens on community vitality when looking at indicators of vitality pertaining to median household income, educational attainment, the establishment of businesses and housing units. Overall, the evaluation found ...

Community gardens can serve as catalysts for increased and positive community vitality as seen by the positive loose associations between census tracts with community gardens and the indicators of vitality defined by this paper. As supported by literature review, urban community gardening provides opportunities for physical exercise, social cohesion, consumption of locally
sourced fruits and vegetables, decreased health problems, increased economic community, and individual status, and community vitality as a whole. Overall there is an association between the presence of community gardens and an increase in median household income per census tract. However, the presence of the community garden cannot be solidified as the sole or main reason for this loose association. The economic recession incited the promotion of aesthetically pleasing community enhancements, while also contributing to the public health of the community (Al-Delaimy et al., 2017). Coupled with the enhancement of the urban environment of Atlanta as a whole, community gardens may be one of many factors that contribute to community vitality.

Further, gentrification has resulted, and it is quite possible that the change in population has caused the influx in median household income and not the presence of community gardens enhancing the population that currently resides there. The analysis of the relationship between community gardens and gentrification could be the key to unraveling the direct benefits community gardens may have on public health. County-level data for total establishments and average yearly employee wage did not reflect a direct association between itself and the presence of community gardens. However, there was a decrease in total wage employees for both Fulton and DeKalb counties from 2000 to 2013. In 2013 the Federal Poverty Guideline for a family of four in the United States was $23,550. Data for the ten community gardens that have been founded at least ten years ago varied across all indicators of community vitality and did not show a direct association of the potential benefits of community gardens in their specified census tracts. Although, of the community gardens that are at least 20 years old, there was a positive association for median household income between 1990 and 2013,
master’s degree obtainment and occupied housing rates for over 50% of those community gardens at least 20 years old. These findings align heavily with previous literature reviewed in that it is challenging to pinpoint the direct benefits of community gardens accurately. An evaluation tool could be useful to those conducting further research for the benefits of community gardens on public health.

vi. CONCLUSION

The results of this study provide stepping stones for future research that would further enhance the role community gardens play on the vitality of a community. As stated in the introduction, this paper focuses on specific indicators of vitality, and these indicators can serve as links towards the confirmed and widespread acceptance of the valuation of community gardens. After the economic downturn in 2008, there was a 19% increase in community gardens in the United States (Al-Delaimy et al., 2017). Community gardens are being established to achieve a more precise understanding of the public health benefits of these community gardens and their potential effects on several aspects of socioeconomic status and health. In this study, there were no associations found between community gardens and the vitality of a community. Many contributing factors that may alter the indicators of vitality as defined in this paper. However, there are links between positive benefits like increased median household income, increased degree obtainment, higher degree attainment, total number of establishments, and owner-occupied housing units to census tracts with community gardens. Those factors can provide a basis for an informed dialogue in the decision-making processes for partnership within the community and creation of new laws and regulations for policy-makers.
These findings are still pertinent to community garden impact. The increase in descriptive literature in recent years reflects the acknowledgment of the importance of community gardening.

Community gardens are not without risk. Known harm of community gardens to the community includes the exposure to heavy metals and other chemicals often present at contaminated plot sites (Al-Delaimy et al., 2017). The chance for soil contamination is occasionally heightened where community gardens were located on unused, low-value, or properties in which former uses (e.g. industrial) are unknown. Making participants aware of the potential dangers of gardening at said community gardens, the implementation of regulation laws by policy-makers, and the maintenance of those who participate in the community garden can help alleviate this threat to community gardens' existence.

In conclusion, community gardens have the potential to increase the vitality of communities. The direct impact community gardens may be accrued on both the community and the individual levels. Due to this grey area, it is critical to look at the role of community gardens on the overall culture and environment of the community, and from there solidify direct indications of positive public health benefits.

**Limitations**

There is the acknowledgment of limitations. Due to minority status-related barriers, communities prioritized for community gardens often lack the adequate resources needed to properly and efficiently sustain a community garden. The project focused on only two counties
in the Atlanta metro area, and the small sample size of community gardens is often found to be a limitation in research.

Despite the strengths of the analysis in this study, given that there are many confounding factors that have the potential to alter the indicators of vitality as defined by this paper, no actual causality can be inferred between the presence of a community garden and the indicators of vitality as defined by this paper. Because of these threats to causality, there is a clearer understanding of future opportunities to be explored by future studies. Due to the specificity of this study, results may not be generalizable to other communities or cities.

Further, the chance of selection bias is also considered to be a limitation in this study. There is the potential that urban community gardening selectively attracts people who are interested in gardening, healthy food, social interaction, or healthier lifestyles in general, which may alter the results found from studies within the literature review. As well as the population being served and benefiting from the community garden may not coincide with the census tract. Due to the limited nature in the literature surrounding community gardens, this serves as a limitation in this paper, but also provides insight on the gap that needs to be filled.

vii. REFERENCES


Data USA - Atlanta, GA. (n.d.). Retrieved from https://datausa.io/profile/geo/atlanta-ga/


viii. APPENDICES
(FIGURE 2)
(FIGURE 3)
(FIGURE 4)
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