UNIVERSITY OF CALIFORNIA, SANTA CRUZ

PEOPLE WHO GARDEN: A CLOSER LOOK AT URBAN COMMUNITY GARDENERS IN THE CALIFORNIA CENTRAL COAST REGION

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ABSTRACT: Urban environments pose many challenges to social, economic, and environmental sustainability. Community gardens hold potential for addressing these concerns by fostering bottom-up, community management practices that embody local sustainability initiatives. However, despite prevalence of support in literature, politics, and media, urban community gardens are increasingly becoming contested spaces as economic and population growth pressures pose challenges for the promotion and protection of these spaces. This thesis analyzes the implications of this issue using social geography and environmental justice frameworks. Using empirical research methods, I analyzed 189 gardeners in 19 urban community gardens within 3 counties of California Central Coast region to understand the socio-economic and socio-demographic characteristics of gardeners in relation to neighborhood census tract populations. The results show that urban community gardener populations were similar to neighborhood populations in gender and income while differences in age, ethnicity, and food security of gardeners were significant. Showing evidence that both validates and disputes commonly cited generalizations made about urban community gardeners, my research findings highlight the complexity of urban community garden spaces while providing reasons for the promotion and protection of these spaces.

KEYWORDS: Community Gardens, Social Geography, Environmental Justice, Community Based Management, and Sustainability

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Introduction

Cities and Sustainability

More of the world's population aggregates in cities, and as a result, there is overwhelming disagreement on the implications of sustainability and climate change in these urban environments. Cities are criticized as hot spots for greenhouse gas emissions, resource depletion, waste, energy consumption, poverty, and are widely viewed as threats to sustainability (Grimm et al., 2008). Population growth and urban infrastructure in rapidly growing cities are commonly culprit for these negative impacts. However, many critics argue that in regards to urban development, it is "misleading to see population growth as the driver of climate change" (Satterthwaite, 2009). Rather than mere population growth, it is irresponsible consumption patterns that hinder sustainability in cities (Satterthwaite, 2009). Furthermore, densely populated cities hold increased potential to become hot spots for environmental innovation as creative strategies to mitigate the impacts of climate change emerge from bottom-up, community-based practices ushered by local leadership and governance (Reed, 2008).

Many theorists argue that promotion of sustainability in urban environments, often referred to as "smart growth," can allow cities to foster solutions for sustainability challenges in an increasingly urbanized world (Ewing et al., 2007). Economic wealth in populous cities show potential to accelerate "smart growth" initiatives, which, in turn, may play a key role in altering the current projection of global climate change.

The California Context

The US Census Bureau reports that California hosts 7 out of the 10 most densely populated cities in the nation (Branch, 2010). Two of those cities (San Jose and San

Francisco) located in the California Central Coast region, rank second and third highest in the nation for population density (Branch, 2010). Of the 50 states, California was the most urban with nearly 95 percent of its population residing within urban areas. (Branch, 2010).

In addition to population growth, economic growth rapidly alters the environmental, economic, and social landscape of California. This has much to do with rapid growth in 3 major industry sectors: agriculture, technology, and tourism (Egerer et al., 2017). When separated from the overall US economy, California's economy alone ranks 5th globally exceeding the national economy of the United Kingdom (Associated Press, 2018).

Based on "smart growth" logic, we can argue that population density and a growing economy, increases the potential for California to become a leader in environmental sustainability. Currently, California holds the nation's highest standards for sustainability, and successful statewide sustainability initiatives have become widely adopted by other states (Urpelainen, 2012).

However, despite economic and environmental leadership, in recent years many social issues have surfaced. As cities become more densely populated, increasing pressure on affordability and housing resulting in neighborhood decline, is caused by the interactions between demographic shifts, economically driven political agendas, and entrenched segregation (Zuk et al., 2015).

A clear example of increased social and economic pressures is found in the gaps between state-wide minimum wage rates and average income level of the California Central Coast region where I conduct my study. Annual income of full-time work at

minimum wage in California at $13/hr is $22,880 (CA Employment Report 2017). In conjunction, the US Dept. of Housing and Urban Development (HUD) estimates that the "extremely-low" income threshold, which represents household incomes that do not exceed 30% of Local Area Median Income, range from $66,800-$94,450 in the three counties I've conducted my research (HUD FY 2018 Income Limits). It is evident that a significant portion of the population, especially those earning minimum wage, experience extreme financial adversity as housing prices and cost of living continue to inflate in conjunction with growing sectors of California's economy.

The increasing gap between wages and HUD low-income threshold clearly shows the inefficiency of state and federal policies on a local level in addressing this issue. According to ecological economics theorists, too many strategies for governance are ignorant of local conditions (Dietz et al., 2003). Adopting local, place-based models can help vulnerable communities cope with the risks of socio-economic change as well as enhance social capital and collective ownership in addressing these problems (Adger, 2003).

An initiative for sustainable development emerged from the 1992 United Nations Rio Summer Conference titled Local Agenda 21 (LA21) to address these types of governance inefficiencies (Roddick & Dodds, 1993). This initiative placed great emphasis on local level, collective resource management and multiple stakeholder approaches discussed widely in ecological economics literature (Roddick & Dodds, 1993).

The Potential of Community Gardens

In recent years, urban agriculture has been given fresh impetus by the implementation of LA 21 initiatives sparked by the 1992 UN conference for sustainable development. In effort to combat the pressures of the rapidly changing socioeconomic and demographic composition of cities, growing concerns in regards to gentrification, displacement, food insecurity, and sustainability have played an important role in developing better urban planning policies and methods (Zuk et al., 2005). An institutional shift towards collaboration and fostering greater consideration for individual rights, communal ownership, and the overall improvement of the quality of life for city residents has heightened support for urban community gardens (Ferris et al., 2001).

The benefits of community gardens on ecological, social, and economic conditions of urban neighborhoods are multidimensional. Natural habitats and biodiversity are threatened by urbanization due to habitat loss and fragmentation. Industrial activities, fuel exhaust, and energy consumption have physically and chemically degraded valuable ecosystem functions of urban environments (Pavao-Zuckerman, 2008). Community gardens are extremely valuable in combating these pressures by providing refuge for plants, animals, and microbes (Quistberg et. al, 2016). Degraded urban ecosystems benefit from plants and trees which filter pollutants and add oxygen in the air, reduce temperatures as much as 5 or 6 degrees in the summer, decrease noise pollution, and reduce urban runoff (Schmelzkopf, 1995).

Community gardens bring together residents and create a strong sense of community in their neighborhoods. Many of these gardens have formed out of a direct response to inner-city urban decay (Lawson, 2016). They are a catalyst for neighborhood

revitalization, create spaces for social gathering, and increase community resiliency (Irazábal et. al, 2009). What sets community gardens apart from “green spaces” and public parks is a sense of "public ownership, access, and degree of democratic control ” (Ferris et. al, 2001). Effective collective efforts to revitalize vacant lots show that citizens can and do work together to foster collective action while positively influencing and transforming urban spaces through environmental stewardship and communal ownership regimes.

Increasing food security in low-income and minority neighborhoods is another aspect of community gardening that aligns with LA21 initiatives. Supermarkets and grocery stores in low-income neighborhoods are lacking while cheap or fast food options abound in these neighborhoods (Flachs, 2010). This is in part due to high demand for low cost and convenient options. Inner-city community gardens help meet essential needs of resident populations by minimizing the gap between fresh, healthy, and affordable food and local resident populations (Pena, 2005). Moreover, better nutrition and staying active in gardens has been studied to significantly reduce risk of heart disease, type two diabetes, and obesity, and substantially reduces medical costs (Bellows & Hamm, 2003).

Quantitative research findings show that community gardens play a key role in increasing the property value of its surrounding neighborhood. In the city of New York, the “gross tax benefit generated by all community gardens over a 20-year period amounts to about $563 million” (Irazabal & Punja, 2009). Additionally, evidence links the presence of community gardens with the reduction neighborhood crime rates (Kondo et al., 2016). Collectively, these benefits have provided mass appeal for the promotion of

community gardens in urban environments to help address the challenges that urban residents face.

Community Gardens Closures

As the economic growth become rapidly concentrated in cities, pressures for responsible urban planning and implementation of new infrastructure for housing and growing industries are heightened. To combat these pressures, municipal organizations have sold government-owned city lots to implement infrastructure and development projects to support a growing population (Schmelzkopf, 1995). By year 2000, over 600 municipally owned community garden sites in New York City were at high risk for closure (NYC Environmental Justice Alliance v. Giuliani, 2000), and many garden properties were sold at market competitive prices for private development projects (Reynolds, 2014).

Community gardens in low-income and minority neighborhoods were disproportionately targeted by these urban planning decisions despite the positive impact of these gardens within these neighborhoods (Reynolds, 2014). Although evidence for this phenomenon has been widely discussed in the context of New York City's urban gardens, research in other regions on this issue is significantly lacking. Addressing this gap in literature, I use empirical analysis of urban community gardeners to further understand the implications of community garden closures in the urban California Central Coast region.

Empirical Research on Community Gardens in the CA Central Coast Region

Like those in New York City, community gardens in the California Central Coast region are increasingly becoming politically contested spaces. Due to a deeply rooted

history of agriculture and technology development, substantial economic and population growth has yielded high economic value to this region of California (Egerer et al., 2017). Stark socioeconomic and demographic changes have taken place (Zuk et al., 2005). Despite being the world's leading producer of agricultural products and the global center for high technology and venture capital, the region as a whole suffers from deep disparities in income and food security as well as unequal access to food (Egerer et al., 2017). According to LA21 initiatives, community gardens in this region can better combat these disparities by promoting more food security and community resiliency despite social and economic pressures within the region.

Using principles of environmental justice to better understand if and how groups of people are disproportionately impacted by community garden closures, I ask, who are the types of people that currently use and benefit from community gardens? To better understand the impact of community gardens, I analyze the differences and similarities of socio-economic and demographic characteristics of gardeners and surrounding neighborhood residents? Using a quantitative empirical approach, I aim to better understand the types of people these gardens host. In doing so, I will surface social and economic implications of community garden closures.

Methods

I worked in 19 community garden sites in Monterey, Santa Cruz, and Santa Clara counties in the California Central Coast. The following table shows general features of these community gardens, as well as the census tract number in which the gardens are located.

Table 1. Garden Characteristics of 19 Urban Community Gardens in the CA Central Coast Region

Garden	Census Tract	County	Acreage	# of Gardeners	# of Cultivated Beds	Year Founded	Individuals on Wa	Cost Per Plot
Goodwill	141.02	Monterey	1.50	22	64	2011	0	$40.00
MIIS	127	Monterey	0.13	36	27	2008	info unavailable	$0.00
Pacific Grove	124.02	Monterey	0.15	info unavailable	57	2012	info unavailable	$10.00-$85.00
Pájaro	101.01	Monterey	0.11	19	18	2015	info unavailable	$96.00
Salinas	18.02	Monterey	0.05	5	20	2012	0	$0.00
Prusch	5036.02	San Jose	1.00	105	79	1984	0	$120-$240
Berryessa	5043.19	San Jose	2.00	85	79	2004	6	$90-$126
Charles Street	5086.01	San Jose	0.77	92	118	2006	75	$85.00
Coyote Creek	5031.22	San Jose	0.76	info unavailable	67	1994	0	$120-$240
Green Thumb	5063.05	San Jose	1.30	info unavailable	65	1991	6	$120-$240
Guadalupe	5003	San Jose	1.30	78	89	2008	66	$120-$240
La Colina	5120.31	San Jose	1.73	92	104	1978	18	$120-$240
Laguna Seca	5120.35	San Jose	0.75	info unavailable	88	1981	3	$120-$240
Trescony	1006	Santa Cruz	1.13	45	44	info unavailable	27	$100.00
Aptos	1224	Santa Cruz	0.36	65	72	2010	3	$100.00
Beach Flats	1010	Santa Cruz	0.60	23	24	1993	15	$40.00
Grange	1214.02	Santa Cruz	0.50	11	12	2011	info unavailable	$78.00
Mi Jardin Verde	1106	Santa Cruz	0.75	27	25	2011	info unavailable	$96.00
Mid-County Senior Center	1218	Santa Cruz	0.70	63	46	prior to 1970	info unavailable	$85.00

I chose U.S. Census Bureau data from 2012-2016 American Community Survey 5 year estimates to analyze neighborhood socio-economic and socio-demographic characteristics using the American Fact Finder database made available to the public online. Many of the 19 garden sites were located clearly within the census tracts, while others bordered closely to the census tract boundaries.

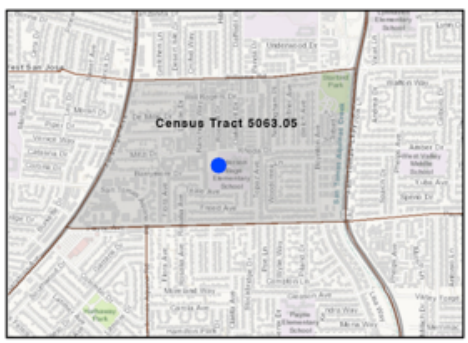

Figure 1a. Community Garden Location Clearly Within Census Tract Boundaries

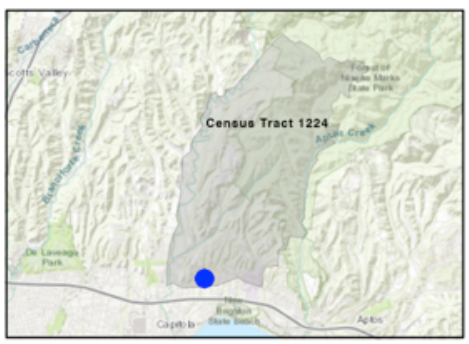

Figure 1a. Community Garden Location Close to Census Tract Boundaries

Data Collection

Together with a team of seven researchers, I conducted surveys at 19 urban community gardens in the California Central Coast region. All of the community garden sites in this study were "allotment style" community gardens, allowing individual households to cultivate their own individual plots, and managed by local organizations and/or city governments (Egerer et al. 2017).

Figure 2. Map of Community Garden Study Sites in the California Central Coast Region

Voluntary gardener surveys were administered during peak gardening season from June to October in 2017. In order to capture responses in a standardized manner, the surveys were designed in the form of questionnaires which consisted of 31 questions both structured, allowing gardeners to select their answer from a given set of choices, and unstructured, allowing gardeners to provide responses in their own words (Appendix 1). I notified each survey participant that their responses were voluntary and confidential and they were allowed to skip any of the questions that they did not want to give a response.

Some of the survey participants chose not to give responses to specific questions that included information about sensitive information such as income and food security. For data entry, each unanswered category was marked as "n/a" and every "n/a" was omitted from data analysis for each category as a result.

I aimed to survey 10 gardeners at each garden, however, the number of surveys obtained from each garden site varied. On average, I surveyed 9.5 gardeners per garden, where the highest total number of surveys obtained per site was 14 surveys and the lowest number of surveys per site was 3. Surveys were administered in 4 different languages, English (n=142), Spanish (n=38), Korean (n=1), and Bosnian (n=1), and were read out loud by the researcher in person (n=150), via phone (n=2), filled out by the gardener themselves (n=27), or read out loud to the gardener by another gardener (n=3). Average completion time for individual surveys was 10 minutes.

Data Analysis

Neighborhood socio-economic and socio-demographic data was obtained from the U.S. Census Bureau's 2012-2016 American Community Survey 5-Year Estimates. A total of 19 census tracts were selected to represent the neighborhood population

characteristics. Each community garden was located within the boundaries of a separate census tract.

To address our research question of how closely census data of neighborhood population characteristics matched the characteristics of gardeners surveyed, I compiled data for each of the 19 census tracts for the following categories: income, age, race, income, and food security.

Income

The census tract data available differed in upper and lower limits from the survey data, so both gardener and census tract data was adjusted to have matching upper and lower limit boundaries. Four categories were used to compare the two data sets: <$10,000, $10,000-$49,999, $50,000-$74,999, and $75,000+. The percentage of the census tract population that fell within each of these boundaries was compiled alongside the percentage of gardener survey participants that matched the boundaries used for census tract population. I compared incomes for the census population to the gardener population with Chi-Square tests. I used the average values across all 19 census tracts for each category as the expected variable, and the averages incomes of all gardeners surveyed for each category as the observed variable. We built a model using stacked column charts to visualize the differences and similarities between gardener and census tract populations for each income category.

Age

The exact age of individual gardeners were collected for the surveys, while census tract data determined the categories of age range used for data analysis. The following 8 categories were used for age: <20, 20-29, 30-39, 40-49, 50-59, 60-69, 70-79, and 80+.

Individual gardeners that fell within the boundaries of each category were counted. I compared ages for census population to the gardener population with Chi-Square test. I used the average values across all 19 census tracts for each age category as the expected variable, and the average ages of all gardeners surveyed for each age category as the observed variables. Then, we built a model using stacked column charts to visualize the differences and similarities between gardener and census tract populations for each age category.

Gender

The genders of individual gardeners were collected for the surveys, while census tract data determined gender breakdown for each neighborhood in percentages. Only 2 categories were used for gender: male and female. I compared gender breakdown for census population to the gardener population with Chi-Square test. I used the average percentages values across all 19 census tracts for both gender categories and multiplied that by the total number of samples collected (n=185) as the observed variable, and the total number of all gardeners surveyed for each gender were used as the expected variables. Then, we built a model using stacked column charts to visualize the differences and similarities between gardener and census tract populations for each age gender

Race

The following categories were used to compare census tract populations with gardeners survey participants: Hispanic or Latino, African American, American Indian, Asian, Native Hawaiian or Pacific Islander, White, Other, and 2+ races. To accommodate for census tract data available, which separates “one race” from “two or more races”, the category “two or more races” was determined as its own category.

Using the mean averages of the percentages of each race category for both census tract (expected variable) and gardener population (observed variable), I used chi-squared test to compare the races of the census population and the gardener population by taking average values across all tracts and gardens.

Food Security

The 6 questions relating to food security (Question 25 to 29 in Appendix 1) were standard questions developed by the U.S. Department of Agriculture. Individual gardener's food security was determined by the number of questions each respondent answered "yes", "sometimes true", or "often true". If gardener expressed food insecurity to one or more of the questions, they were categorized as "food insecure." If respondents answered "no" or "never true" to all of the questions they were categorized as "food secure." Out of 189 gardener survey participants, 9 of the respondents who answered, "I don't know" or "N/A" for at least 1 or the 6 questions were omitted from the data analysis for this factor. To analyze the census tract population, percentage of the tract population receiving SNAP assistance was used to determine food insecurity of neighborhood residents. Mean averages of percentage of census tract population receiving SNAP assistance were categorized as "food insecure" to determine our "expected variable", while mean average percentage of gardeners who were categorized as "food insecure" determined our "observed variable."

To further understand food insecurity in these community gardens, I used survey data to analyze whether or not certain variables, such as income and/or years of gardening experience, are predictors of heightened food insecurity of community gardeners. To account for each county's economic and social differences, I separated the

data by its appropriate county (Santa Cruz, Monterey, and Santa Clara) and performed chi-squared analysis to see if income and/or gardening experience played a key role in alleviating food insecurity. Further analysis of how gardener behavior affects food insecurity, chi-squared analysis was performed to test significant difference between income and number of hours gardening per week for all gardeners in the region.

Results

I found that the gardener population did not differ from the census tract population in terms of overall income ($p=0.666$, Fig. 3a) or gender ($p=0.427$, Fig. 3b). However, the gardener population was significantly different than the census tract population for age ($p<0.001$, Fig. 4a), race ($p=0.001$, Fig. 4b), and food security ($p<0.001$, Fig. 4c).

From my data analysis, and examining the visual representation of the data, I can infer that California Central Coast community gardeners are generally older, racially different, and experience more food insecurity than the surrounding neighborhood population.

My analysis of food insecurity in these community gardens shows that in two of the three counties, income was a strong determinant of food insecurity. In particular, in both Santa Cruz ($p<0.001$, Fig. 5a) and Monterey County ($p=0.001$, Fig. 5b), gardeners with lower incomes were significantly more likely to be food insecure. In contrast, food security did not differ with income level in Santa Clara county ($p=0.295$, Fig. 5c).

Increased years of gardening experience was not a determinant of decreased food insecurity in any of the three counties. For Santa Clara ($p= 0.828$, Fig. 6c) and Monterey county ($p= 0.243$, Fig 6b) there was no statistically significant difference between number of years gardening and food insecurity. In contrast, in Santa Cruz county years of gardening experience did significantly relate to food insecurity with higher rates of food insecurity among gardeners with very few or many years gardening ($p<0.001$, Fig. 6a).

Analysis of gardener behavior and its effects on food insecurity shows income level is not related to number of hours gardening each week. Rather, regardless of income, all gardeners are gardening roughly the same amount of hours per week ($p=0.999$).

Figure 3. Similarities Between Community Garden and Neighborhood Census Tract Populations

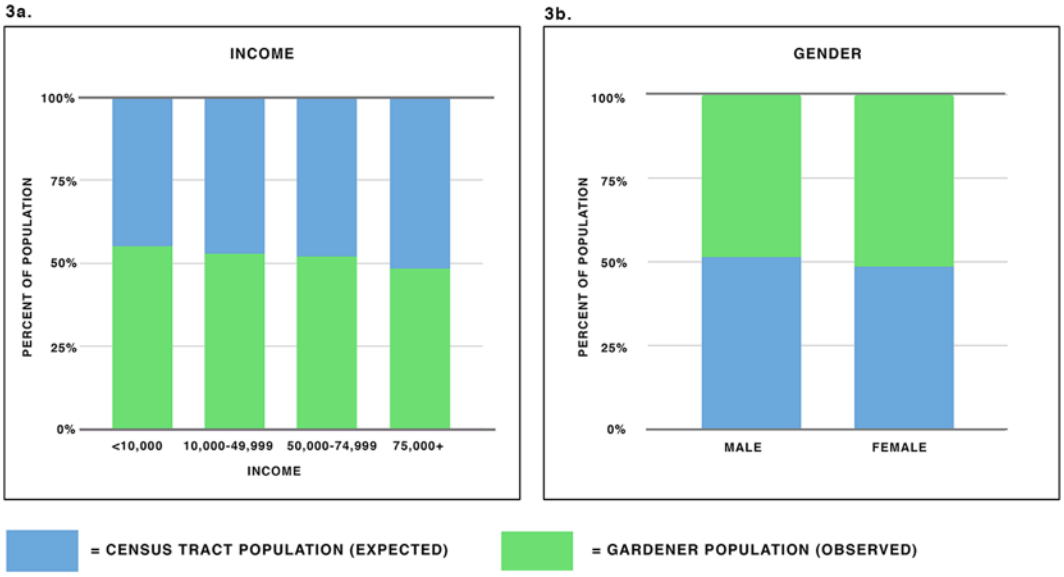

Figure 4. Differences Between Community Garden and Neighborhood Census Tract Populations

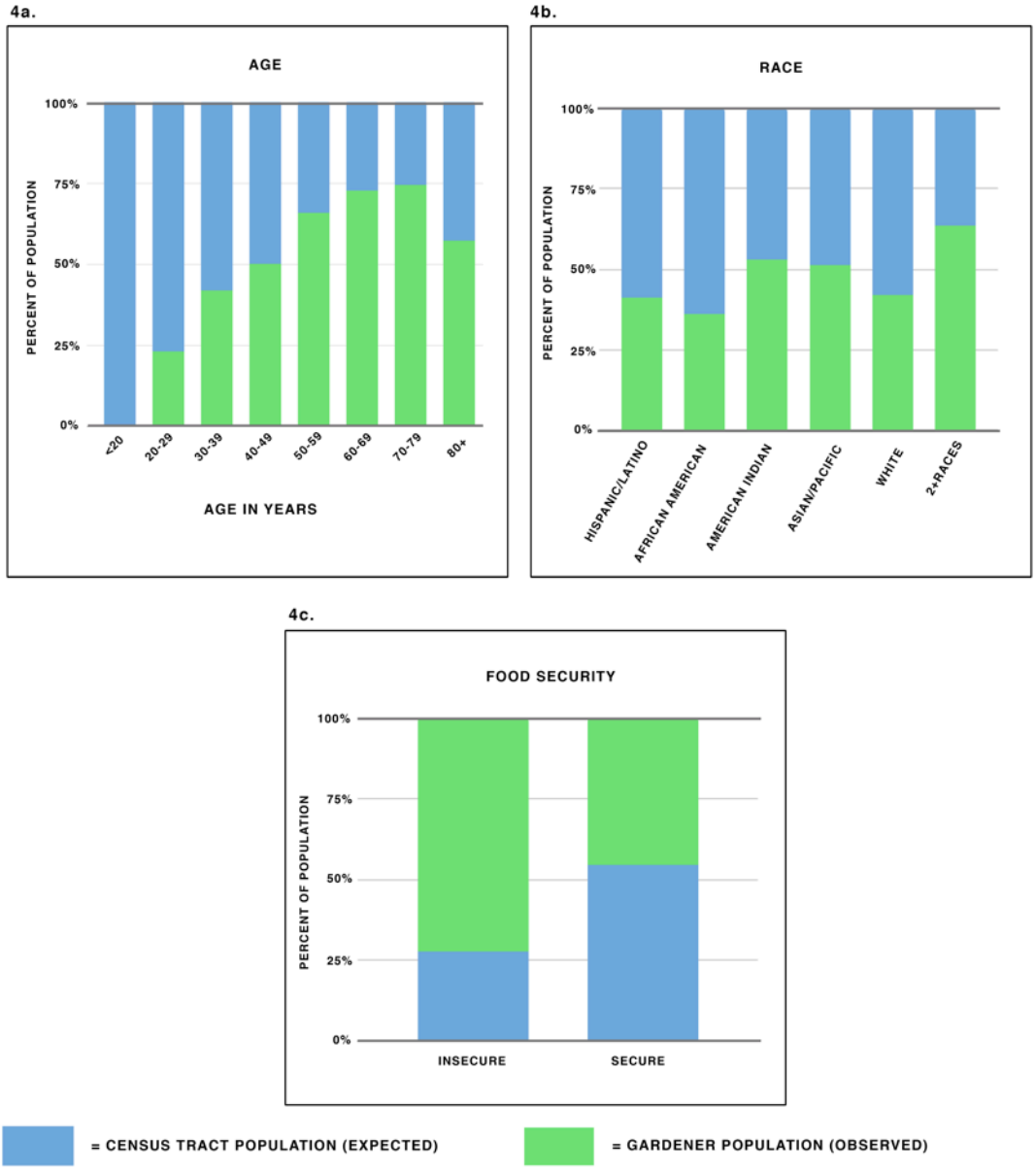

Figure 5. Food Security and Years Gardening of Community Gardeners

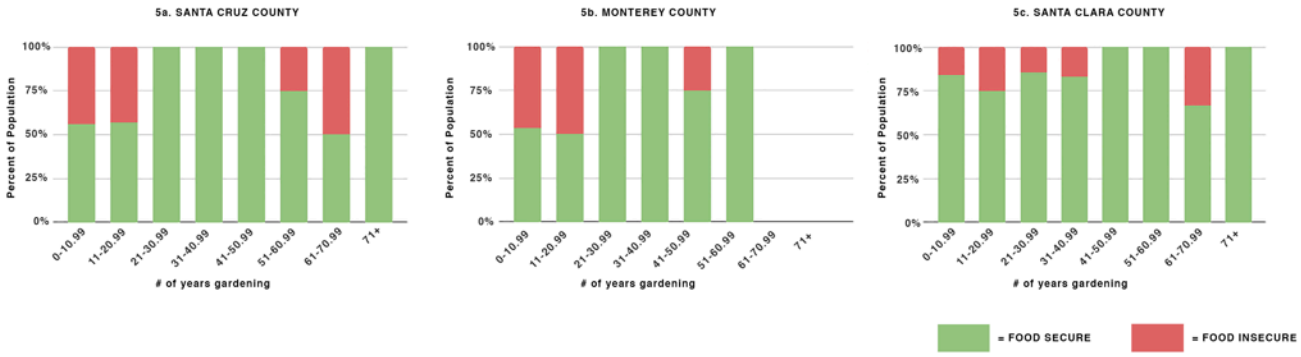

Figure 6. Food Security and Income of Community Gardeners

Discussion

The benefits of urban agriculture have gained much media and political attention from government agencies, non-profit organizations, and funders (Reynolds, 2014). By comparing and contrasting community gardeners and neighborhood residents, my research emphasizes the complexities of trying to understand the types of people who use and furthermore, benefit from urban community garden spaces. As community gardens increasingly become politically contested spaces, my research attempts to find evidence that validates or disputes commonly cited generalizations made about community gardeners to further understand the importance of promoting and protecting these spaces (Schmelkopf, 1995; Reynolds, 2014; Twiss et al., 2013).

Gender

Some international studies claim that there are gender imbalances in agriculture due to gender dynamics that bear responsibility on females for household sustenance (Ngome & Foeken, 2010). Furthermore, despite United States Department of Agriculture reports of a male dominated agriculture industry, in recent years, the emergence of female leadership in urban agriculture has received attention in the media and in literature (USDA Agcensus, 2012; Tortorello, 2014). In my research, a closer look at the gender breakdown of community gardeners in the California Central Coast region shows that there exists no significant difference when comparing genders both within the gardens and with neighboring populations (Fig. 2a). In other words, there are roughly equal numbers of male and female gardeners, and these numbers correlate with neighboring census tract data.

Further research is needed to understand whether or not there exists a similar trend of gender equality in other regions of the U.S., which contrasts media portrayal of female predominance in the context of urban agriculture.

Income

Many studies have documented the benefits of community gardens in low-income communities (Pena, 2005; Irazábal, 2009; Cohen et al., 2012; Schmelzkopf 1995). Increased access to fresh, affordable and culturally appropriate food in the gardens is an especially important feature that many gardeners expressed verbally during the interviews I conducted. My research shows that the annual income earned by gardeners and neighborhood populations were similar for all income categories.

Consistency across all income categories clearly shows that both low income and higher income populations are utilizing these urban garden spaces. This evidence should be especially appealing to policy and decision makers who are faced with the pressures of economic and population growth paired with the displacement of low-income populations. The diversity of socio-economic characteristics shows that urban community gardens are inclusionary spaces and furthermore merit their implementation and protection.

Race

My data shows there are significant differences between the racial breakdown of gardeners and neighboring populations. However, graphical visualization adds complexity to this research finding. For Hispanic / Latino, African American, and White race categories there were less than expected gardeners while there were more than

expected gardeners who were American Indian, Asian/ Pacific Islander, and multi-racial when compared with census tract populations.

This may mean that there is more inclusion for certain races while other races are still excluded from urban community garden spaces. In addition, there may exist more economic and social opportunities for certain races while other races continue to experience exclusion as a result of deeply rooted racial and institutional imbalances. This highlights descriptive works that claim the urban agriculture movement as one that facilitates social inclusion by providing more opportunities for immigrant populations and preservation of cultural agricultural practices (Reynolds 2002; Hynes 1996; von Hassell 2002).

Age

Studies that have discussed age in the context of urban agriculture are few, however my research results regarding age characteristics of urban community gardeners presents valuable insight on this topic (Blaine et al., 2010). Urban community gardeners are significantly older when compared with census tract populations. The significant lack of younger populations poses concern about whether or not it is lack of interest or opportunity that is a barrier for younger generations to participate in community garden spaces. However, this shows that older populations are effectively utilizing urban community gardens spaces and these spaces are a host for their social inclusion.

Furthermore, as urban community gardens are experiencing pressures of closures, reduction in size, and relocation, disproportionate impact on older generations poses significant environmental justice concerns.

Food Security

Food security and food sovereignty are two of the main benefits of community gardens widely cited in the literature. However, my data shows that community gardeners experience increased food insecurity when compared to neighborhood populations. This may be in part due survey design inefficiencies such as ambiguous wording of standardized USDA food security questions and/or the different metrics used to compare community gardeners to census tract populations. If research trials are to be conducted in the future, I would suggest adding an additional question to the survey asking whether or not gardener food security has improved since acquiring access to the community garden.

Furthermore, if increased years of gardening experience and number of hours gardening per week were not clear indicators of decreased food insecurity, there exists a need for more community garden programs that can educate and promote increased yields of food production in the gardens. Demonstrations and workshops do exist in certain gardens, however, those types of garden programs seem to exist in predominantly high-income neighborhoods.

Further Discussion

My analysis results are inconclusive due to the small sample size of community gardeners in comparison to census tract population data. However, it is important to note that because this is the first year of data collection, my research results general projections of the differences and similarities between community gardeners and neighborhood census tract populations. Conclusive results will require repeated research trials to increase sample size for more accuracy when making claims about relationship between community gardener and census tract populations. In addition, a larger sample

size would allow more accurate gardener analysis to determine similarities and differences between each neighborhood. I hypothesize that individual garden analysis would yield different results from the overall entire region due to the differences in socio-economic and socio-demographic characteristics of each neighborhood census tract.

Conclusion

Attempts to understand community gardener characteristics and their behaviors in through further research will foster better understanding of how and where gardens are implemented and utilized by the community. More specifically, understanding whether or not allotment-style gardens and their locations in the context of social geography can foster community participation and furthermore, increase social capital.

The significant differences found between community gardener and neighborhood populations in my research shows that the assumption that community gardens serve populations similar to that of the neighborhood in which they are located can be false. However, the differences and similarities of socio-economic and demographic characteristics between gardeners and neighborhood populations highlight community gardens as public spaces for increased social capital and inclusion, especially for marginalized groups experiencing poverty and food insecurity.

As population and economic growth places increasing pressure on the existence of community gardens spaces, the disproportionate impact of community garden closures on certain groups of individuals poses environmental justice concerns. In the California Central Coast region, 5 out of the 20 community garden research sites have experienced closures, relocation, and/or reduction of size during my research period. Preservation of

these spaces through community action and responsible governance has been limited. Furthermore, the impact of community garden closures on the mental, social, and physical well-being of individuals need to be further addressed. Based on my research findings, as these garden closures become more prevalent, older and more food insecure gardeners will be disproportionately disadvantaged by these closures.

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Appendix 1. Gardener Survey Sample Questionnaire

Gardener Survey - UC Santa Cruz Research Project - 2017

Through this survey, we would like to know more about your interest in participating in a community garden, your gardening techniques, your diet, your access to varied food, and basic demographic features. We are aware that some information in this survey may be sensitive, and we want to assure you that all information you provide will remain completely ***confidential*** *and will be used exclusively for the purpose of this study. This survey is completely* ***voluntary****; please feel free to skip any questions or to stop at any time.* ***Thank you for your time!***

1. Garden Name: _____

2. Date: _____

3. Age: _____

4. How many family members do you live with?

- 0
- 1-3
- 4-6
- 7-10
- 10+

5. How many other people do you live with?

- 0
- 1-3
- 4-6
- 7-10
- 10+

6. How many people in your family (including you) are?:
Women over 18 _____
Men over 18 _____
Girls 0-18 years old _____
Boys 0-18 years old _____

7. What is your gender?
- Male
- Female

8. What is the ethnicity of your family (mark all that apply)?:
- White
- Hispanic or Latino
- Black or African American
- Native American or American Indian
- Asian/Pacific Islander
- Other
- Undetermined

9. What is the national origin of you or your parents, if not U.S.A.?

10. Is there a language other than English spoken at your home?:
- Yes

- No

If so, what language(s)?: _____
11. How far away do you live from the garden?:

- <1 mile
- 5-10 miles
- 1-5 miles
- > 10 miles

12. What are the primary sources of employment for you and other members of your immediate family (mark all that apply)?:

- Agriculture
- Gardening
- Construction
- Sales
- Domestic Service
- Education
- Legal Services
- Health Services
- Office Administration
- Technological Services
- Restaurant/Food Service
- Other _____(employment type)

13. What is the average annual income earned in your immediate family?:
- $0-$10,000
- $10,000-$19,999
- $20,000-$29,999
- $30,000-$39,999
- $40,000-$49,000
- $50,000-$74,999
- $75,000+
- I'd rather not say

14. What is your highest level of completed education?
- No formal schooling
- Elementary school
- Middle school
- Some high school
- High school graduate
- Trade/technical/vocational training
- Some college
- Associate degree
- Bachelor's degree
- Master's degree
- Professional degree
- Doctorate degree

15. How long have you been gardening? ____ years

16. List three reasons why you garden?

A. _____

B. _____

C. _____

17. How many hours per week do you spend at this garden?

18. Which crops do you grow in your garden?

• Tomato	• Tomatillo	• Beans
• Corn	• Amaranth	• Artichoke
• Arugula	• Asparagus	• Beet
• Bitter melon	• Broccoli	• Cabbage
• Carrot	• Cucumber	• Eggplant
• Kale	• Leek	• Lettuce
• Mustard	• Parsnip	• Peppers
• Potato	• Squash	• Chard
• Basil	• Dill	• Cilantro
• Oregano	• Garlic	• Thyme
• Mint	• Lavender	• Strawberry

List other crops you grow:

_____
_____
_____
_____
_____

19. Which flowers or ornamentals do you grow in your garden?

• Dahlia	• Borage	• Iris
• Calendula	• Nasturtium	• Sunflower
• Zinnia	• Cosmos	• Rose

List other ornamentals you grow:

_____
_____
_____
_____
_____

20. Do you have problems with pests or diseases in your garden?
- Yes
- No
- Don't know

If yes, which of the following methods do you use to protect your crops from pests or diseases (mark all that apply)?
- Hand remove pests
- Organic, purchased sprays
- Homemade sprays
- Pesticides
- Release ladybugs

- Other:_____

21. Do you add any soil amendments in your garden?
    - Yes
    - No

If so, what do you add?
- Fertilizer
- Compost
- Manure
- Worm castings
- Blood meal
- Cover crop
- Mulch
- Other

22. Where do you get soil amendments you add (mark all that apply)?:
    - Purchase
    - From other gardeners
    - From garden management
    - Make it yourself
    - Other

23. Who taught you how to garden or farm?
    - Family member
    - Friend
    - Self-taught
    - Workshop/Class
    - Other gardeners
    - Other

24. How many pounds of fruits, vegetables, and herbs to you harvest from your garden every week during summer (May-October)?
    - 0 lbs
    - 1-5 lbs
    - 6-10 lbs
    - 11-20 lbs
    - 20 lbs+
    - Don't know

The next six questions are standard questions developed by the U.S. Department of Agriculture.

The following are several statements that people have made about their food situation. For these statements, please indicate whether the statement was often true, sometimes true, or never true (for you/your household) in the last 12 months:

25. "The food that (I/we) bought just didn't last, and (I/we) didn't have money to get more."
    - Often true
    - Sometimes true
    - Never true
    - Don't know

26. “(I/we) couldn’t afford to eat balanced meals”
- Often true
- Sometimes true
- Never true
- Don’t know

27. In the last 12 months, since last (name of current month), did (you/ or other adults in your household) ever cut the size of your meals or skip meals because there wasn’t enough money for food?
- Yes
- No
- Don’t know

If so, how often did this happen?
- Almost every month
- Some months but not every month
- Only for 1 or 2 months
- Don’t know

28. In the last 12 months, did you ever eat less than you felt you should because there wasn’t enough money for food?
- Yes
- No
- Don’t know

29. In the last 12 months, were you ever hungry but didn’t eat because there wasn’t enough money for food?
- Yes
- No
- Don’t know

30. Has a doctor ever told you that you are at risk or have any of the following?:
- Diabetes
- Cancer
- Asthma
- Cardiac Disease
- Hypertension
- Obesity
- Other persistent health problems

31. Has gardening had a positive impact on you or your family’s well-being?
- Yes
- No

If so, how?
_____
_____
_____
_____
_____
_____
_____
_____

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