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LONG ISLAND FARMERS' MARKETS: AN ANALYSIS OF PATRONAGE AND LOCATION

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ABSTRACT: *The focus of this study is why patrons attend farmers' markets and how the demographics of the farmers' market patrons compare to the demographics of the surrounding service areas. Six different Long Island, NY markets were visited (three in Nassau County and three in Suffolk County), and surveys were handed out to patrons. The survey assisted in determining the gender, race, income, education levels, and reasons for attendance of the patrons who shop at each market. Out of all the participants, 73.5%, were white females, 87.3% have completed education past high school, and 64.7% said the main reason for attending these markets was to purchase locally grown produce. MiniTab V.14 was used to perform analyses of variance on the data. The analyses showed a statistically significant difference (p-value: 0.002) in self-reported average annual income and a difference (p-value: 0.081) in level of education. In order to compare the demographics of the farmers' market patrons to the demographics of the surrounding service areas, the areas within 1,000 meters of each market were calculated using ArcMap 10.2, the comparison showed that there are clear demographic differences.*

Keywords: *farmers' markets, sustainability, local food*

INTRODUCTION

In recent years, the prevalence of farmers' markets has increased on Long Island, as well as across the country and around the world. Attending farmers' markets isn't just a fun way to get out and purchase fresh produce, it is also a great way to reduce one's carbon footprint and support local producers (Wells, 1994). Farmers' markets are a daily part of in vogue urban life. They are generally open during the spring through early fall months but some may run year round. They have emerged as an alternative method of obtaining groceries (Dodds et al., 2013). Fresh produce, organic foods and specialty prepared goods such as breads and cheeses are typically sold at farmers' markets. Sometimes arts and crafts items and flowers can be found here as well. Not only do they benefit the farmers, but they benefit the consumers too. People are able to purchase fresh healthy foods that may be sold at or below supermarket prices (USDA, 2014). They also promote local businesses and help to create healthier communities (EPA, 2015).

The popularity of farmers' markets has grown significantly over the more recent years. According to a USDA-AMS (2014) survey, between 2000 and 2013, the number of markets increased by 184%. As a means of reducing ones carbon foot print, buying locally grown produce requires fewer transportation externalities. This can be partially attributed to the raised awareness of food safety concerns and the concern regarding the release of carbon emissions (Dodds et al., 2013).

Goals for Farmers and Shoppers at Farmers' Markets

The goals of the vendors at farmers' markets are to sell their goods directly to the public, grow a consumer base, and test new products and pricing strategies (Gumirakiza, Curtis, and Bosworth, 2014). There are many reasons why people shop at farmers' markets. According to Gumirakiza, Curtis, and Bosworth (2014), the most common reasons for going to markets are to purchase fresh produce, for social interaction, and to purchase ready to eat or packaged foods. Others may go to support the local farmers or to just simply browse. When consumers were asked why they attended a market in North Carolina, 88% said that they came for fresh produce and 64% said that they came for local products (Andreatta and Wickliffe, 2002).

In California, people saw produce in farmers' markets to be fresher looking, fresher tasting, more reasonably priced, and economically friendly (McGarry-Wolf et al., 2005). In 2009 and 2011, Gumirakiza, Curtis, and Bosworth

completed two studies in Nevada and Utah, respectively. They concluded that the primary motivations for going to these markets are to purchase produce (78%), to interact with their communities (14%), to purchase ready to eat foods (5%), and to buy packaged foods, arts, and crafts (3%). Also, they found that increased education level, concerns for diet of health, home gardening, and being a married female increased the probability of attending a farmers' market.

Another study, conducted by McGarry-Wolf et al. (2005), noted that people who shop at farmers' markets are more likely to be female, married, and to have completed post-graduate work. These results were much broader than the ones they recorded in a previous study conducted by Wolf in 1995. According to a similar study carried out by Dodds et al. (2013), 67.9% of the total farmers' market patrons were female.

Surrounding Areas – Walkability and Famers' Markets

The presence of farmers' markets can improve the accessibility of healthy foods. One measure of accessibility is the ability to walk to healthy food sources. Walkability and the distance that is deemed walkable varies in densely and sparsely populated areas. The United States Department of Agriculture has defined walking distance low accessibility as 1 mile (USDA, 2012). In its 2009 report to Congress, *Access to Affordable and Nutritious Food: Measuring and Understanding Food Deserts and Their Consequences*, the USDA reported over 2.3 million households live over a mile from the nearest supermarket and do not have access to a vehicle. The Department collected accessibility measures from over 30 research studies and found that the most common distance in measuring walkability was 1 kilometer (0.62 miles). This distance was used for studies in Portland, Oregon and Montreal, Quebec (Leete, Bania, and Sparks-Ibanga, 2012 & Apparicio, Cloutier, and Shearmur, 2007). In order to measure the accessibility of the farmers' markets in the study, the areas within 1,000 meters of each market were calculated. The demographics of these service areas were then compared to the demographics of farmers' market patrons.

RESEARCH GOALS

The first goal of this study is to determine why patrons attend farmers' markets on Long Island, New York. To accomplish this, a survey will be administered to farmers' market patrons at six long island farmers' markets. The second goal of this study is to compare the demographics of the farmers' market patrons to the demographics of the surrounding service areas. To accomplish this, the survey will be used to profile farmers' market patrons at the six long island markets. Then GIS will be used to construct and profile the surrounding service areas. The final goal of this study is to determine how market placement (i.e. walkability) influences the demographics of patrons and their reasons for attending the markets. The results of this project can be used to help improve existing markets, determine optimal locations for future farmers' markets across Long Island, and determine how location impacts products purchased. In the future, the results of this project can help planners determine ways to better incorporate the farmers' markets into their surrounding communities.

METHODOLOGY

Survey Component

Six different markets across Long Island, NY were visited and surveys were handed out to patrons. Three of these markets were located in Nassau County (Garden City, Long Beach, and New Cassel) and three were in Suffolk County (Patchogue, Islip and Kings Park); the locations of these Markets can be seen in Figure 1. The towns that the markets are located in each have a different socioeconomic status and were chosen based this and on their distance from each other. A survey (Figure 2) was developed and handed out to the patrons at each of the markets. Prior to administration of surveys, IRB approval was granted. While at each of these markets, researchers noted the number and type of vendors that were there, kinds of products that were sold, and the weather conditions that day. Table 1 provides an overview of each market (ie. days open, products available, number of vendors) as well as census data for the area.

GIS Component

Using ArcMap 10.2, the areas deemed within walking distance (1,000 meters) were calculated for the six farmers' markets in the study; this was done to compare the geographic and population reaches of each market. Initially, a network was generated from New York State Roads data, excluding roads with no pedestrian access. Using the created network and geocoded farmers' market locations, a 1,000 meter service area was generated for each of the six farmers' markets in the study. Given the sparseness and irregularity in road networks in Nassau and Suffolk

Table 1. Farmers' Market Information

Farmers' Market	Patchogue	Islip	Kings Park	Garden City	Long Beach	New Cassel
Days Open	Fridays	Saturdays	Sundays	Tuesdays	Wednesdays Saturdays (crafts)	Saturdays
Number of Vendors	7	15-20	20-25	20-25	20-25	1
Products Sold	flowers, plants, fruit, vegetables, coffee, cookies	fruits, vegetables, baked goods, pretzels, pickles, dog treats, pasta, soap, hummus, granola bars, honey, preserves, plants, flowers, wine	pickles, bread, pies, soap, body oils, fruits, vegetables (organic and conventional), coffee, honey, preserves, seafood, flowers, cheese, yogurt, poultry, pork, herbs, plants	dog treats, vinegar, oil, flowers, plants, fruits, vegetables, baked goods, seafood, pickles, dairy products, organic meat, vegan/gluten free goods, nuts, soap, pasta	cheese, fruit, vegetables, organic bread, yogurt, fudge, baked goods, pasta, seafood, spices, nuts, herbs, preserves, granola, soap	fruits, vegetables
Market Goals	Provide locals easy access to fresh produce	Provide locals easy access to fresh produce	Share local resources with and give back to the community	Accommodate people entering and leaving the court house	Strengthen the local economy	1. Get teenagers involved in the community and provide them with work-related training 2. Provide fresh market produce to the entire community
Census Data (2013 5 year ACS)						
Population	11,902	18,563	17,657	22,443	33,407	13,932
Median Household Income	$65,487	$96,818	$95,098	$150,380	$84,882	$73,048
Per Capita Money Income	$31,004	$40,407	$39,787	$66,768	$44,944	$20,132
Persons Below Poverty Level	15.9%	2.8%	5.5%	4.0%	10.2%	15.4%

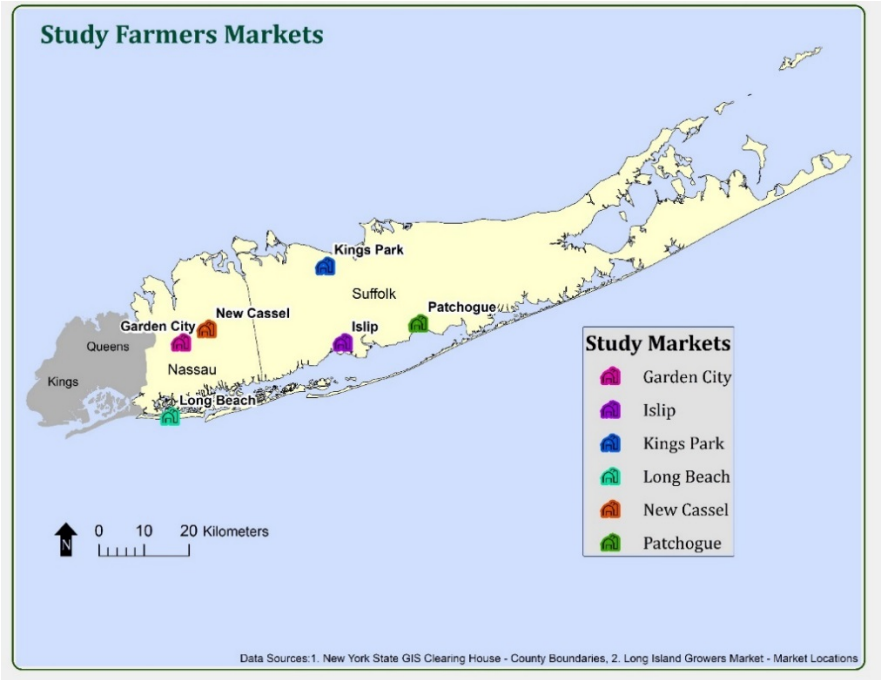

Figure 1: Farmers' Market Locations.

Farmers' Market Survey

Directions: The following questions concern your visitation of this farmers' market. Please answer the following questions honestly and to the best of your ability. For multiple choice questions, please select the choice that most closely reflects your answer. For any written response questions, please write your answer in the space provided.

1. Your Age:_____
2. Gender:
   a. Male
   b. Female
3. Race/Ethnicity:
   a. White
   b. Black or African American
   c. Hispanic or Latino
   d. Native American or American Indian
   e. Asian / Pacific Islander
   f. Other: _____
4. How far did you travel to come here?
   a. less than a mile
   b. 1-5 miles
   c. 5-10 miles
   d. 10+ miles
5. How often do you visit this market? (i.e. - once a week, twice a month, once every other month)
   _____
6. What is your main reason for coming here? ***(Choose only one answer)***
   a. To purchase locally grown produce
   b. To purchase organic produce
   c. To purchase specialty prepared goods
   d. Browsing
   e. Other: _____
7. How did you get here?
   a. Walk
   b. Bike
   c. Car
   d. Public Transportation
8. What is the highest degree or level of school you have completed? *If currently enrolled, highest degree received.* ***(This question is optional)***
   a. No schooling completed
   b. Nursery school to 8th grade
   c. Some high school, no diploma
   d. High school graduate, diploma or the equivalent (for example: GED)
   e. Some college credit, no degree
   f. Trade/technical/vocational training
   g. Associate degree
   h. Bachelor's degree
   i. Master's degree
   j. Professional degree
   k. Doctorate degree
9. Annual Household Income: ***(This question is optional)***
   a. Less than $25,000
   b. $25,000 – $50,000
   c. $50,001 – $75,000
   d. $75,001– $100,000
   e. $100,001 – $125,000
   f. $125,001 – $150,000
   g. More than $150,000

Figure 2: Farmers' Market Survey.

counties, a network service area was the preferred method when compared to a simple circular buffer around each market. The resulting service areas were used to select the Census Block Groups which intersected each market's service area. These selected groups were assigned to a market and clipped to derive the portion of each Block Group within corresponding service area. The area of each clipped Block Group was divided by the total area of the Block Group and the area of the corresponding farmers' market service area. The resulting fractions were used to conduct areal/population weighted calculations of applicable 2013 5-Year American Community Survey statistics. These areal/population weighted estimates were used to aggregate estimates for the service areas as a whole.

Two variables were mapped, using quantile categorization, at the Census Block Group level for each service area: Median Household Income (Figure 3) and Household SNAP Participation Rate (Figure 4). In addition to the mapped variables, the male to female ratio, ethnicity characteristics, education attainment, percent of population under the poverty line, and the percent of households with no vehicle access were also calculated. These seven statistics were also aggregated at the service area level, using on areal/population weighed averages, for comparison between service areas and comparison to the corresponding city, village, or census designated place.

RESULTS AND DISCUSSION

Survey Results

A total of 168 surveys were collected and the data was compiled and analyzed. Among the markets, the majority of shoppers, 73.5%, were white females. The average annual household income of the patrons was over $100,000. Most of the patrons surveyed, 87.3%, have completed education past high school. 64.7% of all patrons said the main reason for attending these markets was to purchase locally grown produce (Table 2). In order to compare the six markets, several analyses of variance were performed using MiniTab Version 14.The analysis of self-reported average household income showed a statistically significant difference (p-value: 0.002) between the patrons of the six markets. In particular, the Kings Park market patrons had a much higher self-reported average annual income (~$125,000) than New Cassel patrons (~$50,000). Also the market patrons did show a difference, though not a significant one (p-value: 0.081), in level of education. For example, the Kings Park patrons had a higher level of

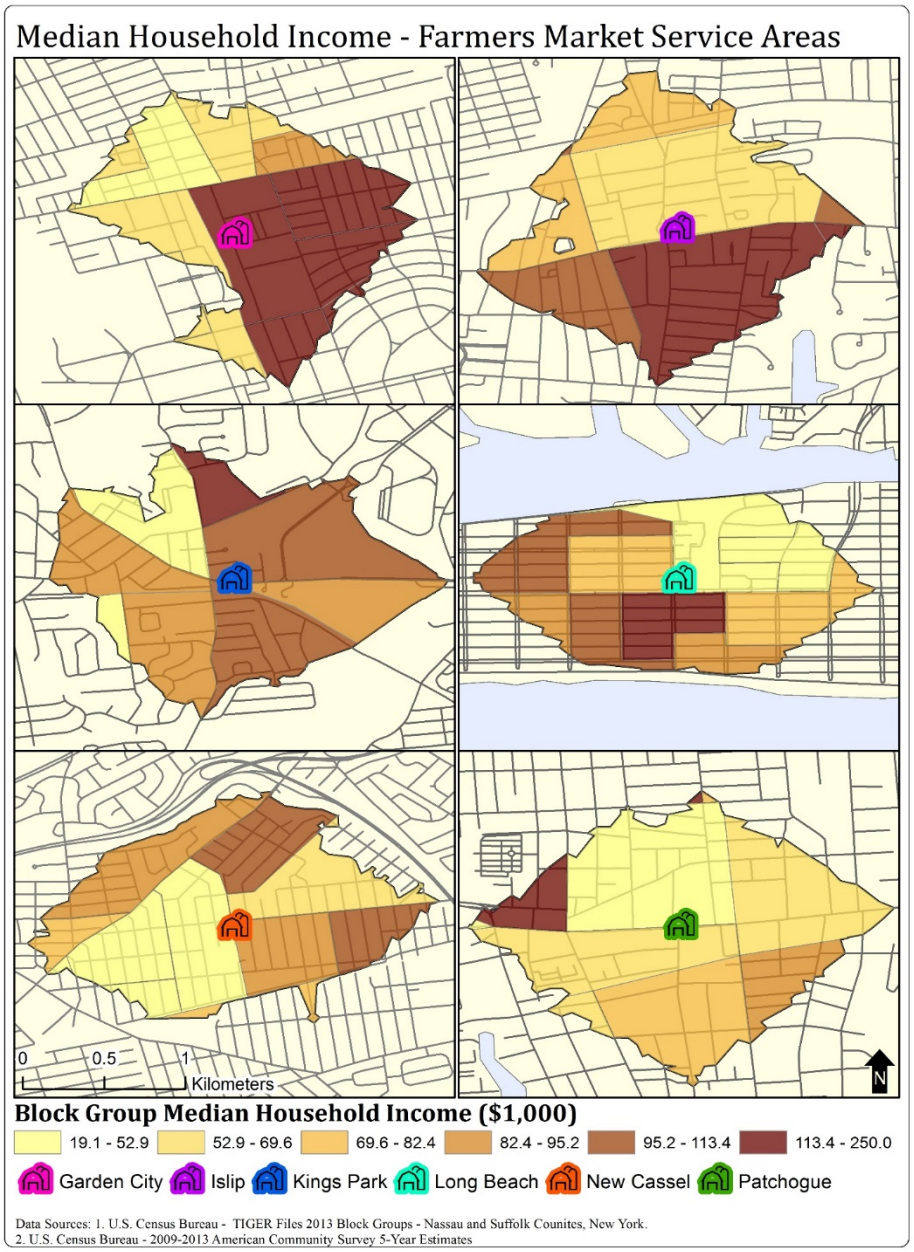

Figure 3: Median Household Income by Block Group.

education than those at the Islip market. This may be because Stony Brook University is located near Kings Park, so students and professors may be frequenting that market. Furthermore, women (77.2% of patrons surveyed) are more likely to shop at farmers' markets than men and have a higher level of education. In the markets that were not located near the town center, none of the patrons selected browsing as their main reason for visiting, and the number of browsers increased when the market was located on a town's main street (Table 3).Therefore the location of the market may have an influence on the reason for shopping and is a question for future study.

Revitalization of communities may include the establishment of farmers' markets, which is the case for the town of New Cassel. Its farmers' market is run by the local church and its staff is made up of the teenagers living nearby. This is a great way to bring the community together, however, it receives very few customers. To change this, it may be beneficial for the market to contact other vendors (since there is only one) in order to increase its popularity. The Patchogue farmers' market is similar to the New Cassel market in the sense that it is not very popular, as exhibited by patronage. If its location were changed from the strip mall to a main street or a town hall, the number of people

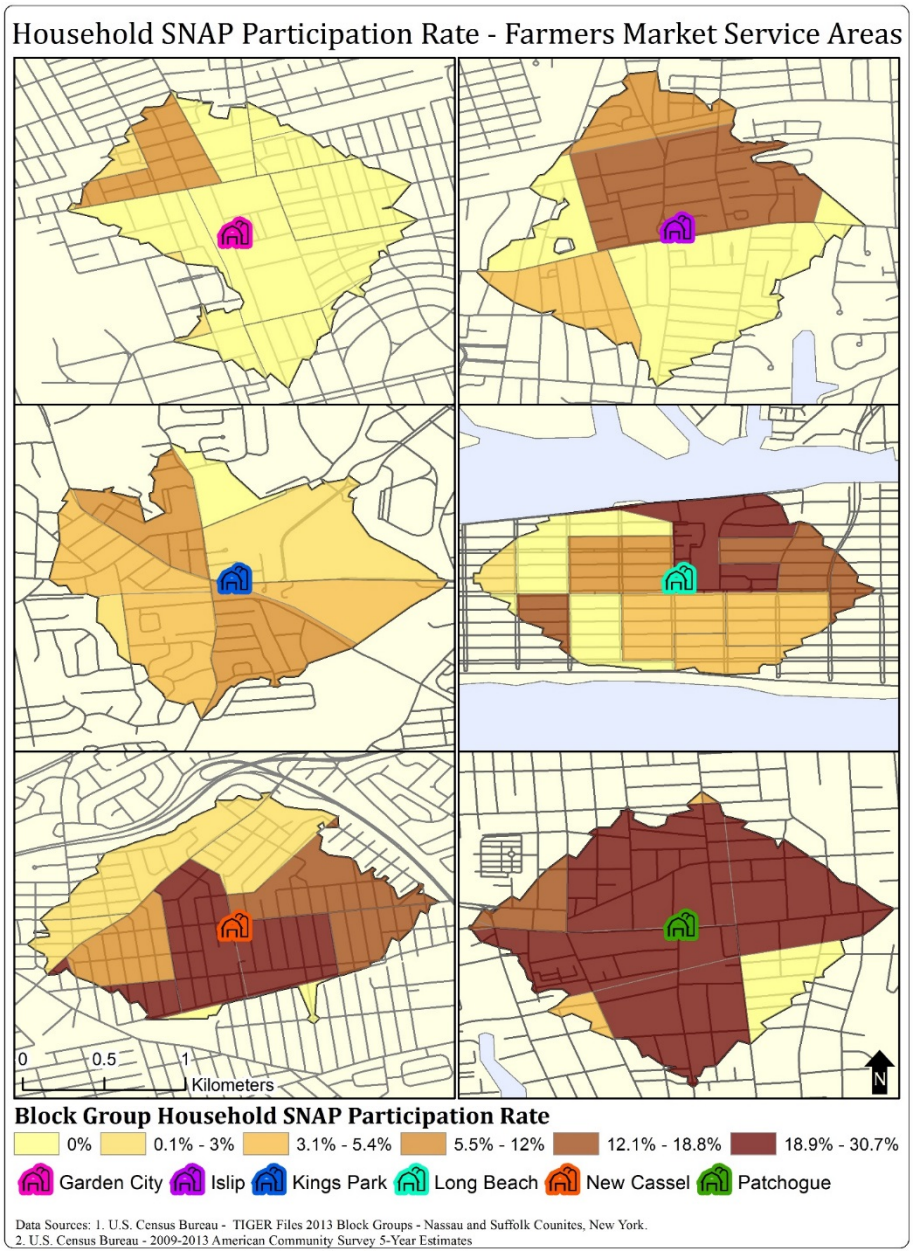

Figure 4: Household SNAP Participation Rate by Block Group.

shopping may increase. In fact, a second Patchogue market location has been added to a railroad station parking lot for the upcoming season. This will allow for a future study of the impact of location on patronage.

This information, along with GIS data, can be used to determine the optimal locations for future farmers' markets. Increasing the productivity of existing farmers' markets may spur the addition of new markets on Long Island. For the success of farmers' markets on Long Island, it is imperative to look at Long Island as a whole when determining where to put markets, and what to sell at the markets. This will maximize all of the benefits of these markets for the patrons, the vendors, the community, and the environment.

Table 2. Select Survey Questions and Patron Responses.

Survey Question	Survey Question Choices	Patrons
Gender	**Male**	31
	Female	105
Level of Education	**Max High School Graduate**	21
	Post High School - Max Bachelor's	90
	Post Graduate	55
Race/Ethnicity	**White**	108
	Black/African American	12
	Hispanic/Latino	11
	Asian/Pacific Islander	2
	Other	3
Annual Household Income ($1000's)	**<25**	11
	25-50	21
	50-75	20
	75-100	20
	125-150	20
	>150	27
	N/A	27
Reason for Attending Farmers' Market	**Locally Grown Produce**	88
	Organic Produce	12
	Specialty Prepared Goods	11
	Browsing	20
	Other	5

Table 3. Market by Market Comparison of Survey Responses.

Reason for Attending Farmers' Market	Patchogue (patrons)	Islip (patrons)	Kings Park (patrons)	Garden City (patrons)	Long Beach (patrons)	New Cassel (patrons)
Locally Grown Produce	19	15	19	13	17	5
Organic Produce	1	1	1	1	3	5
Specialty Prepared Goods	1	2	3	1	4	0
Browsing	0	4	3	5	8	0
Other	0	1	1	1	2	0

GIS Component

Comparisons between service areas

The generated service areas showed the variability in the road network connectivity and population density among the six farmers markets in the study. Service area size varied from 1.45 km^2, around the Long Beach market to 1.87 km^2, around the Patchogue market. The estimated population within 1 kilometer of the markets varied from 1,464, around the Kings Park market, to 8,419, around the New Cassel market. The size of the markets service area did not directly relate to an increase in the estimated population served. Two of the smallest service areas Long Beach, 1.45 km^2, and New Cassel, 1.58 km^2, had the largest estimated population served, 8,177 and 8,419 respectively. The variation of the service areas continued when additional characteristics were analyzed.

The two mapped variables, Median Household Income and SNAP Household Participation, displayed the wide differences in the make-up of the service areas within 1 kilometer of the farmers markets. At the Block Group level, Median Household Income ranged from $19,111, in Long Beach, to greater than $250,000, in Garden City. Within the service areas there was also a wide range in median household income. In Garden City, the Block Groups to the southeast of the service area displayed high median household incomes, over $113,400, while the Block Group to the northwest had a median household income of $37,337. This trend was present in all the service areas. With the exception of New Cassel, all service areas had contained at least one Block Group with a Median Household Income over $113,400. With the exception of Islip, all service areas contained at least one Block Group with a median household income below $52,900. Similarly, SNAP participation varied from 0% to 30.7% at the Block Group level. All the service areas contained at least one Block Group with no households participating in SNAP. There was

comparable uniformity in SNAP participation within the service areas. In Garden City the highest incidence of SNAP participation was 11.99%, in the same northwest Block Group with the area's lowest Median Household Income. In Patchogue, the majority of the population lived in Block Groups with over 18.9% of households participating in SNAP. These two indicators of wealth display the variability of the population in the walking distance service areas of the six markets. There is a wide range of wealth among and within the six service areas.

At the service area level, there were large differences in Median Household Income and SNAP participation. At this level of aggregation, the variety within each service area is lost. However, there are stark differences apparent between the service areas. At this level, Median Household Income ranges from $63,763, in Patchogue, to $109,738 in Garden City. This difference is complemented by the highest and lowest SNAP household participation rates, in Patchogue and Garden City respectively. There were also large variations in the ethnic makeup evident at the service area level. The percent of the population identifying as Non-Hispanic White ranged from 2.34% in New Cassel, to 87.67%, in Kings Park. The inverse was true for the Non-Hispanic Black population, ranging from 0.33%, in Kings Park, to 46.23%, in New Cassel. The Hispanic-Latino population ranged from 6.92% of population, in Islip, to 46.74% of population, in New Cassel. However, the Hispanic-Latino population was estimated to be higher than the Non-Hispanic Black population in all six of the service areas. This could be caused by Hispanic-Latinos who consequently identify as Black. Due to the structure of the survey, these peoples would be categorized as Hispanic-Latino. As displayed in Tables 4 and 5, there is wide variation in the characteristics of the populations within walking distance to the six markets. However, the service area level of aggregation, the variations within each of the service areas themselves is lost.

Comparisons of service area population, market shoppers, and the larger community

Comparing farmers markets shoppers surveyed to the populations in the estimated service areas, there are clear differences in the characteristics of those shopping at the markets and those who live in the areas surrounding the markets. The median of the Household Income of those survey was $100,000 – $125,000 while the average Median Household Income in the six service areas was $83,878. Less than 12% of those surveyed had no education beyond high school compared with over 45% in the service areas. Over 80% of those surveyed were White compared to around 45% of those in the surrounding service areas. Less than 7% of the surveyed shoppers identified as Hispanic-Latino compared to over 31% of those in the surrounding areas. The surveyed shoppers were more likely to be white compared to the service area populations. Of those surveyed, over 34% of respondents came from within a mile of the market and 10% walked to the market. In the estimated service areas within a kilometer of the markets, nearly 14% of households do not have access to a vehicle. Taking these observations into consideration together, it is evident that markets have the ability to serve the nearby population without vehicular access. There was also a disproportionate number of females shopping at the farmers markets compared to the service area populations.

Table 4. Service Area Characteristics.

Market	Service Area (Sq. Km)	Female to Male Ratio	Median HH Income	No College Education	SNAP HH Participation	Population Under PL	No Vehicle
Garden City	1.51	1.13	109,738	26.50%	3.06%	8.67%	12.00%
New Cassel	1.58	1.04	72,283	67.55%	14.57%	17.40%	15.74%
Kings Park	1.73	1.09	90,052	38.67%	4.41%	6.24%	8.63%
Long Beach	1.45	0.93	75,748	39.24%	7.58%	12.58%	18.90%
Islip	1.79	1.07	93,961	27.65%	8.04%	5.32%	5.76%
Patchogue	1.87	0.94	63,763	54.44%	19.71%	23.64%	12.57%
All Service Areas	9.93	1.01	83,878	45.63%	9.85%	13.93%	13.96%

Comparing the populations in the estimated service areas to the larger populations their respective service areas, it appears that those populations surrounding the farmers markets are less affluent than the rest of the community. For all six markets, the population in the surrounding service area had a lower Median Household Income, and a higher poverty rate than the corresponding larger community. Thus, it appears that those in the areas surrounding the farmers market are less affluent than the rest of the community.

Table 5. Service Area Demographics: Ethnicity.

Market	Total Population	Asian/Pacific Islander	Black/African American	Hispanic/ Latino	Other	White
Garden City	3,224	3.43%	1.62%	23.63%	1.20%	70.30%
New Cassel	8,419	0.64%	46.23%	46.74%	4.04%	2.34%
Kings Park	1,464	2.95%	0.33%	8.58%	0.47%	87.67%
Long Beach	8,177	4.33%	12.25%	25.17%	5.10%	53.14%
Islip	2,986	0.99%	1.93%	6.92%	1.06%	89.10%
Patchogue	3,676	0.04%	5.57%	44.26%	0.66%	49.47%
All Service Areas	27,946	2.12%	18.66%	31.18%	3.07%	44.97%

CONCLUSIONS AND RECOMMENDATIONS

Block Groups are small samples of the population, generally between 600 and 3,000 people (U.S. Census Bureau). Large variations within the service areas and between the service areas provide farmers markets with a challenge to meet the wants and needs of their nearest consumers. If the markets aim to provide access to locally grown and healthy foods, the barriers to access for the surrounding community should be taken into consideration. The surrounding communities within one kilometer of the surveyed markets exhibited lower Median Household Incomes than surveyed shoppers and the six jurisdictions featured in the study. The surrounding communities were more likely to be in poverty than the six jurisdictions. According to the Cornell Cooperative Extension, two of the six markets, Garden City and Islip, do not appear to offer payment through SNAP. While these were the two most affluent areas, it was clear that portions of the service area populations in both Garden City and Islip would benefit from the acceptance of programs like Electronic Benefit Transfer (EBT). Given the large differences in those shopping at the market and those who live near the market, the aim and purpose of the markets does not appear to be serving the immediate community.

Based on preliminary findings, it is apparent that the 1,000 meter service areas surrounding each of the farmers' markets has a lower socio-economic status compared to the village or town that it is situated in. Further research into this pattern for markets across Long Island will be considered. Additionally, this pattern may not be coincidental as markets may be aiming to locate in more vulnerable areas in order to improve accessibility to healthy and locally sourced foods. The structures and aims of the markets, along with who their targeted costumers are, should be analyzed in future work.

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