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Characterization of Urban Agricultural Practices and Gardeners' Perceptions in Bronx Community Gardens, New York City.

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This study investigates urban agricultural practices in the community gardens in the Bronx, New York City, United States, due to their historical role of helping bring peace and a sense of community to areas that suffered from violence and social injustice. Through semi-structured interviews with the gardeners, visits to observe the gardens, and a spatial analysis of community socio-demographic characteristics using Geographic Information Systems (GIS), we characterize the community gardens visited, and survey the gardeners' perceptions regarding the benefits and challenges that are involved in the activity. The GISc analysis results showed that there is a much higher rate of poverty in block group populations living within a quarter mile of the community gardens and there is also a significantly higher Hispanic population in block groups living close to the gardens than those further away. The community gardens visited can be characterized as places where the activity of growing plants is a way to socialize within the community, a source of fresh vegetables and fruits, a way to beautify the neighborhood, and a place for education. Regarding the gardeners' perceptions, it was unanimous that in the garden they enjoy being together with family and community, appreciating nature, and receiving therapeutic benefits that gardening brings. However, some have spoken about their fears of losing the gardens, since they are still not protected by the City, and are prone to take-over by developers.

Keywords
ccommunity gardens, urban agriculture, New York City, Bronx, gardeners' perceptions, benefits and challenges, Geographic Information Systems (GIS), socio-demographic analysis.

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INTRODUCTION

Historically, urban agriculture (UA) has become more popular and widespread when social and economic problems intensify. UA provides not only food, but also therapeutic benefits and recreational and educational activities for the urban dwellers, as well as promotes inter-generational contact and community pride. According to Boukharaeva and Marloie (2006), the organization of urban and periurban areas has always reserved a place for urban agriculture since antiquity, but the concept of UA began to develop as a modern movement in the 1980s and 1990s, with the pioneering work of the Urban Agriculture Network supported by the United Nations Development Program (UNDP), which institutionalized the activity as "a distinct industry that needs to be recognized."

In many countries, UA is at the forefront of important social and environmental movements in urban neighborhoods. Examples of this may be seen in Cuba with the Urban Agriculture Movement (Aquino 2002); in Argentina with *huertero* – which means gardener worker (Terrilf et al. 2007); in Germany with *ökologische Siedlung* - ecologic neighborhoods (D'avila 2007); in Holland (Pouw and Wilbers 2005); and in the United States (US) with the community garden movement (American Community Garden Association, 2010).

The community garden movement in the US has a long history that started with the nation's first organized city gardening program established by the Mayor Pingree of Detroit, which began in the early 1890s when the country was in an economic depression. Omaha, Baltimore, New York City (NYC), Philadelphia, and Chicago were among those US cities that thought highly of Mayor Pingree's plan and started their own vacant lot gardening programs. When the economy improved and people could find work again, these cities then tended to abandon their vacant lot gardens. The areas were used during economic downturns and essentially forgotten in more prosperous times. For instance, in 1914, with the start of World War I, "Liberty Gardens" appeared; in the 1930s with the Great Depression, and later during World War II gardens were again planted. In the 1940's, the National Victory Garden Program encouraged people to plant gardens as a way of showing patriotism and support for national war efforts. In 1944 40 percent of the fresh vegetables grown in the United States came from Victory Gardens. In 1945 the war ended, and once more urban gardening died away (Huff 1990; von Hassel 2002; Saldivar-Tanaka and Krasny 2004; Quattebaum 2004).

However, in the 1960s and 1970s, informed and sensible people became concerned about land use, air, and water pollution, especially within cities as New York (Huff 1990). Community concern brought about discussions regarding ecology and the environment. Once again the community garden movement gained attention, and these two decades provided much of the ideological impetus behind the present-day movement. The Civil Rights movement also spawned a generation of pioneer community organizers with an increased emphasis on housing, labor, and the environment (von Hassel 2002).

During the financial crisis of the 1970s, many parts of NYC suffered, and existing public vacant land and new land acquired by the City through landlord abandonment and foreclosure proliferated. Abandoned buildings dotted the landscape, especially in some Manhattan

neighborhoods (such as the Lower East Side, Hell's Kitchen, and East Harlem), and in major portions of the Bronx, especially the South Bronx, many abandoned buildings were torn down or fire-damaged (NYC Department of Parks & Recreation 2011).

There have been many changes in these neighborhoods starting in the 1980s, and the community garden movement in NYC has been growing since that time. Gardening has taken on multiple roles in the promotion of physical, economic, environmental, and cultural health. These roles are particularly important in light of urban sustainability issues and environmental justice concerns, such as differential access to open space, recreation, and the availability of fresh produce in poorer communities. Their function goes beyond food production itself - the gardens have an interdisciplinary role in "promoting a sense of place or focus for communities that often have little access to safe parks or recreational space within their neighborhoods. Further, they create a center for cultural and educational activities," (Maantay 2001a). The Bronx has about 175 community gardens administered by Operation Green Thumb (Weissman 1995) plus a number of community gardens operated by non-profit entities, such as the New York Restoration Project, the Trust for Public Land, and community gardens on private property (Maantay 2001a). Because of the variety of ownership of the community gardens, and the lack of a master list of all the gardens, it is difficult to get an exact current count, but it is believed that the number of community gardens in the Bronx has remained relatively stable over the years, with some being lost to the developers' bulldozers, while on the other hand new gardens have been created (Gittleman et al. 2010).

In light of the contentious history of community gardening and the importance of the gardens to community-building, the scope of this work is to describe and characterize the community gardens in the Bronx (throughout semi-structured interviews, visits, and GIS analysis), and survey and discover the gardeners' perceptions (throughout semi-structured interviews) regarding the benefits and challenges that are involved in the activity. The Bronx was chosen because it demonstrates a history of urban problems, such as poverty, violence, and social differences; but despite these obstacles, its residents showed how it is possible to change the scenario through community efforts, including the community gardening program. Other studies also highlight the importance of community gardening to the population of NYC; however, few have focused only on the Bronx neighborhoods, by characterizing in detail these community gardens. It is believed that the work brings fresh data through interviews with the gardeners, and a spatial analysis of community socio-demographic characteristics using Geographic Information Systems (GIS). These results may provide direction and underpinnings for future research work on urban agriculture within New York City and beyond.

In addition, this research, which highlights the community gardens of the Bronx, New York, is one aspect of a larger study. A multiple-case study comparing different urban realities: the Bronx, NYC, and the Fanny community, located in Curitiba, PR, Brazil, where the study targets urban agriculture as practiced in home gardens.

A SNAPSHOT OF THE BRONX: POPULATION, GEOGRAPHY, AND HISTORY

The Bronx is the northernmost of New York City's five boroughs, located northeast of Manhattan, and the only part of NYC on the mainland of the US. In the year 2010, the US

Census Bureau estimated that the Bronx's population was 1,385,108 (US Census Bureau 2011). On average, the Bronx is the least affluent of NYC's boroughs, and the one with the highest "minority" population. About 88.9% of the population is considered to be "minority," (African-American, Hispanic of any race, Asian, American Indian, Pacific Islanders, Other, and multi-race people) with only about 11.1% of its population being Non-Hispanic White. The South Bronx lies within the poorest Congressional District in the nation (The Bronx History 2010; US Census Bureau 2011).

During the 1960s and 1970s the Bronx became a national symbol of urban deterioration. Neighborhoods that had held generations of Bronx families disintegrated due to waves of arson, crime, and housing abandonment, with solid blocks of brick apartment buildings "turning into rubble-filled empty acres" (Gonzalez 2004). In the 1970s, the South Bronx became the icon of North America's urban crisis of unemployment, slum housing, and poverty. Persistent arson in the city's public and privately owned housing was a major symbol of these problems, and became known as "The Burning of the Bronx" (Gonzalez 2004). However, with the guidance of determined community leaders and some innovative federal programs, many burned-out tenements were replaced with single and multifamily housing during from the '70s to the present, such as the Charlotte Street low-density housing project, which was in an area that had come to symbolize urban blight in the aftermath of the fires; (Gonzalez 2004; Yardley 1997).

The Bronx is also well-known for the "white flight" and extreme demographic shift that occurred from the 1950s through the 1970s. The South Bronx, in particular went from being two-thirds Non-Hispanic-White in 1950 to two-thirds African-American and Hispanic by 1960. Forty years later, by 2000, the population of the entire borough was almost completely black and/or Latino (Gonzalez 2004), and according to the last US Census (2010) 53.8% of the Bronx population is Hispanic or Latino and still rising, while the African-Americans constituted 30.1%. Much of the Bronx is dominated by one "majority group": Hispanics/Latinos" (US Census Bureau 2012).

The Burning of the Bronx happened predominantly in the South Bronx. According to Gelman (2007) outmigration of more affluent city residents left the neighborhood with poorer tenants, shrinking rent rolls to support repairs and rising fuel costs, and diminishing populations to demand city services. Buildings suffered from owners' absence, tenants' alienation increased and empty buildings became target for vandalism. As a response some landlords decided to burn their buildings and profit from the insurance payments they received, rather than continue to pay property taxes and invest in maintaining properties that they felt were not profitable enough. Many people blamed the insurance companies: their policies of refusing to underwrite home insurance in sections of the city that were no longer majority white, and refusing to renew insurance coverage on properties in those areas (a practice known as "redlining") might have encouraged the landlords and residents' behavior to burn the buildings.

Redlining practices also extended to the common place of banks refusing to give mortgages for properties in certain neighborhoods within the "red lines," which generally designated areas on the map that were primarily populated by minorities (University Neighborhood Housing Program, 2012).

The consequences for the Bronx residents were devastating, as detailed by Wallace and Wallace in their 2001 book *A Plague on Your Houses: How New York Was Burned Down and National Public Health Crumbled.*

> Less than a decade later (after the mid-1970s budget crisis), the South Bronx had lost 43,000 housing units, the equivalent of four square blocks a week. Thousands of vacant lots and abandoned buildings littered the borough. Between 1973 and 1977, 30,000 fires were set in the South Bronx alone. In 1975, on one long hot day in June, 40 fires were set in a three-hour period. These were not the fires of purifying rage that had ignited Watts or a half dozen other cities after the assassination of Martin Luther King Jr. These were the fires of abandonment. (Wallace and Wallace 2001).

After the destruction of many buildings in the South Bronx, the arsons slowed significantly in the latter part of the decade, but the after-effects were still felt into the early 1990s (Oser 1990). The Bronx also had become a convenient dumping ground for many of the city's noxious facilities, including waste transfer stations and sludge processing plants, as well as being the home of some of the most heavily trafficked highways in the nation (Maantay 2001b; Maantay 2002).

Citizens of the Bronx started to become involved in various community reform efforts due to this wave of social crisis, such as the community garden movement. Many African-American people in the Bronx came from rural areas of the nation's southern states. They grew up on farms, and they knew a lot about agriculture (Stack 1996; Zeiderman 2006). Life changed dramatically for migrants who made the journey to the northern cities such as NYC, and they brought a social and cultural history that would prove important to the development of community and identity (Zeiderman 2006). Since many Latino/as in the Bronx also came from rural/agricultural backgrounds in Puerto Rico, Dominican Republic, Cuba, and Mexico, and much of the Bronx's significant Afro-Caribbean population from Jamaica, Trinidad, Guyana, etc., also had farming roots, such characteristics helped them to get involved in community gardening.

Meanwhile, a nonprofit environmental group dedicated to preserving urban gardens, the Green Guerillas, founded by Liz Christy in 1973, started to throw "seed bombs" packed with fertilizer, seed, and water over fences around vacant lots, where access was otherwise limited in an attempt to beautify some of these places. This move not only beautified formerly vacant lots but soon became a grassroots program that fostered neighborhood participation (NYC Department of Parks & Recreation 2011).

Some other institutions were also responsible for building this contemporary community garden movement, not only in the Bronx but throughout the entire city. Hattie Carthan established the Magnolia Tree Earth Center, an environmental/cultural institution listed on the National Register of Historic Places (Magnolia Tree Earth Center 2011). Mollie Parnis also encouraged volunteer efforts by rewarding neighborhood clean-ups and beautification projects. In addition, in 1976, the Cornell University Cooperative Extension was chosen by the US Department of Agriculture to implement the pilot Urban Agricultural Program to provide New Yorkers backyard and community gardeners with horticultural expertise and assistance. All these

initiatives led to the creation of Operation Green Thumb within the NYC Parks Department in 1978 (Weissman 2005).

Today Operation Green Thumb is the largest community garden program in the nation and provides programming and material support to over 500 community gardens in NYC. Workshops, which are the access point for supplies, are held every month of the year, covering gardening basics to more advanced farming and community organizing topics. Operation Green Thumb gardens are located in all five boroughs in the city. Some are green spaces meant for relaxation and as a community meeting space, others are full–fledged farms, and many are a mix of the types. The volunteer gardeners are the backbone of the program and are of diverse ages and backgrounds (Green Thumb 2012).

In the 2000's the Bronx has livable neighborhoods again, crime is down, and land is in demand. Local housing advocates continue to build affordable rows of owner-occupied attached homes wherever they find space and funding, even fighting for control of community gardens (Gonzalez 2004).

The conflict between gardeners and real estate developers escalated with Mayor Rudolph Giuliani, who permitted the bulldozing of some of the community gardens during his time in office (1994-2001) in order to allow private developers to build housing and other types of development on the land occupied by the gardens (Hernandez 2010; von Hassel 2002). The fact that this development was primarily luxury housing; added insult to injury, the new units were not intended to be affordable (nor *were* they affordable) to neighborhood residents. Yet in many cases the community gardens were responsible for improving the neighborhood so much so that developers were interested in investing there. In some cases, the new housing developments had the unfortunate effect of gentrifying the neighborhoods to the point that the original residents could no longer afford to live there at all. A number of strategies were employed by gardeners and the gardens' friends (communities and non-profit organizations) in the struggle to keep the community gardens alive, such as legal and legislative efforts, outreach and media campaigns, and direct actions. The community gardeners started to file lawsuits in 1997, and the most prominent one was brought up by District Attorney General Elliot Spitzer. The Spitzer lawsuit contends that the gardens should be declared parks and they should not be treated on a case-by-case basis, but rather a proper environmental review process must be conducted to conserve and protect all of the existing community gardens (von Hassel 2002).

The agreement was firmed up with the state attorney general to protect 198 gardens in 2002, but it expired on September 17th, 2010. The Bloomberg administration already released new rules that aim to preserve 282 community gardens in the city. But the response from garden advocates was mixed, and some said they wanted clearer guarantees that the garden lots would not be turned over to developers. The rules, which went into effect on October, 2010, replaced the 2002 agreement (Hernandez 2010). The Bronx also has community gardens administered by non-profit entities, such The Trust for Public Land, which is another way to protect these areas, and some residents still maintain gardens on private land. (Maantay 2001a).

Regarding Bronx demographics, the 2000 US Census showed that the educational attainment of people in the Bronx over 25 years old was the following: 25.8% had finished high

school, 21.9% had attended 9th to 12th grade but didn't get their diplomas, and 16.4% had attended a college but without completing their requirements. It was also noted that 31.8% of the population aging between 21 and 64 years had some type of disability, 56.6% of the employed population have an earned incomes between $15,000 to $75,000 a year, and 20.5% with less than $10,000 a year, the per capita income in 1999 was $13,959, the median household income in 2004 was $28,173 and the percentage of persons below poverty level in 2004 was 28.4%. (US Census Bureau 2010). The last US Census (2010) showed some small changes for the Bronx population: 68.8% of the population graduated from high school and 17.6% had a bachelor degree or higher, the per capita income was $ 17,575, the median household income was $34,264 and the percentage of persons below poverty level was 28.2%. These data indicate that the Bronx's population is still struggling compared to the rest of New York City regarding educational attainment levels (84.4% with high school and 32.1% with bachelor degree) and income (per capita income $ 30,938 and median household income $55,603) (US Census Bureau 2012). This relative lack of affluence compared to New York City as a whole has ramifications on the use and meaning of community gardens in the Bronx.

DATA AND METHODS

Empirical Data Collection

Firstly, a research plan for this work was submitted to the Institutional Review Board (IRB) of the Faculty Lehman College/City University of New York (CUNY), the institution with which the co-authors have their primary affiliation while conducting this study. After review by the IRB and necessary corrections as recommended, the research plan was approved. The study was conducted through semi-structured interviews with the gardeners and by visiting and observing community gardens in the Bronx during 2009-2010. The analyzed domain was a self-selected sample (only the gardeners that accepted the invitation were interviewed) out of the 93 active non-school community gardens listed as being under the jurisdiction of the NYC Park Department's Operation Green Thumb. All of the 93 gardens were reached either by phone or personally, but not all of them were included in the study; only 40 gardens were visited and 77 gardeners were interviewed. Some gardens were closed or deactivated by the time the study was conducted, in some of them, the gardeners were not interested in participating in the study or in some of them, for various reasons, the gardeners could not be interviewed. All the interviews were conducted in person; some were done in English and others in Spanish. The researcher did not record the interviews; but all the answers and notes were written up on the interview instrument.

The self-selected sampling technique was chosen due to its quickness, effectiveness, and relative easiness to conduct. However, it is well-known that the type of participants who volunteer may be more motivated to take part in the study than interviewees selected at random. Nevertheless, it is a popular technique applied in different areas of scientific research that requires human subjects, and was also recommended in informal conversations with persons involved with community gardening studies, due to the difficulty in accessing the gardeners and getting them to spend time participating in the study.

The interview with the gardeners contained questions about the socio-economic characteristics of the gardeners; garden structures; facilities; size and age of the gardens; benefits and meaning of the gardens for the gardeners; and issues facing the existence of the garden. Even though the interviews were open-ended (semi-structured), the researcher tried to conduct them like an informal conversation, being an attentive listener, showing interest, understanding, and respect for what the subjects said (Kvale 1996), so gardeners could feel more comfortable talking about their lives and relationship with the garden to the interviewer. Semi-structured interviews were chosen, because they can have a sequence of themes to be covered, but at the same time there is openness to changes of sequence and forms of questions in order to follow up the answers given by the subjects (Kvale 1996), which also helps the interviewees in getting more comfortable sharing their experiences with the researcher.

The interview instrument (Appendix 1) was based on the pilot study about the role community gardens play in enhancing social capital and fruit and vegetable consumption in the Bronx, conducted by Professor Yasmin-Mossavar Rahmani (Mossavar-Rahmani et al, unpublished study 2009).

Survey Data Analysis

The quantitative variables, such as age, education attainment, profession, number of people in the family, birthplace, monthly income, how long gardeners had been living in the neighborhood, how far they lived from the community garden, how old the community garden was, the size of the community garden, etc., were summarized and transformed into percentages. The qualitative variables, including the benefits of growing plants, how a person became a member of the garden, how many members the garden had, how the children and the teenagers used the garden, how many months a year the garden was active, if gardening activities took place during the winter, the most important purposes of the garden for the community, what kind of challenges gardeners felt the community garden faced, etc., were grouped together into similar responses, summarized, and transformed into percentages, as well.

Analysis of Bronx Socio-demographic Characteristics Using GISc (Geographic Information Science)

This study also includes a basic Geographic Information Science (GISc) analysis of the socio-demographic characteristics of the populations living close to the Bronx community gardens, as compared to a reference population (people not living close to a community garden). Using GISc, socio-demographic population characteristics such as race, ethnicity, income, and educational attainment were measured at the U.S. Census block group level for all Bronx block groups, and these block groups were then separated into two categories of near and far (defined as having good or poor access, respectively). Near, or proximate block group populations were determined using a standard GISc buffer approach, where a constant radius of one quarter mile was used to include all block groups within a quarter mile of each community garden. One quarter mile equals approximately 5 city blocks, considered to be reasonable walking distance. Since most of the community gardeners live in areas where vehicle ownership is quite low, it was assumed that most people would be walking back and forth between their homes and their

gardens, and therefore would want the gardens to be in close proximity to their homes, even more so for the very young and older gardeners.

The proximity analysis using the buffer approach simply overlays a perfect circle with a radius of one quarter mile directly over the community garden location (where the community garden becomes the centroid of that circle). The inverse of this selection was used to determine block group populations that are far from community gardens, or that have poor or no access. The method used to select the block groups within the buffers was a manually-adjusted "Intersect," by which all block groups with a majority of their area within the buffers were selected as being "within the buffers," and those block groups only very partially within the buffers were excluded from the selection. Block groups with no part of their area within the buffers were obviously also excluded from the "within the buffers" selection.

Once near and far block groups were determined, descriptive statistics were used to determine the breakdown of socio-demographic populations both near and far from community gardens, and ultimately these two groups were compared. Block groups with a population less than 250 were omitted from the analysis.

The socio-demographic data was mapped using a manually-adjusted Natural Breaks classification, (Jenk's Optimization algorithm). This method of creating class ranges was thought to best represent the true spatial variation of the data, making spatial patterns easiest to see - retaining intra-class homogeneity while emphasizing the inter-class differences.

The socio-demographic variables that were mapped were all derived from the US 2000 Census data, and used the standard Census definitions. The definition of "poverty level" used in the GIS analysis is the one given in the US 2000 Census. "Following the Office of Management and Budget's (OMB) Statistical Directive 14, the Census Bureau uses a set of money income thresholds that vary by family size and composition to determine who is poor." For instance, in the year 2000, a single-parent household with three children under the age of 18 would be considered below the poverty line if their before-tax income was less than $17,463, not including non-cash public assistance, such as public housing, food stamps, Medicaid, etc. (Dalaker 2001). One drawback to using this definition of poverty for an analysis in NYC is that the poverty thresholds do not vary geographically throughout the United States, and in areas like New York City, where living expenses are much higher than in many other parts of the country, the percentages of households living below the poverty line could be seriously underestimated when using the nation-wide thresholds.

RESULTS AND DISCUSSION

GISc Analysis of Community Gardens and Their Proximate Populations

The GISc analysis reveals some interesting results. There is a much higher rate of poverty in block group populations living within a quarter mile of the community gardens than populations living outside of the quarter mile buffer (Figures 1, 2 and 3).

There is also a significantly higher Hispanic population in block groups close to the gardens than those further away (Figure 4), and conversely, there is a high non-Hispanic white population living beyond a quarter mile of the community gardens (Figures 4 and 5). A large portion of the population living in block groups within walking distance to the community gardens did not finish high school (Figure 6).

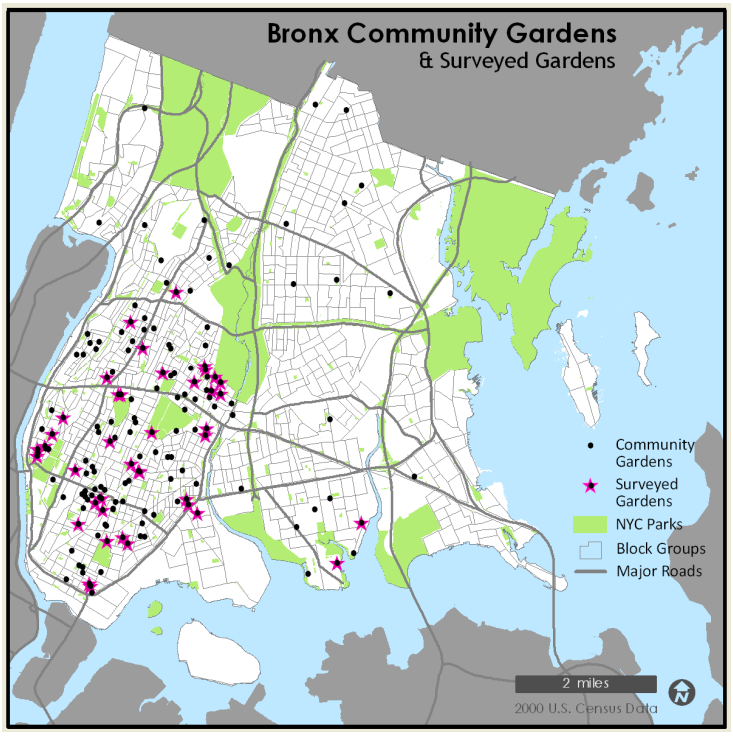

Figure 1. Map showing the locations of all the NYC Operation Green Thumb community gardens in the Bronx and the community gardens which were surveyed for this study.

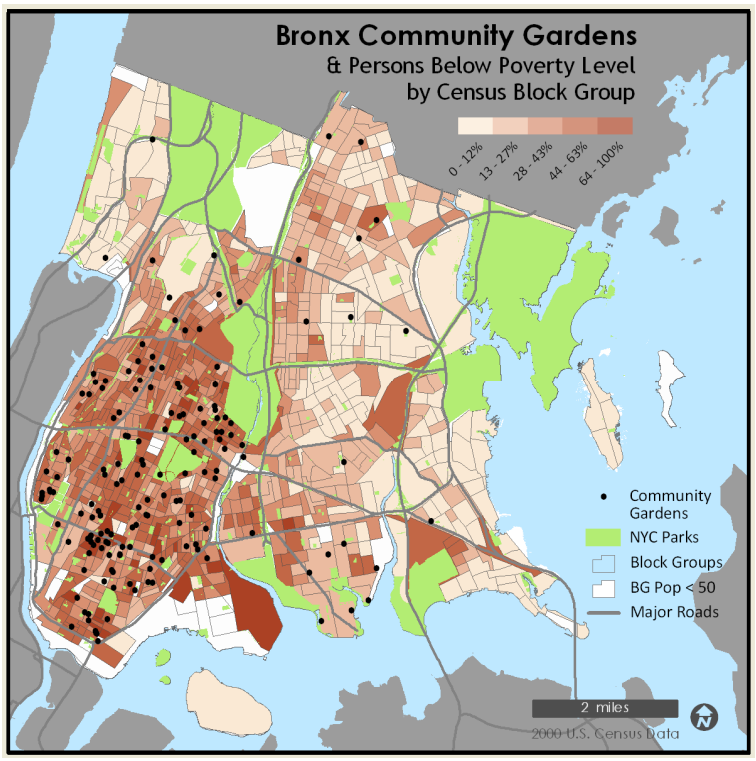

Figure 2. Map showing the percentages of Bronx population below the poverty level, according the 2000 US Census Data, in relation to the location of the Bronx community gardens.

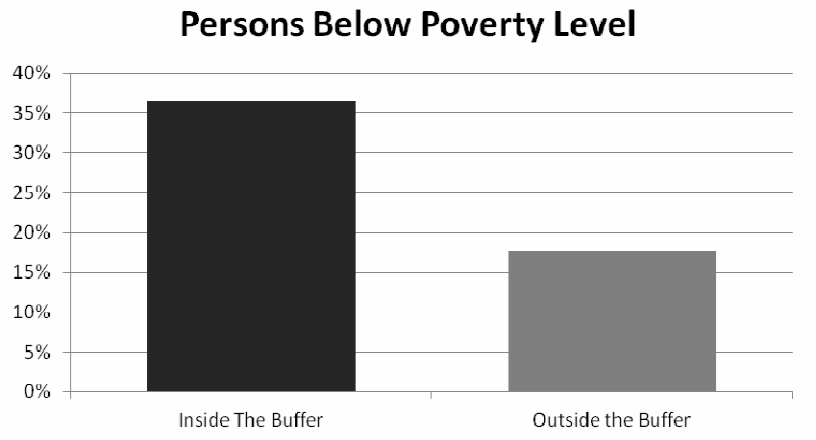

Figure 3. The percentage of population in Poverty of the Bronx, NYC, according the 2000 US Census Data. "Inside the Buffer" refers to the population residing in block groups within a ¼ mile of a community garden, and "Outside the Buffer" refers to the population residing in block groups that are not within a ¼ mile of a community garden.

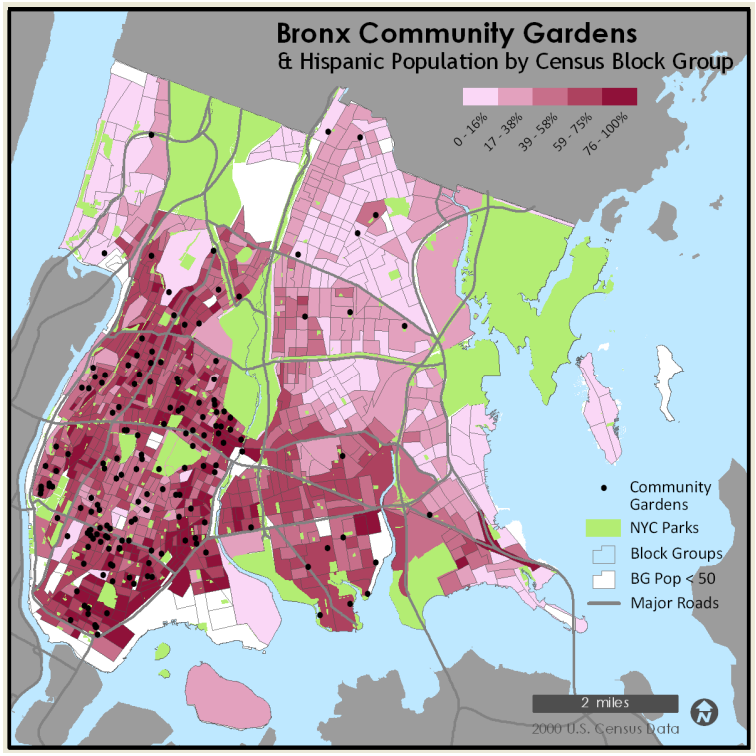

Figure 4 Map showing the Bronx Hispanic Population, according the 2000 US Census Data, in relation to the location of the Bronx community gardens.

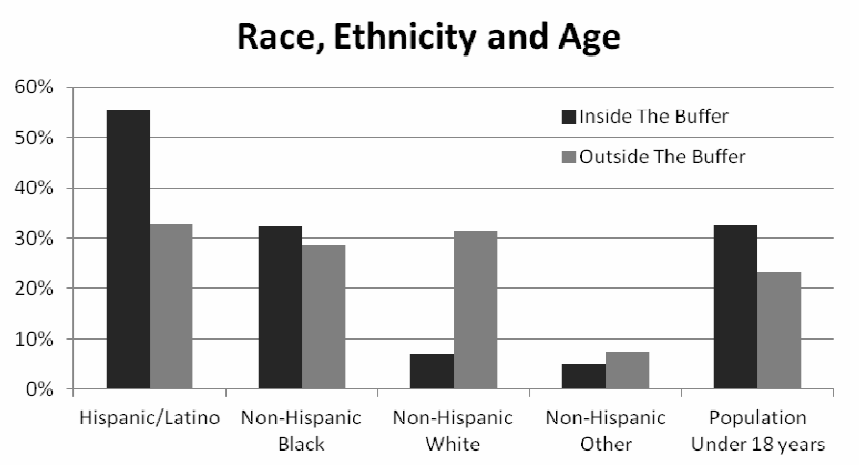

Figure 5 Bar graph showing the percentages of race, ethnicity, and age of the populations within ¼ mile of the community gardens in the Bronx ("Inside the Buffer") compared to populations further away from the community gardens ("Outside the Buffer"), according the 2000 US Census Data.

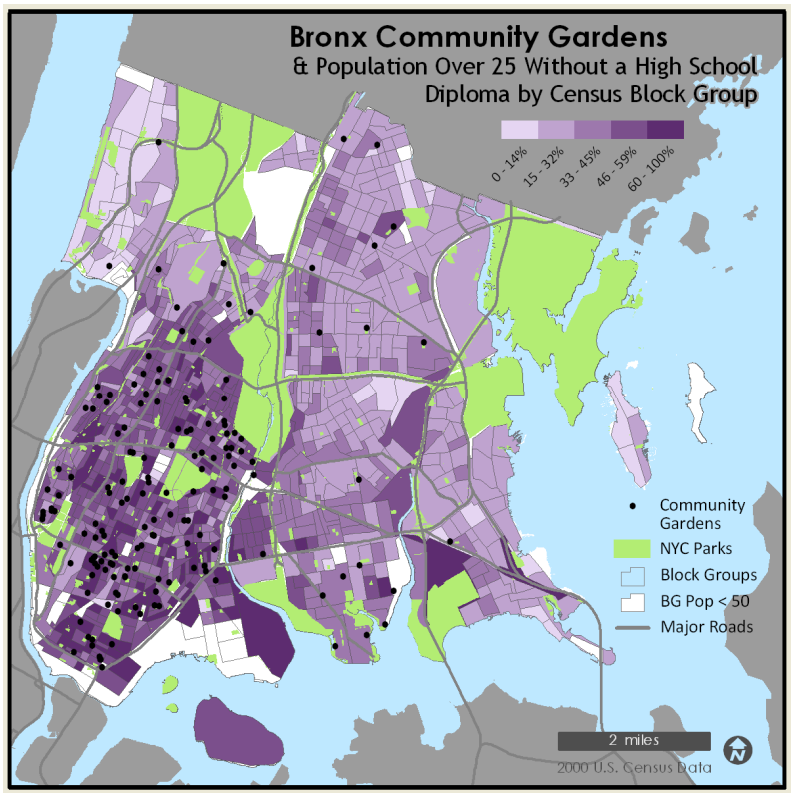

Figure 6 Map showing the Bronx Population over 25 years of age with no High School Diploma, according the 2000 US Census Data, in relation to the location of the Bronx community gardens.

These GISc findings suggest that lower socio-economic status (SES) populations and minorities tend to have better access (live closer) to community gardens than higher SES populations and non-minority populations. This may reflect the fact that most of the available vacant lots now used as community gardens were found in neighborhoods that experienced wholesale landlord abandonment and City take-over of properties in the past. The implications of this remain largely unexplored, but it is hypothesized that the prevalence of community gardens in these less affluent and more minority neighborhoods might in some way mitigate the existence of "food deserts." Food deserts are areas without adequate access to healthy food choices, often occurring in areas where large supermarkets do not locate, perhaps because of perceptions of crime and non-profitability on the part of the business managers of the chain stores. Many of these neighborhoods not only lack supermarkets, but also places from which to buy fresh produce, meat, seafood, and which have a good selection of low-fat or low-sugar food alternatives, such as farmer's markets, fruit and vegetable stands, and health food stores. They also tend to be areas having high access to fast food restaurants and other manifestations of unhealthy or extremely limited food options. The food desert neighborhoods are typically the less affluent and more minority communities, making this an environmental health justice issue (Galvez et al 2008; Kirkpatrick et al 2010; Larson et al 2009; Morland and Filomena 2007; Morland et al 2002; Sharkey et al 2009; Smoyer-Tomic et al, 2008). Recent critiques in food justice argued that urban garden programs, such as community gardening, can fill the gaps left

by the lack of interest from private capital and the reductions in government investment in these neighborhoods (McClintock, 2008).

The gardens also serve to mitigate the lack of access to major parks and open spaces in many of the neighborhoods that have community gardens, thus partially negating the environmental health justice effects borne by many communities of color and the less affluent of having lower access to public active and passive recreational land uses and natural areas, as well as having fewer backyards. Previous studies (Estabrooks et al. 2003; Wolch et al. 2005) have found that lower-income residents and non-white residents have access to fewer parks and physical activity sites.

Accordingly to The Open Space Index Report (2009) northern neighborhoods of the Bronx have an excellent open space provision (more than 2.5 acres per 1000 residents), but the report recognizes that, for example, many residents of the neighborhoods surrounding Pelham Bay Park in the Bronx are not within walking distance of that very large park, and may not have access to its recreational opportunities. Additionally, other research has shown that although the Bronx on average has relatively high park acreage per 1,000 population, many Bronx neighborhoods are not near major parks or open space, although there might be playgrounds or small vest-pocket parks within walking distance. "[In New York City,] populations living near the smallest parks are disproportionately represented by Latino residents, while populations living near large parks are overrepresented by non-Hispanic white residents and underrepresented by Asian and Latino populations," (Miyake et al, 2010). A survey conducted by Operation Green Thumb reported that 38% of the respondents from Bronx community gardens indicated that there were no alternative open spaces, whatsoever, available in their neighborhoods (Nemore, 1997), thereby reinforcing the importance that the community gardens have in these communities.

Characteristics of Gardeners Interviewed

The gardeners interviewed (n=77) from the community gardens that had been visited (n= 40) were: men (51%) and 49% women, the majority aged up to 50 years old (74%); 52% have only high school education; and 71% come from the Caribbean (Puerto Rico, Dominican Republic, and some from Jamaica) (Figure 7).

Figure 7. Latino gardeners in a community garden in the Bronx, NYC.

Gardeners' origins showed similar percentages from the countryside (32%) and city natives (35%); the remaining interviewees (33%) did not state their region origins. This result shows us that not only are people from the countryside maintaining their plant growing traditions, but also that urban people are getting more involved with gardening activities. Some of the gardeners' statements reveal their attachment to the gardens, and the recognition of the gardens' importance and benefits to the gardeners : "Here in the garden we can experience nature in the middle of the Bronx"; "*Me encanta el verde, las plantas son mi vida*" (I love the green, plants are my life); "It's an opportunity to grow our own food"; "The garden beautifies the community and helps to keep the violence controlled, because people have a place to go." This fact is well-documented by many researchers who have been studying the phenomenon in various cities all over the world (Dresher et al. 2000; Zeeuw et al. 2000; Boukharaeva et al. 2005; Mendonça et al. 2007); they suggest that urban agriculture increases the access to fresh food and green spaces and also decreases violence, especially through the community gardens at the local level (Irvine et al. 1999; Holland 2004; Carter 2006).

Thirty-six percent of the interviewed gardeners from the Bronx are employed, but we also see a significant number (27%) of retired people getting involved. Long time Bronx residents, those who have lived in the Bronx more than 30 years, account for 57% of the total. This fact can be correlated with historical aspects, mentioned previously, when **c**itizens of the Bronx started to become involved in various community reforms efforts due to the wave of social crisis, such as the community garden movement. Many African-Americans and Caribbean immigrants grew up on farms. One of the interviewees stated that he experienced for himself this historical change in his neighborhood: "After the Burning of The Bronx, that happened in the end of 1970's and beginning of 1980's, the community in the Bronx started the community movements. A lot of people (African-Americans) in the Bronx they came from the south of US. We grew up in farms. So we know a lot about planting, that's why we started the community gardens movement against all those problems". Von Hassel (2002) also described a similar context for community garden initiatives based the urban and immigration history of the Lower East Side of Manhattan, where the community experienced extreme fluctuations in population density, industrialization, waves of investment and disinvestment and the gentrification process. This especially affected

the Puerto Ricans, to whom community gardens have been provided a sense of control over their lives and staking a claim to the neighborhood (von Hassel 2002).

This finding also suggests that the community garden plays an important role in perpetuating political activism among the young people by sharing experiences and listening to oral history from the elderly on how they struggled with community problems, inequality, and injustices in the past. The garden represents one of the most effective means of disseminating cultural heritage within the family or the community. Many adults are able to transmit knowledge to children and grandchildren, through recounting stories about the past (Boukharaeva et al. 2005). The community garden therefore supports other activities that generate social connection, in particular inter-generational linkages, in addition to transmitting culture and knowledge.

About 75% of the interviewees live near their community gardens - less than 4 blocks away. This helps to support the rationale for choosing ¼ mile (about 5 blocks) as the threshold distance of "near" or "not near" the gardens, for the socio-demographic analysis in GISc. Since 71% of the gardeners interviewed come from the Caribbean, this information matches up with the results of the GISc analysis, which showed a significantly higher Hispanic population in block groups close to the gardens than those further away (Figure 4) and minorities tend to have better access (live closer) to community gardens than non-minority populations. This suggests that the garden can be a "kind of extension" of their own houses; the community garden can work as their own backyard, due to its proximity, emphasizing its importance for the community, or as in the gardener's words about the purposes of the garden: "A place like home"; "Me siento en mi propria casa" (I feel at my own home). As mentioned earlier, the reason that the gardens function as extensions of home is due in large measure to the fact that the gardens are typically within easy walking distance to the gardeners, many of them being within a few blocks of the gardeners' homes. Typically the gardeners do not live in single-family homes with backyards, but in multi-family apartment buildings, so the gardens take on an even greater importance in these areas.

Regarding the gender role played in the community gardens visited, we see a more balanced involvement of those practicing urban agriculture (51% of active gardeners were men and 49% were women). Contrary-wise, Saldivar-Tanaka and Krasny (2004) found few women gardeners in their study of 20 different Latino community gardens in NYC. However, in the present study the results demonstrate that not only do women have an important role in implementing UA, but men also appear to be involved in community gardening in order to feed their families; promote an urban environmental education (Krasny and Tidball 2009); beautify the community; and to help to decrease the crime and violence on the community's streets by keeping the teenagers participating in a healthier activity and out of trouble (Baker 1997 cited by Armstrong 2000). One of the interviewees said that his wife does not like gardening but she loves when he comes back with some vegetables for cooking.

Boulianne (2001) correlated the women's role in UA with the "female empowerment" that can be obtained from community gardening, being interveners, producers, and consumers of literally the fruit of their own efforts. They also can socialize and discuss their thoughts about politics and rights, and build a strong food and nutritional sovereignty for their community.

Nonetheless, in the Bronx the male gardeners also appeared to perceive the garden as a place not only to hang out, playing dominos, cards, etc., but also a place to discuss their thoughts, and for the Hispanics and other immigrants to remember their home countries, as one of the gardeners said: "The community feels like they are in Puerto Rico coming to the garden."

Garden Characteristics and Uses

The 40 community gardens studied in the Bronx have a large variation in size: 30% of them have less than 500 m^2, 20% have between 501 - 1000 m^2 and the remaining 50% possess more than 1000 m^2. How the land is gardened also varies: some gardens share all their land in common with their members (47%) and some – in addition to sharing - have private plots (45%), which they call "box beds", usually for vegetable growing. The most common plants grown by the gardeners are vegetables (68%); 23% of them cultivate mainly flowers; 5% grow flowers and vegetables in approximately the same amounts; and 4% have mostly trees in the garden. Some of the vegetables typically grown include tomatoes, "*jalapeño*" peppers (*Capsicum annum* L.), "*gandules*" beans (*Cajanus cajan* (L.)), "okra" (*Abelmoschus esculentus* (L.) Moench), "*cilantro*" (*Coriandrum sativum* L.), and "*yerba buena*" (*Mentha nemorosa* Willd.) – produce which is all very appreciated by the Latino gardeners. Some gardeners from Mexico also showed a strong relation between the gardening activity and cultural traditions observed by the cultivation of homeland herbs and other plants like: "*pipicha*" (*Porophyllum tagetoides*), "*papalo*" (*Porophyllum ruderale*), "*chipilín*" (*Crotalaria longirostrata* Hook. & Arn.) and Mexican tomato (*Physalis philadelphica*). Roses, tulips and daffodils are featured in many gardens. Only six community gardens visited sell their produce in the farm markets located in the community.

The activity of growing vegetables is not only a way to provide one's family with healthy food, but it is also, an instrument of socialization which flourishes by the sharing of the harvest. Zeeuw (2004) discusses how urban agricultural projects not only result in food and income but also in a higher self-esteem amongst the gardeners, enhanced self-management capacity, and more interactions with respect to other actors in the urban society, resulting in enhanced capacity-building for the community. Martin et al. (2001) also affirm that frequently the importance of the intangible benefits from the UA (social bonds, greening open spaces, etc.) is recognized, but usually these less tangible benefits are excluded from the total economic value of UA.

All 77 gardeners interviewed say they share their harvest, usually with friends, neighbors, people from the community and other members of the garden. They supply the gardens with donations and buy any materials needed by them (55%). Sources of donations come from non-profit organizations as Operation Green Thumb - which sponsors most of the gardens in the Bronx - Bronx Green-Up (New York City Botanical Garden), New York Restoration Project, and the Coalition of Gardens Group. They also receive donations from the community, churches, and schools. A few gardens belong to The Bronx Land Trust organization.

Approximately 72 % of the gardens operate only by volunteerism. The remaining survive with a combination of volunteerism and member fee charges. Of the gardens visited, about 67% have 10 to 20 active members that work as gardeners; all the others members are so-called

"friends" of the garden. These active members are evenly split between men and women in about one quarter of the gardens; in 30% of the visited gardens, men comprise the majority, and in 22% of the gardens, women outnumber the men (22% of the visited gardens did not provide their gardeners' gender composition). Most of these active gardeners (63%) are either under 35 years old or seniors (above 65 years old). Saldivar-Tanaka and Krasny (2004) also found that seniors are the most active members of the Latino community gardens of NYC; however they highlighted that children and teenagers are the most common friends of the garden. In the Bronx this appears to be the same: only one gardener mentioned that the children and teenagers are active members of the garden, but almost all of them remarked that children and teenagers enjoy visiting the garden. Most of the gardens (72%) also run programs with the public schools or private schools from the community. However, some gardeners pointed out that although they have been trying to implement school programs, little interest has been shown from the schools. Previous literature supports the concept of the important role of the community gardens to promote interdisciplinary education, interracial interaction, and the mobilization of social capital (Krasny and Tidball, 2009; Holland 2004; Shinew et al. 2004), and these benefits should be explored by the local schools, with definite steps planned for implementation.

Benefits and Challenges

When the gardeners were asked about the benefits they have in their lives by participating in the community garden program, 90% of the gardeners answered that "decreasing stress" is a direct benefit from UA; followed by "neighborhood beautification" (88%) and "family health" (86%). Reinforcing these results, Armstrong (2000), studying community gardens in upstate, NY, wrote that the most common reasons reported by the coordinators for participation in community gardens were access to fresh/better tasting food, to enjoy nature, and because of health benefits, including mental health.

The gardeners' perception on how they benefit by community gardening varies from: "We can grow our own food"; to "Keep children away from street crime" and even "The community feels like they are in Puerto Rico coming to the garden". These statements indicate that they use the garden for other purposes besides growing plants. It was unanimous that the garden is a place where they get together with the family, enjoy nature, and receive some sort of psychological/spiritual therapy (Figure 8).

When visiting and observing the gardens the researcher noted that many gardeners used the place for meetings with the community such as festivities, praying, meditation, playing, singing, and also to discuss problems as violence, vandalism, and other community concerns. It was observed that for some gardeners these places are mainly places to hang out, but for most of the community they are multi-purpose, and their existence seems to be relevant regarding the community's sustainable development.

Figure 8 Women relaxing in a community garden in the Bronx, NYC.

Zeeuw (2004) reported that several cities in the US use community gardening projects as a way to upgrade certain neighborhoods by reclaiming open spaces that gradually have become informal dumpsites and that often are breeding grounds for drug dealing and other criminal activities, and turning them, with help of the surrounding households, into "gardens of hope" with vegetables, flowers and children's playgrounds. The author also mentioned that once the urban citizens have their needs covered, they may undertake gardening more for the physical and/or psychological relaxation it provides them, rather than for food production *per se*.

However, when gardeners were asked about the challenges they are facing to keep the gardens viable, most of them answered that they have problems with the maintenance of volunteers, vandalism, and the constant threat of potential eviction of the garden by the City. The lack of secure tenure and long-term protection of many community gardens was also pointed as a problem by Saldivar-Tanaka and Krasny (2004).

This problem still worries the gardeners ever since Mayor Rudolph Giuliani began evictions of gardens and this worry hasn't stopped with the new agreement released in October, 2010, replacing the 2002 agreement. This might be a long fight between "communities" and the "gentrification process" that is happening all over the big cities. The land access for urban agriculture activities has been reported as a barrier to its own development (Dresher et al. 2000).

"The community need not own the lot, but some form of secure land tenure is important for the longer-term survival of the scheme. Insecurity over tenure can often blight a community's development of a garden. Growers often plan for seasons ahead and may regard lack of tenure as a barrier to garden development "(Holland, 2004). Thus, this threat can often disrupt the gardener's motivation and decrease significantly the volunteerism.

CONCLUSIONS

The GISc analysis results showed that minorities tend to have better access (live closer) to community gardens than non-minority populations in the Bronx. The community gardens visited in the Bronx can be characterized as a place where the activity of growing plants is a way to socialize within the community, a source of fresh vegetables/fruits, a way to beautify the neighborhood, and a place for education. Regarding the gardeners' perceptions, it was unanimous that in the garden they enjoy spending time together with family and community, appreciating nature, and being in a pleasant place conducive to mental health promotion as well.

Nonetheless, some gardeners have spoken out about their fears of losing their gardens, since the City has not offered secure and long-term tenure to the gardeners for the land. It is clear that the community garden program is beneficial to neighborhoods, being a place where residents not only grow plants and contribute to community and individual health and the well-being of the urban environment, but also a place where they "feel at home". There is a strong need to enter into a discussion with all actors involved on how these places can be protected and how the community can raise volunteerism and diminish vandalism, by increasing the "sense of place" of the entire community.

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APPENDIX 1

Interview instrument used to interview the gardeners in the community gardens in the Bronx, NYC, US.

1. Year of Birth:
2. Education level:
3. Birthplace: ( ) countryside ( ) city ( ) USA ( ) other country
4. Profession:
5. How long have you been living in the neighborhood?
6. How old is your garden?
7. Can you tell me how far you live from the garden? Do you live within: 1 Block / 2 Blocks/ 3 blocks/ 4 or more Blocks
8. How large is your garden? (use blocks/feet/yards or acres to describe size.)
9. How is the land gardened? Private plots / Shared garden / Both
10. What structures do you have in your garden? Casitas/ Chairs / Benches / Trellis / Greenhouses / Tool sheds / Rainwater / Harvesting Tank / Other: please specify
11. Is the garden open to the public?
    If yes, how often is your garden open to the public? (Approximately, how many hours per week)

12. Which crop occupies the greatest percentage of your garden space? Vegetables / Fruit / Herbs / Flowers
13. What percent of your harvest do you sell? 0% / Less than 50% / Greater than 50%
14. Where do you sell your produce?
15. What percent of your harvest do you share/ give away? 0% / Less than or equal to 50% / Greater than 50%
16. To whom do you give it away?
17. Are there any rules or regulations on gardening methods?
18. Do you seek for information on how to proper grow these plants?
19. What benefits do you have by using the community garden?
20. How do you get the seeds, plants, dirty, amendment, fertilizers, etc?
21. Do receive any help of the following organizations? Which kind? Green Thumb; Bronx Green-Up/The New York Botanical Garden; Bronx Land Trust; New York Restoration Project; Coalition of Garden Groups; Church; School; Other: Green Guerillas, More Gardens! Fund, New York City Community Garden Coalition
22. How do you define a person as being a member of a garden?
23. Roughly how many active members does your garden have? Less than 10 / 11-25 members / 26-50 members/ Greater than 50 members
24. How do children and teens use the garden?
25. Is your garden associated with a school in the community (for example, do you offer field trips, classes, volunteer opportunities to a school)?
26. Which school do you work with?
27. How do adults and seniors use the garden?
28. How many months of the year is your garden active? Less than 4 months / 4-6 months / More than 6 months
29. What are the most important purposes the garden serves for your community?
30. What does the garden mean to you?
31. What, if any, challenges do you feel that the community garden currently faces?