

ABSTRACT

Title of Thesis:

INFILL FARM:
REVITALIZING URBAN LANDSCAPES FOR
FOOD PRODUCTION

Thesis Directed by:

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Lack of access to quality food, education, jobs, and housing have caused New York City's most deprived neighborhoods to have higher rates of obesity, unemployment, homelessness, and other concerns for the average American. Designing to combat food deserts, income inequality, and environmental concerns is achievable yet has not been implemented. The roofscape and open or abandoned lots of the city can be seen as millions of unused square feet, prime for development. The Food Hub in East New York is a community space for educating the public on the food they consume. Hands-on learning is possible and creates a stronger sense of community through the rituals around food production, preparation, and consumption. Construction, adaptive reuse, or retrofitting the city's infrastructure revitalizes these spaces, improves the lives of the locals, and strengthens the community.

INFILL FARM:
REVITALIZING URBAN LANDSCAPES FOR FOOD PRODUCTION

by

Daniel Ryan Peragine

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To everyone who helped me on this journey, thank you for your constant support and advice. Design and research are collaborative efforts and I hope this thesis inspires others as you have all inspired me.

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“Urban Agriculture Toolkit,” United States Department of Agriculture, accessed December 13, 2020, <https://www.usda.gov/sites/default/files/documents/urban-agriculture-toolkit.pdf>

“What Really Happens When a Grocery Store Opens in a ‘Food Desert’?”, New York University, last modified December 10, 2019.
<https://www.nyu.edu/about/news-publications/news/2019/december/what-really-happens-when-a-grocery-store-opens-in-a--food-desert.html>

Yvonne Hung. "East New York Farms: Youth Participation in Community Development and Urban Agriculture." *Children, Youth and Environments* 14, no. 1 (2004): 56-85. Accessed November 13, 2020. <http://www.jstor.org/stable/10.7721/chilyoutenvi.14.1.0056>.

Introduction

This thesis proposes urban agriculture as a catalyst for improving the health of a disinvested community. Accessibility to quality food, education, housing, healthcare, jobs, and all other aspects of life is severely deterred due to a historical lack of funding and racist policies that overwhelmingly affect people of color. All of these issues are interconnected, and the genesis of a solution is to actively create a space where people can learn, connect, and develop. Issues related to urban agriculture include the food cycle, access to healthy food, poverty, and nutrition. These are used to inform the disparity seen between more and less invested areas, with a focus on New York City and how policies like redlining, gentrification, and urban renewal have damaged those less fortunate with regards to their quality of life, learning, and economic advancement. Many environmental concerns hit these communities the hardest, including heat island effect, brownfield sites, and poor water and air quality. By focusing on one of the most affected areas in New York City, East New York, the research materialized into the story of an area pushed aside and left to itself, with no help or concern compared to areas that thrive. Urban agriculture and a space to learn about healthy life choices will sustain this neighborhood, provide capital, and offer an oasis of hope in the concrete jungle.

Chapter 1: Food Accessibility

Food Desert & Swamp

The term “food desert” was defined by the Nutrition Task Force of the Department of Health in the UK in the early 1990s. They coined the term to describe an area of public housing that was not near any food. The term’s definition changes and adapts to context because of the geographical, cultural, social, economic, and political differences of the locations affected. New York City, as well as many other metropolitan areas around the globe, has been trying to record and solve food deserts, poverty, income, and other interconnected issues for decades. NYC’s FRESH system is modeled after the Fresh Food Financing Initiative in Pennsylvania, and edited to reflect the decrease in zoning regulations and high land cost, and the increase in plot sizes. It is imperative to mention that the reason food deserts, income inequality, and lack of access all exist is that they stem from the issues of racism, segregation, disinvestment, and redlining. Lower credit lines, home values, and home ownership all affect these areas.¹

23.5 million Americans live in these food deserts, with African Americans half as likely to have access and Hispanics a third as likely to be near a store for food, meaning these groups make up the majority of America’s food desert population. Detroit, which largely consists of African Americans and Latinos, has no major supermarkets. White residents in Los Angeles have 3.2 times the amount of supermarkets as African Americans and 1.7 times the amount for Latinos. Two neighborhoods of Washington D.C. have 1 supermarket for

¹ “The Fresh Approach to Food Insecurity: NYC’s Market-based Food Movement-LIA Warner”, The Gallatin Research Journal, last modified April 22, 2019.

<https://wp.nyu.edu/compass/2019/04/22/the-fresh-approach-to-food-insecurity-nycs-market-based-food-movement/>

every 70,000 residents compared to 1 for every 12,000 in white neighborhoods of the same city.²

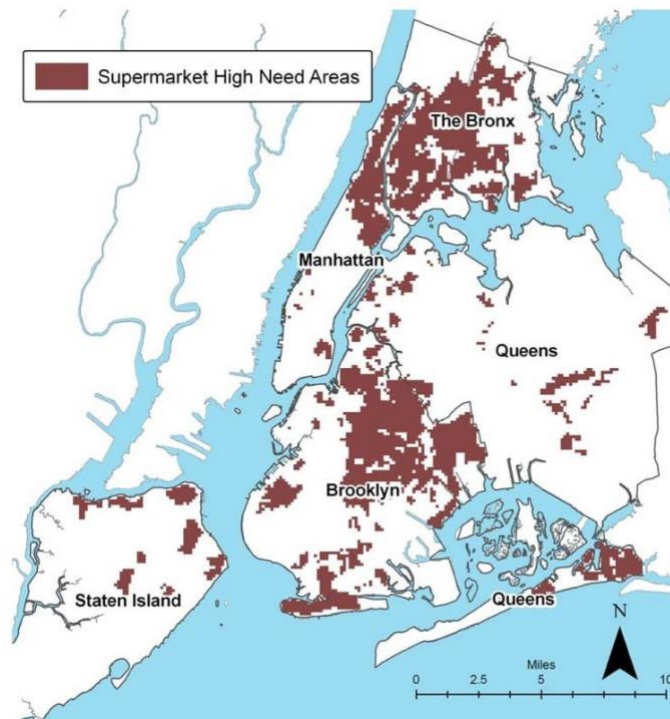


Figure 1: Assessing Need for New Grocery Stores (Source: The City of New York)

Food deserts have been studied in many parts of the globe, but there has been no standardized process of finding and categorizing them. New York City's government divides food establishments in New York City as supermarkets, fast food, and small convenience stores, often called bodegas. Studies have found that areas with higher income and a larger percentage of white residents had the least fast food, most supermarkets, and healthiest options at their bodegas. Areas with lower incomes and predominantly African American residents had the least amount of supermarkets and most fast food options, while

² New York Law School Racial Justice Project., "Unshared Bounty: How Structural Racism Contributes to the Creation and Persistence of Food Deserts. (with American Civil Liberties Union)." (2012). Racial Justice Project. Book 3.
http://digitalcommons.nyls.edu/racial_justice_project/3

Latino-dominated areas had a slightly higher amount of healthy options and a slightly lower amount of fast and unhealthy food than African Americans. The bodegas in immigrant areas were filled with more healthy options, which strengthens the theory that the citizens of these areas are less assimilated to the unhealthy nutritional lifestyle of the average American.³

Income Inequality

Criteria for a low income area according to the USDA Economic Research Service are as follows: the poverty rate is at or above 20%, the median family income is less than or equal to 80% of the state-wide rate, as well as 80% or below the metropolitan area's rate. These areas also must have at least a third of the population further than a ½ mile to the nearest supermarket.⁴

Research by NYU questions the helpfulness of a supermarket in a previous food desert, and explores how access is not enough for lower income families. Even if there is access, the families cannot afford the healthier options, so supply and demand take effect and these residents follow their traditional patterns of buying less healthy but cheaper goods. Until

³ Gordon, Cynthia, Marnie Purciel-Hill, Nirupa R Ghai, Leslie Kaufman, Regina Graham, and Gretchen Van Wye. "Measuring Food Deserts in New York City's Low-Income Neighborhoods." *Health and Place* 17, no. 2 (2011): 696–700. doi:10.1016/j.healthplace.2010.12.012. ⁴ "Documentation" USDA Economic Research Service, accessed Oct 16, 2020, <https://www.ers.usda.gov/data-products/food-access-research-atlas/documentation/> ⁵ "What Really Happens When a Grocery Store Opens in a 'Food Desert'?", New York University, last modified December 10, 2019. <https://www.nyu.edu/about/news-publications/news/2019/december/what-really-happens-when-a-grocery-store-opens-in-a-food-desert.html>

the access reflects the price of these resources, this problem could continue.⁵ Critics have researched and found that shopping patterns do not always change for residents in these low income neighborhoods, due to education on nutrition, ability to travel to certain places, and cultural cuisine choices. Just because it is closer does not mean people will change their patterns, even if the food options are there. One store may have deals that another doesn't, and in these areas residents always are trying to find the best deal first. Affordability and awareness are needed for residents to gain the benefits of these changes of habit.⁴

Health Effects and Diseases

A majority of adult residents of New York City are considered overweight or obese, with this trend increasing. There is a disparity between low and high income areas: the Upper East Side has rates of 6% while some areas like East Harlem and North and Central Brooklyn have rates as high as 21-30%. These statistics are reflected with the issue of diabetes, with 5% and 10-15%.⁵ Research has shown that obesity causes lower productivity which then affects social and academic development.⁶ Lower rates of physical activity and are three times more likely to develop diabetes.

⁴ "The Fresh Approach to Food Insecurity: NYC's Market-based Food Movement-LIA Warner", The Gallatin Research Journal, last modified April 22, 2019.

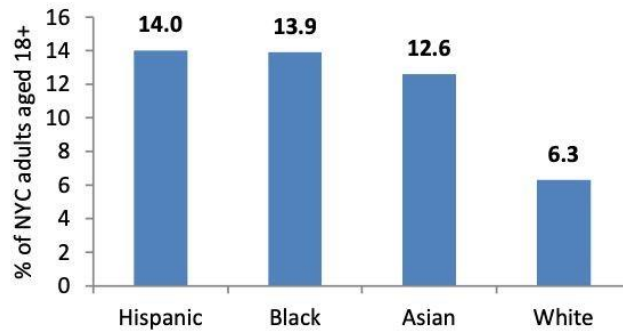
<https://wp.nyu.edu/compass/2019/04/22/the-fresh-approach-to-food-insecurity-nycs-market-based-food-movement/>

⁵ Gordon, Cynthia, Marnie Purciel-Hill, Nirupa R Ghai, Leslie Kaufman, Regina Graham, and Gretchen Van Wye. "Measuring Food Deserts in New York City's Low-Income Neighborhoods." *Health and Place* 17, no. 2 (2011): 696–700. doi:10.1016/j.healthplace.2010.12.012.

⁶ Anderson, Theresa, Gearing, Maeve. "Innovations in NYC Health & Human Services Policy: Food Policy." *Urban Institute* (2014):1-13.

<https://www1.nyc.gov/assets/opportunity/pdf/policybriefs/food-policy-brief.pdf>

Prevalence of diabetes by race/ethnicity among New York City adults

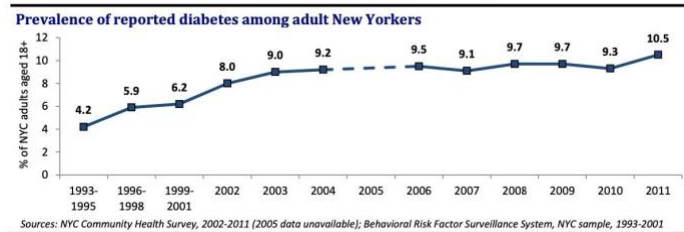


Source: NYC Community Health Survey, 2011

Figure 2: Prevalence of Diabetes by Race/Ethnicity Among New York City Adults

(Source: New York City Department of Health and Mental Hygiene)

Diabetes increased 150% in New York City since 1993-1995

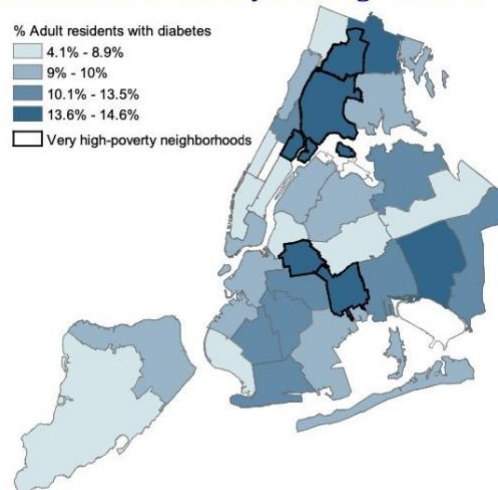


Sources: NYC Community Health Survey, 2002-2011 (2005 data unavailable); Behavioral Risk Factor Surveillance System, NYC sample, 1993-2001

Figure 3: Diabetes increased 150% in New York City since 1993-1995 (Source: New

York City Department of Health and Mental Hygiene)

Prevalence of diabetes by NYC neighborhood



Source: NYC Community Health Survey, 2009-2011

Figure 4: Prevalence of diabetes by NYC neighborhood (Source: New York City

Department of Health and Mental Hygiene)

Poverty

As was recorded during the recession of 2008 and is sure to be similar during the COVID-19 Pandemic, the rate of food insecurity increases during economic hardships. Healthier food prices have been on the rise in recent decades, whereas unhealthy options have stayed consistently cheaper. While the overall poverty levels of the city have been decreasing over time, areas with minorities, less education, and more unemployment are much more likely to still suffer from the issue.⁷

Figure 1.11
Percentage of Population Below Poverty Threshold, by Neighborhood, 2013–2017
 Citywide Rate: 19.8%

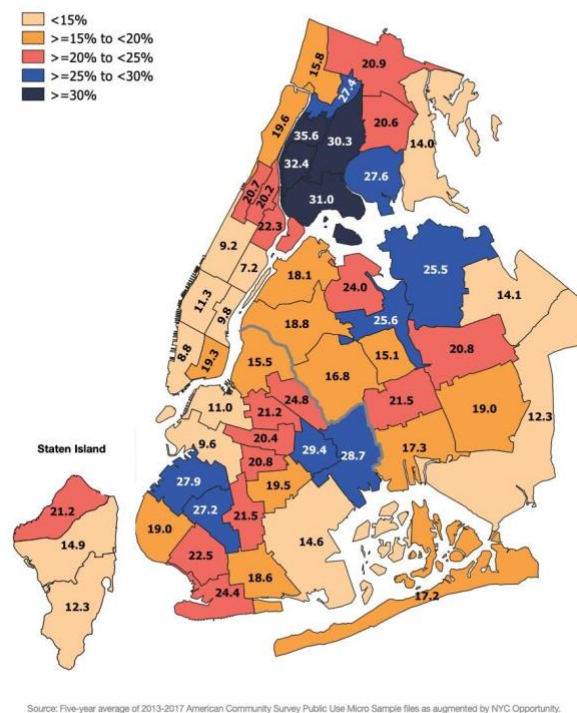
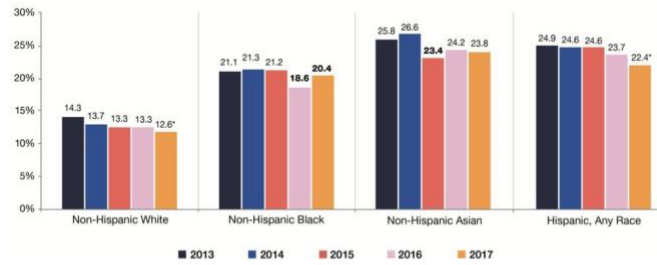


Figure 5: Percentage of Population Below Poverty Threshold, 2013-2017 (Source: NYC Mayor's Office for Economic Opportunity)

⁷ Anderson, Theresa, Gearing, Maeve. “Innovations in NYC Health & Human Services Policy: Food Policy.” *Urban Institute* (2014):1-13.
<https://www1.nyc.gov/assets/opportunity/pdf/policybriefs/food-policy-brief.pdf>

Figure 1.6
NYCgov Poverty Rates by Race/Ethnicity, 2013–2017



Source: American Community Survey Public Use Micro Sample as augmented by NYC Opportunity.
Notes: Numbers in bold indicate statistically significant change from prior year.
An * indicates statistically significant change from 2013 to 2017.

Figure 1.9
NYCgov Poverty Rates by Work Experience, 2013–2017

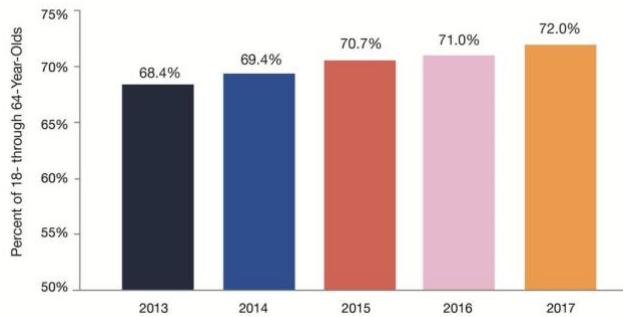


Source: American Community Survey Public Use Micro Sample as augmented by NYC Opportunity.
Notes: Numbers in bold indicate statistically significant change from prior year.
An * indicates statistically significant change from 2013 to 2017.

Figure 6: Poverty Rates by Race/Ethnicity, 2013-2017 (Source: NYC Mayor’s Office for Economic Opportunity)

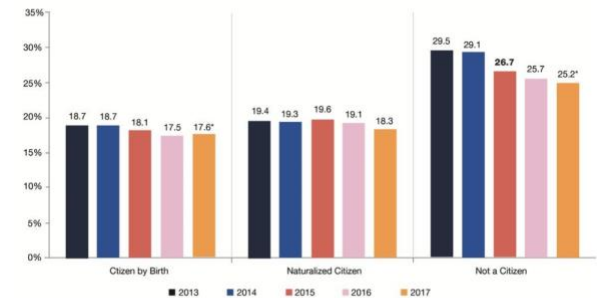
Figure 7: Poverty Rates by Work Experience, 2013-2017 (Source: NYC Mayor’s Office for Economic Opportunity)

Figure 1.12
Employment/Population Ratios, 2013–2017



Source: American Community Survey Public Use Micro Sample as augmented by NYC Opportunity.

Figure 1.7
NYCgov Poverty Rates by Citizenship Status, 2013–2017

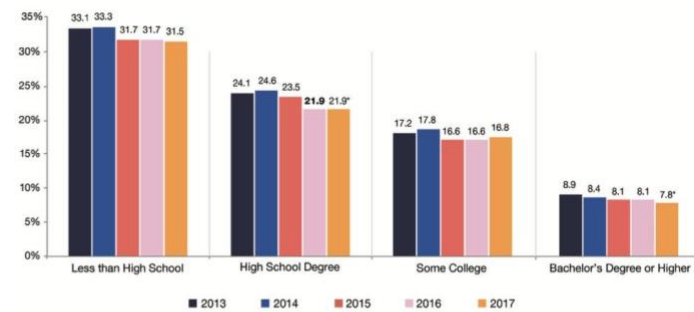


Source: American Community Survey Public Use Micro Sample as augmented by NYC Opportunity.
Notes: Numbers in bold indicate statistically significant change from prior year.
An * indicates statistically significant change from 2013 to 2017.

Figure 8: Employment/Population Ratios, 2013-2017 (Source: NYC Mayor’s Office for Economic Opportunity)

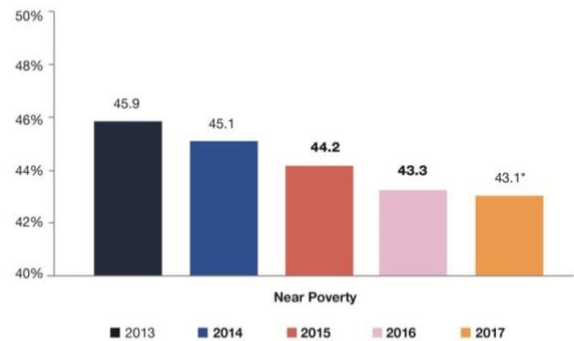
Figure 9: Poverty Rates by Educational Attainment, 2013-2017 (Source: NYC Mayor’s Office for Economic Opportunity)

Figure 1.8
NYCgov Poverty Rates by Educational Attainment, 2013–2017



Source: American Community Survey Public Use Micro Sample as augmented by NYC Opportunity.
 Notes: Numbers in bold indicate statistically significant change from prior year.
 An * indicates statistically significant change from 2013 to 2017.

Figure 1.3
NYCgov Near Poverty Rates, 2013–2017



Source: American Community Survey Public Use Micro Sample as augmented by NYC Opportunity.
 Notes: Numbers in bold indicate statistically significant change from prior year.
 An * indicates statistically significant change from 2013 to 2017.

Figure 10: Near Poverty Rates, 2013-2017 (Source: NYC Mayor’s Office for Economic Opportunity)

Figure 11: Poverty Rates by Citizenship Status, 2013-2017 (Source: NYC Mayor’s Office for Economic Opportunity)

Chapter 2: A Tale of Two Cities

Homelessness & Housing Prices

In urban food deserts, trends show that the population has decreased, with white residents leaving these areas the most. This leaves the neighborhood with less people, a higher proportion of minorities, and higher rates of poverty, and lower median incomes. This unfortunately scares away development of businesses in these areas, so food deserts remain.¹⁰ The possible introduction of larger stores also welcomes another issue: gentrification. Smaller businesses cannot compete, and the rental prices of the areas increase, pushing residents out of the area.¹¹

Gentrification is the process of increasing economic investment and development into historically disinvested areas, which leads to demographic changes as higher income residents move in and make it a more expensive place to live. Gentrification is a result of previous racist policies and practices that are still affecting life today. Redlining standards from the 1930s to 1960s worked with banks to deny loans to people of color, which barred them from investing into buying or repairing homes in their neighborhoods. The White Flight, which was a result of the GI Bill guaranteeing white soldiers loans for homes in the suburbs, would often deny people of color from moving out of cities. Urban Renewal programs such as public housing projects and the Interstate Highway Act of

¹⁰ “Characteristics and Influential Factors of Food Deserts” USDA Economic Research Service, accessed Oct 16, 2020,

<https://www.ers.usda.gov/data-products/food-access-research-atlas/documentation/> ¹¹ “The Fresh Approach to Food Insecurity: NYC’s Market-based Food Movement-LIA Warner”, The Gallatin Research Journal, last modified April 22, 2019.

<https://wp.nyu.edu/compass/2019/04/22/the-fresh-approach-to-food-insecurity-nycs-market-based-food-movement/>

1965 demolished and divided up communities of color while disinvesting in these same communities. Foreclosures were more likely to affect people of color in the Great Recession. Today, cities that invest in these areas are bringing amenities and jobs, but with that comes people who would be willing and able to pay more to live there than those who have been affected by these policies.

Although poverty is decreasing throughout New York City, homelessness has not stopped increasing, and is currently at very high levels. The makeup of those who use the city's shelters is split into thirds of approximately 19,000 each: children, adults in families, and single adults. The total from June of 2020 was 58,736.⁸

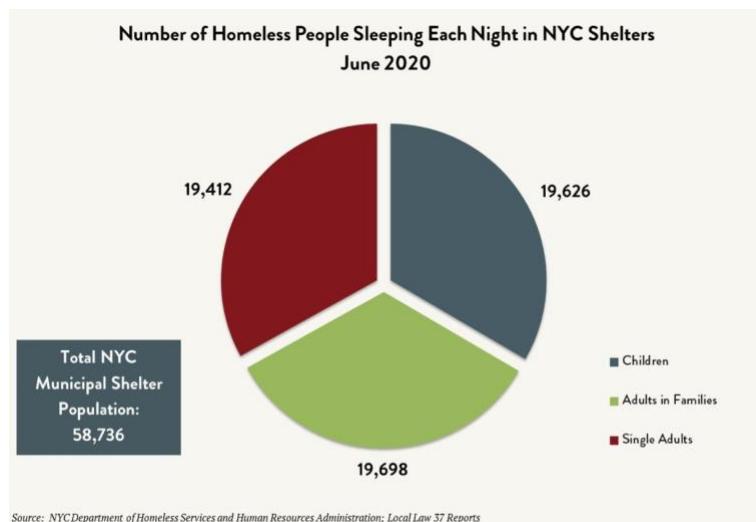


Figure 12: Number of Homeless People Sleeping Each Night in NYC Shelters June 2020
(Source: NYC Department of Homeless Services)

⁸ "Gentrification Explained," Urban Displacement Project, accessed December 13, 2020, <https://www.urbandisplacement.org/gentrification-explained>

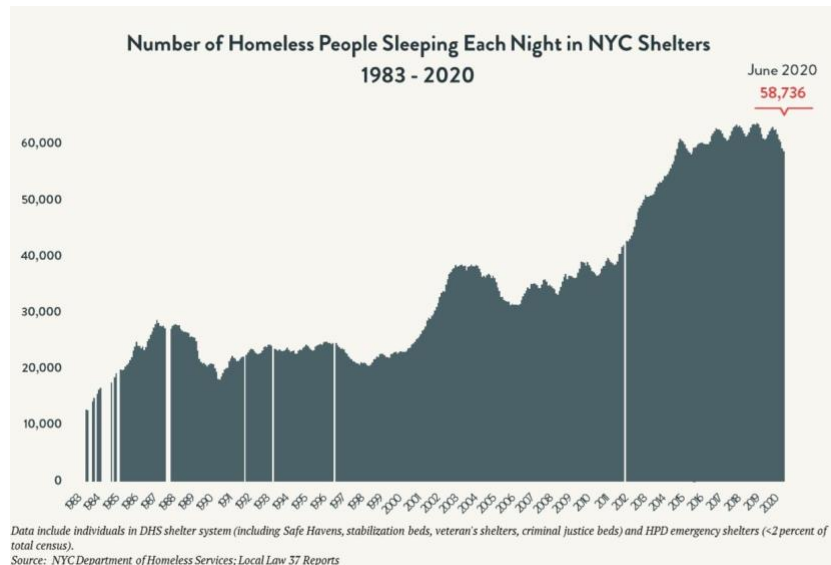


Figure 13: Number of Homeless People Sleeping Each Night in NYC Shelters 1983-2020
(Source: NYC Department of Homeless Services)

Education Disparities

Although the landmark case *Brown vs. Board of Education* did not affect New York City, where segregation was illegal, other institutionalized forms of racism did affect where certain ethnicities and races could live, work, and be educated. Due to decades of migration, both of African Americans from the South and of immigrants from around the world, neighborhoods in New York City became clusters of each of these groups of people. Redlining and disinvestment further divided up areas based on ethnicity and race. It almost seemed like schools in the city were segregated, as predominantly Asian and White schools were better funded, employed more educated teachers, and had higher rates of learning compared to Black and Hispanic-majority schools. The city has tried to integrate the schools with busing and magnet schools, which would send children to schools focused on certain courses you can excel in like math, science, theater, or art. Schools in the state and its largest city are the most segregated in the country today. Desegregation efforts were paused in the past to focus on school testing and school choice, instead of making an equal playing field. Due to changes in demographics and the failure of these policies, schools are still not diverse, in the most diverse city in the country. Over the last twenty years, the Latino and Asian populations

of the state have nearly doubled. Lower income schools became integrated with the Latino and Black students. The New York City metropolitan area only accounted for 10% of the state's total White student population, but 60% of the Black, Asian, and Hispanic. Only 20% of the schools in the five boroughs are considered diverse.

After the Civil War, the city housed one of the largest Black communities in the North. In the nineteenth century this proportion decreased as European immigrants came to the city. The number of Blacks and Puerto Ricans grew again in the early twentieth century. After the Immigration Act of 1965, Asian and Latino residents flocked to the city. The White Flight to suburbia also occurred at this time. Today, all areas around the city are becoming more diverse, but the issues mentioned still remain, especially those related to housing.

Studies have shown that diverse schools and workplaces are more productive and have higher test scores, as well as good socially for building relationships with those from different backgrounds.⁹

Government and Local Programs

New York City uses SNAP, Supplemental Nutrition Assistance Program, the updated federal food stamps program. The SNAP benefit is the same nationally, but food prices in the New York Metropolitan area are higher, around 5% more than in other areas of the country.

⁹ Kucsera, Orfield,. "New York State's Extreme School Segregation" (2014).

<http://www.nysed.gov/common/nysed/files/kucsera-new-york-extreme-segregation-2014.pdf>

Other programs were developed under the Bloomberg administration to help alleviate three main issues: food support, nutrition content, and retail access. These include Health Bucks, where every \$5 of food stamps spent at a farmers market gets you a \$2 coupon, and Healthy Bodegas, which systematically connected these businesses with healthier options to sell.

FRESH (Food Retail Expansion to Support Health) includes tax and zoning incentives for supermarkets to open in food deserts. Schools have adopted the School Garden Initiative and Garden to School Cafe Program which encourage planting a garden and using the produce in school meals. Other policies have advocated and brought about awareness of unhealthy options such as showing a calorie count, promoting water over sugary sodas, and restricting trans fat. The School Food Lunch Program was expanded so students were offered free lunch during the summer as well. The main takeaways of the efforts made in the last decade signal the importance of working in partnership with public and private entities to market and distribute both the food and the valuable knowledge about eating well.¹⁰

Green Carts is another program that is for permits for mobile fruit and vegetables sales. Analysis shows that due to the vendors wanting to make the best profit, the carts were often located in areas with most pedestrian traffic, instead of food deserts. This conundrum is strange since areas already served are more competitive while other areas offer a new

¹⁰ Anderson, Theresa, Gearing, Maeve. "Innovations in NYC Health & Human Services Policy: Food Policy." *Urban Institute* (2014):1-13.
<https://www1.nyc.gov/assets/opportunity/pdf/policybriefs/food-policy-brief.pdf>

market and revenue flow. But, the instant access near subway stops and large employers makes the marketing easier for these street vendors.

The USDA defines a food desert as an area more than 1 mile away from any supermarket. Some studies have edited this radius to relate to New York City, as public transit, driving, walking, and biking are all options that connect the city. People are willing to walk around five minutes, or a quarter mile, to get to their destination. The data found that the Green carts were positioned in both healthy areas and food swamps much more than in food deserts. Neighborhoods in Queens and the Bronx were much less likely to have a Green Cart, especially in a food desert. One takeaway from this research done by the CDC is that the price of healthier food could fall due to more competition, but this has not been verified.¹⁵

Ways to support your local economy as well as your health include setting up a community garden, visiting and increasing the number of farmers markets, and teaching these areas about nutrition. Environmentally wise, locally grown food is much more accessible and requires less chemicals and pesticides to grow, harvest, and transport to other places. The problems escalate because the federal government subsidizes the large food industry companies and pays off plot owners who could easily set up competitive yet sustainable food systems. Qualifying for food stamps may seem helpful, but the process is slow and has some restrictions that do not allow everyone to be on the

¹⁵ Li KY, Cromley EK, Fox AM, Horowitz CR. Evaluation of the Placement of Mobile Fruit and Vegetable Vendors to Alleviate Food Deserts in New York City. *Prev Chronic Dis* 2014;11:140086. DOI: <http://dx.doi.org/10.5888/pcd11.140086>

program, and the program itself does not cover the full price of the meals you should eat every day. Petroleum based pesticides have not led to better yields in crops, and taints the soil with chemicals. Monocropping is also not a healthy practice for the soil.

The World Watch Institute has found that on average food travels 1,500 miles from the farm to where it is eaten. The meat industry produces 18% of the world's carbon emissions, which is massive and even more than the transportation sector. Since the meat industry is so large and can produce cheap, unhealthy food to be sold at places like fast food restaurants, the option to eat the cheaper and filling meal hurts the environment and hurts your health.

Agriculture is key to restructure and fix others issues that are mentioned in this thesis: healthcare, climate change, and energy independence. Rooftops reduce the amount of food transported into the city, which means less traffic and gas burned to reach the city from the farms. The price can then be lowered too. The Food Bank of New York has workshops about how to select, store, and cook healthy options. Eat Well Play Hard in Child Care Settings teaches children to exercise and eat healthy at a young age, and this can enforce the healthy standards at their homes for the future. Greenmarket, Food Bank, and Just Food all have set up cooperatives, yet their locations have not always been in the center of food deserts. Healthy Bodega Initiative is an advertisement campaign to promote healthy purchases at the more commonly used bodegas.¹¹

¹¹ Segal, Adi. "Food Deserts: A Global Crisis in New York City Causes, Impacts and Solutions." *Consilience* 3, no. 3 (2010): 197–214.

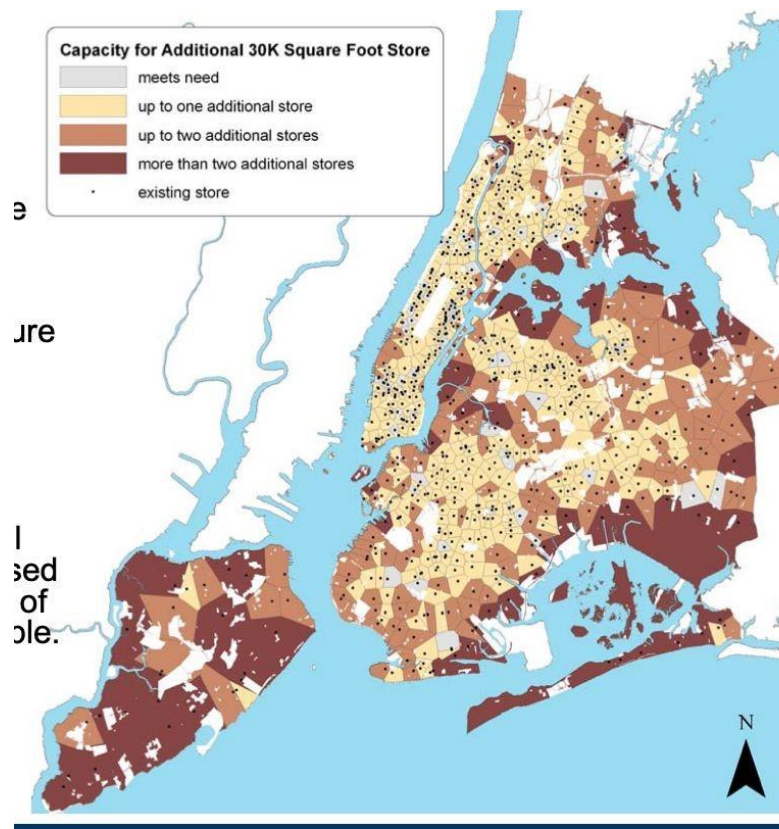


Figure 14: Capacity for Additional 30K Square Foot Store

(Source: The City of New York)

Chapter 3: Environmental Issues

Heat Island Effect

Over 100 deaths and 450 hospitalizations occur every year in New York City due to heat-related illnesses. Cities are often 2 to 8 degrees warmer than their surroundings due to lack of green space. Solutions to this issue are known and just require implementation. These include cool roofs, which are painted white to reflect more sunlight and heat. Air conditioning is the easiest and most effective strategy to keep people healthy, and luckily has been widely introduced but is still missing in the poorest homes across the city and country. Lighter pavement material, more trees, and more ground vegetation are all adaptations that can be made to cities filled with concrete and asphalt.¹²

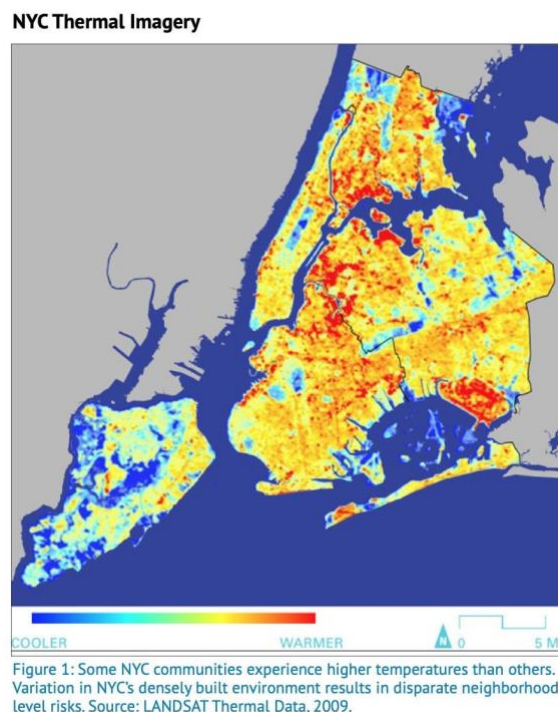


Figure 15: NYC Thermal Imagery (Source: The City of New York)

¹² “Cool Neighborhoods NYC,” The City of New York, accessed December 13, 2020, https://www1.nyc.gov/assets/orr/pdf/Cool_Neighborhoods_NYC_Report.pdf

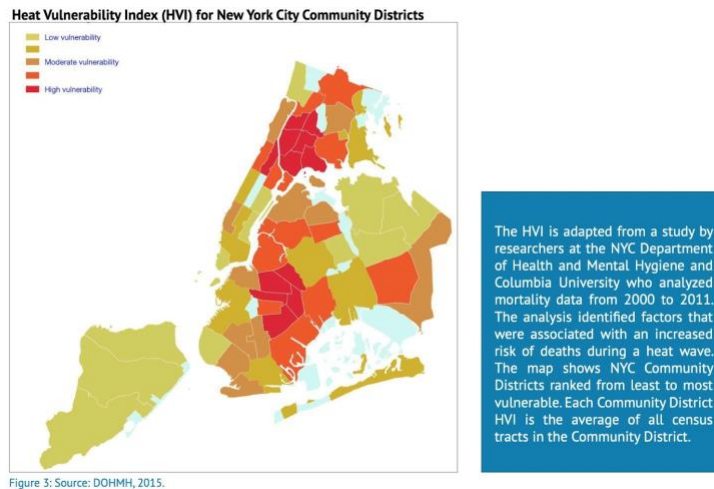


Figure 3: Source: DOHMH, 2015.

Figure 16: Heat Vulnerability Index (HVI) for New York City Community Districts (Source: The City of New York)

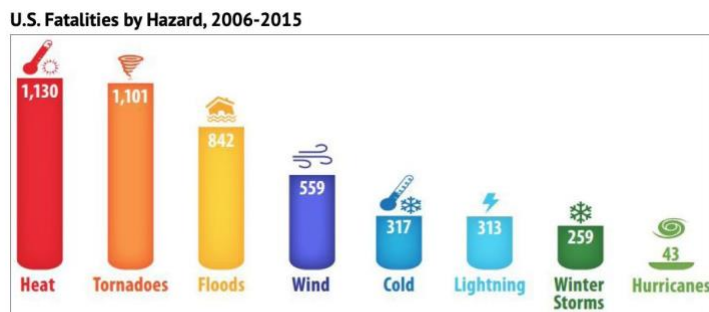


Figure 2: More Americans die from heat waves every year than from all other extreme weather events combined. Source: NOAA National Weather Service, 2016.

Figure 17: U.S. Fatalities by Hazard, 2006-2015 (Source: The City of New York)

Runoff

Stormwater Management is an important issue and critical to solve in a city that is covered by impervious surfaces and with an antiquated sewer system. When it rains, snows, or floods, water would usually seep into the soil and be stored in aquifers once filtered. In cities, the water collects the oil, chemicals, trash, sediment, and pathogens and is brought into the sewer system, where it is treated at a plant. In New York City and many other older cities, the majority of the city uses a combined sewer system. A single pipe carries both wastewater, from homes or businesses, and stormwater to treatment plants. During a storm, the dilapidated system cannot handle the current amount of water and overflows into the

surrounding water ecosystems, damaging and disrupting them. The more modern separate storm sewer system uses two separate pipes, but the pollutants picked up from storms still make their way into local waterways.

Since updating this infrastructure would take years and billions of dollars, small scale improvements can be made by disposing of trash correctly, conserving water, making a rain garden or bioretention swale, and filtering and cleaning catch basins. Changing ground cover to allow the water to naturally seep in and follow the water cycle is what we need to get back to normal, and increasing awareness of these issues and starting community gardens and green roofs are great proposals to sponsor this process.¹³

Air Quality

As we have seen during the COVID-19 Pandemic, air quality is essential to protecting the health of people, especially the elderly, children, and people with preexisting conditions. We know that air quality is lowered when pollution occurs, from cigarettes to cars to industrial plants. In order to combat this we must choose public transit and low emission cars and appliances, choose renewable energies to run our homes and businesses, and need to increase vegetation in areas around pollutant sites.¹⁴

¹³ "Stormwater Management," The City of New York, accessed December 13, 2020, <https://www1.nyc.gov/site/dep/water/stormwater-management.page>

¹⁴ "Outdoor Air Quality," The City of New York, accessed December 13, 2020, <https://www1.nyc.gov/site/doh/health/health-topics/air-quality-air-pollution-protection.page>

Brownfield Sites

Sites that are contaminated with heavy metals, chemicals, and organic solvents that are polluted from commercial or industrial sites. Many of these sites are now vacant and can be redeveloped, but environmental studies and remediation are required to make them safe. These extra costs make the land harder to sell, but in a city that is densifying, this is a great opportunity to make safer spaces filled with amenities the community needs.¹⁵

¹⁵ “Brownfields,” The City of New York, accessed December 13, 2020, <https://www1.nyc.gov/site/sustainability/initiatives/brownfields.page>

Chapter 4: Context

New York City

New York City is the most populous and dense city in the state of New York, as well as in the United States of America. Approximately 8,336,817 people live in the city which takes up 302.6 square miles. It is also the largest urban landmass in the world, connecting to many suburbs and other major cities in the northeast of the country. Many notable sites are located within the city, making it considered the media, cultural, and financial capital of the world. The city comprises five counties, called boroughs. The city is the main gateway of legal immigration into the United States, with over 800 languages spoken. 3.2 million people are immigrants, making the city have the largest foreign born population of any city in the world. The city is the world's eight-largest economy and has the most billionaires on the globe. Three of the top ten most visited tourist attractions are in the city. The geography of the city consists of one of the largest natural harbors, with the islands of Staten Island and Manhattan, the Bronx connected to the contiguous United States, and Brooklyn and Queens on Long Island. These are divided by the Hudson, Harlem, and East Rivers. Originally inhabited by the Algonquian Native Americans, the land was bought by the Dutch and then controlled by the English Duke of York until the American Revolution. Manhattan is the smallest but most populous borough, with the highest GDP per capita. Queens is the largest and most ethnically diverse county in the country and one of the most diverse areas in the world. The Bronx has a strong culture of

rap and hip hop. Staten Island is the most suburban and the most parkland. Brooklyn is the most populated borough and has notable architecture, parks, and diversity.¹⁶

During the industrialization of cities, the concept of a food system changed dramatically. Before this, farm land was closer and the goods could be brought into the city and sold by the local farmers. Some areas of the city even had animals and farms that subtracted the time it took to bring this into the city. The government, at least of the United States, has left the food system and the production, marketing, and distribution to the private sector. We are now seeing issues arise such as health related illnesses due to inadequate diets, food deserts or swamps due to a prevalence of cheap, unhealthy options, and the threat of climate change which makes less and less land usable for farming.

New York City's zoning allows for agriculture in all parts of the city, so around 900 gardens and farms have already been created to service the community. Governmental agencies have allocated that public housing and other governmental buildings can be used for this purpose, with the investment also absorbing stormwater in the inundated sewer system. Other updates by planners include the FRESH program, which combines financial and zoning incentives for supermarkets, and amendments that allow rooftop greenhouses to be exempt from bulk and height limits. These rezonings have spurred construction and redevelopment in the city, which changes zonings from industry to commercial, or from single-family to high rise residential. This densification creates more homes and stores, but if not tracked well it can also result in pockets of space affected by

¹⁶ "The Five Boroughs of the City of New York: A Brief Historical Description". October 7, 2017. Archived from the original on October 7, 2017. Retrieved July 10, 2020.

food deserts, or pricing out existing residents or shops. Some open lots are used as public space or for gardens, and with these redevelopment ideas they become threatened to be replaced for housing or job-creating stores.

Rezoning should be monitored so that there is a proportional relationship between the creation of residential units and commercial space for food retail. The zoning can also contain spaces for not only supermarkets, but also for urban agriculture, farmers markets, and healthy food businesses, food distribution spaces, and composting facilities. Importantly, gentrification must be avoided so that the development helps the existing residents.¹⁷

During World War II, African Americans flocked to northern industrial centers for jobs, including cities like New York. This Great Migration from the Jim Crow South to the north had jobs with better wages and less discriminatory practices. They settled in areas like Harlem, Bedford-Stuyvesant, and Brownsville. Overcrowding, high rents, and lack of social services led to residents moving to other areas of the Bronx, Queens, and Brooklyn. They joined neighborhoods that had a small African American presence or other immigrant populations, which were segregated through certain federal policies. Only certain neighborhoods or blocks would have African Americans, creating nodes of separation.¹⁸

Redlining by the Home Owners' Loan Corporation had maps of certain areas with calculated land values based on the ethnicity of those living there, as well as the mortgage

¹⁷ Cohen, Nevin. "Unintentional Food Zoning: A Case Study of East Harlem, New York." In *Integrating Food into Urban Planning*, edited by Cabannes Yves and Marocchino Cecilia, 312-33. London: UCL Press, 2018. Accessed November 11, 2020. <http://www.jstor.org/stable/j.ctv513dv1.23>.

¹⁸ DuBose-Simons, Carla J. "Movin' on Up: African Americans in the South Bronx in the 1940s." *New York History* 95, no. 4 (2014): 543-57. Accessed November 13, 2020. <http://www.jstor.org/stable/newyorkhist.95.4.543>.

security. This created racial segregation, unequal housing development, and less wealth distribution. These Residential Security Maps would show lower ratings for areas with immigrants and minorities. A red line would be drawn around these areas, leading to the strategy of disinvestment.¹⁹

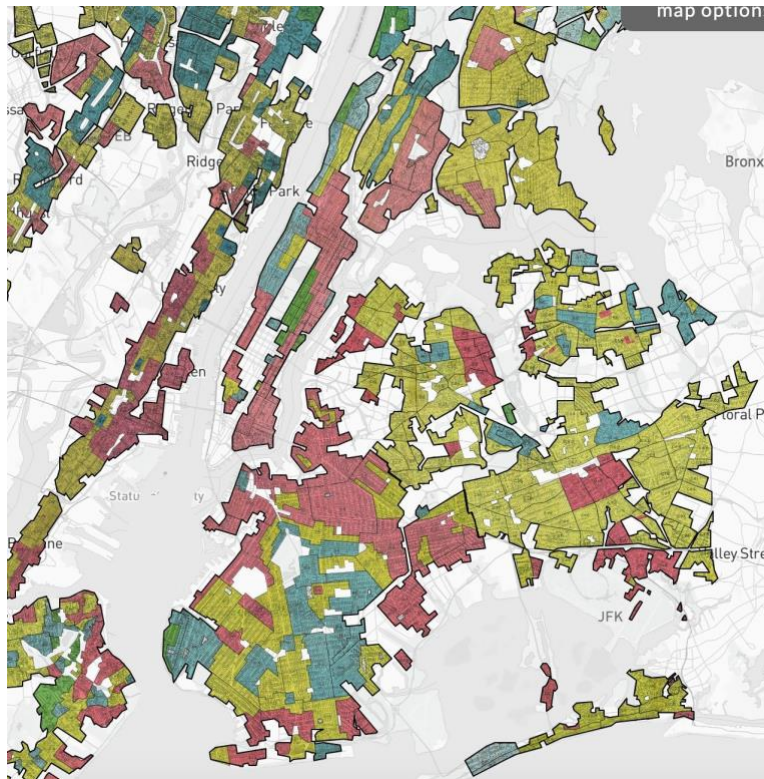


Figure 18: Relining Maps of New York City (Source: Mapping Inequality,

<https://dsl.richmond.edu/panorama/redlining/#loc=11/40.561/-73.949&city=brooklyn-ny>)

The practice of redlining is still ingrained in the way we plan and redevelop areas today.

¹⁹ Herscher, Andrew. "Black and Blight." In *Race and Modern Architecture: A Critical History from the Enlightenment to the Present*, edited by CHENG IRENE, DAVIS CHARLES L., and WILSON MABEL O., 291-307. Pittsburgh, Pa.: University of Pittsburgh Press, 2020. Accessed November 13, 2020. doi:10.2307/j.ctv11cwb7.20.

Hispanics and Blacks each account for less than 10% of all home purchase loans, and the loans they do get are more expensive and not from CRA regulated banks. Communities of color are less likely to have access to a bank branch, which equates to 20% in an area like East New York. Other than the geographical barrier, requirements like overdraft fees and minimum balances further burden these residents. Some states even require more identification than a passport or driver's license. Loans are harder to get for the small businesses that help sustain these neighborhoods, while developers can easily push out lower income residents and gentrify an area.²⁰

Three current policies that enforce segregation include concentrating poverty, limiting access to economic and educational opportunities, and quality of an area's housing, amenities, and social services. Needed amenities like healthy food, chain stores, and healthcare are less likely while unhealthy food options and places that sell damaging products like alcohol are most welcome. Areas in New York city with more black residents have less retail yet more public transit. This means that the infrastructure is created but not allocated to correct this issue. Chain stores stay away from these areas by claiming that crime and low populations means higher insurance and risk while lower profits, which is incorrect. The opposite would happen in these areas: more businesses means more jobs, and more jobs means more profit for the residents and the company.²¹

²⁰ Modern-Day Redlining: The Burden on Underbanked and Excluded Communities in New York (2020) <https://www.congress.gov/116/meeting/house/110580/witnesses/HHRG-116-BA15-Wstate-WeisbergJ-20200306.pdf>

²¹ Kwate, N. O., Loh, J. M., White, K., & Saldana, N. (2013). Retail redlining in New York City: racialized access to day-to-day retail resources. *Journal of urban health : bulletin of the New York Academy of Medicine*, 90 (4), 632–652. <https://doi.org/10.1007/s11524-012-9725-3>



Figure 19: East New York (Source: NYC Health)

East New York

Food Accessibility

East New York is affected by rising rent, crumbling infrastructure, and high unemployment. All of these things make access to food, especially healthy food, harder. The area has one of the highest percentages of its population below the poverty line in all five boroughs. The area is in need of more healthy options of retail and for affordable food markets. Black, Hispanic, and Asian New Yorkers are twice as likely to develop diabetes, and the percent of residents this affects has only been increasing over the years. Due to the diversity of East New York, as well as its minimal access to healthcare and the issues of housing prices and poverty, the neighborhood has one of the highest percentages of diabetes.

Urban Issues

Some issues that these thesis addresses include the urban fabric of the area and how it seems divided by train lines, highways, and lack of connectivity. Cars are much more safe than bikers or walkers in this area, which does not connect the neighborhoods, and only furthers the division between residential, industrial, and commercial areas. Safety is a top concern as the neighborhood has high levels of crime, and due to the lack of development or even maintenance the town has areas falling apart like brownfield sites and open or abandoned lots.

Environmental Issues

East New York is a prime site for developing environmental solutions to problems plaguing the area because of its location near Jamaica Bay, its urban fabric makeup, and the detrimental problems that could be solved with sustainable practices implemented here, compared to other areas of the city. The heat island effect is more severe in certain areas of the neighborhood than others due to the zoning distribution of programmatic buildings in the area. Storm surge and flooding are also possible since the water has less surface area to seep into. East New York has large industrial blocks, as well as a shopping center, which use up the majority of their lots and leave no room for landscaping. However, these large, flat surfaces have the ability to become cool roofs, green roofs, urban gardens, or even solar panel arrays. All of these strategies have positive effects on the environment and make the neighborhood a great place to implement and improve this issue.

Chapter 5: User

Demographics

East New York is a very diverse neighborhood, reflecting the diversity of the city as a whole.

Black residents make up 52% of the population, followed by 37% Latino, 7%

Asian, and 3% White. The population is around 181,300. Of that, 36% are immigrants.

As has been stated, neighborhoods that are not invested in are stuck in a feedback loop of poor social and economic conditions. Residents of East New York have a higher absentee rate in school, with 31% of children missing 19 or more days of school compared to the city average of 20%. The graduation rate is lower than the city average of 75%, with 68% of the neighborhood graduating on time. Nearly a quarter of East New York residents haven't completed high school, 56% have some college experience, and only 21% have a degree from a college. These rates are much lower than the citywide average and many more wealthy and white neighborhoods. 30% of residents live in poverty, 10% are unemployed, and 52% are burdened by rent. Clearly, these struggles then affect affording healthcare, transportation, clothing, and food.

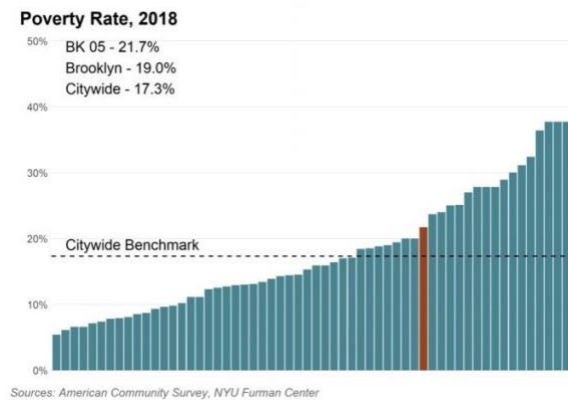


Figure 20: Poverty Rate (Source: NYU Furman Center)

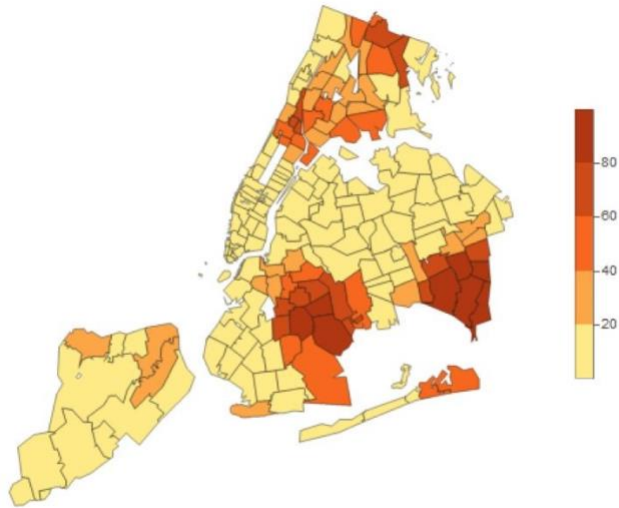


FIG. 1. Percentage of black residents in each NYC zip code [19].

Figure 21: Percentage of black residents (Source:

<https://math.mit.edu/research/highschool/primes/materials/2020/Choi-Unwin.pdf>)

The neighborhood is not gentrifying, yet these issues exist and could only be worsened with gentrification practices. Assault hospitalizations are double the city average, and the incarceration rate is one of the highest in the city. More policing and mental and physical health issues leave these residents struggling to find employment and afford rent and other necessities. The air pollution of East New York is slightly higher than the city's rate at 7.7 micrograms per cubic meter, and 20% of homes do not have air conditioning, which can result in respiratory issues or heat stroke.

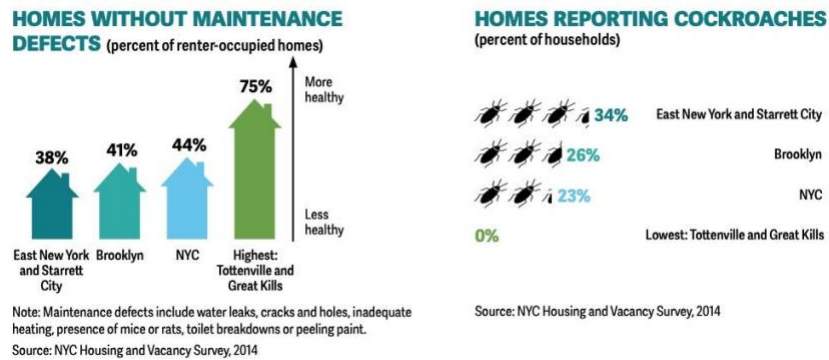


Figure 22: Home Information (Source: NYC Health)

Air pollution

Though air quality is improving in NYC in general, it varies by community district. In **East New York and Starrett City**, levels of the most harmful air pollutant, fine particulate matter (PM2.5), are 7.7 micrograms per cubic meter.

AIR POLLUTION

(micrograms of fine particulate matter per cubic meter)



Source: NYC DOHMH, Community Air Survey, 2016

Figure 23: Air Pollution (Source: NYC Health)

Only 38% of homes are regularly maintained, with leaks, pests, and other crumbling infrastructure common. The bicycle network of New York City has been expanding over the last decade, yet only 8% of roads in East New York have bike lanes. The ratio of supermarkets to bodegas is 1:13, with five farmers markets also located in the neighborhood. Going back to previous research, the bodegas are less likely to offer healthy food, and the healthier options may be more accessible but are unaffordable by residents. Around 11% of all births in the neighborhood are preterm, which are more

likely to cause infant death. 10.7% are late or have no prenatal care; both of these statistics are double the city average and emphasize the lack of access to medical care. The teen pregnancy rate is 2.93%, compared to 1.93% around the city. A quarter of children in East New York are obese compared to 20% overall in the city. Avoidable hospitalizations are those that would not be needed if access to outpatient care was offered or used. The rate in East New York is much higher than the citywide average yet again. 70% of residents have had physical activity in the last 30 days, 76% have a serving of fruits or vegetables every day, 31% drink sugary drinks, and 13% are smokers. The average New Yorker eats healthier, exercises more, drinks less sugary drinks, and smokes less than those in this area. 35% of adults are obese, 14% have diabetes, and 34% have hypertension; all are higher than the average of the city. Black New Yorkers and those living in high-poverty neighborhoods are more likely to have premature deaths, which is seen in East New York. The life expectancy of 78.6 is 2.6 years shorter than New York City's average.²²

²² Hinterland K, Naidoo M, King L, Lewin V, Myerson G, Noumbissi B, Woodward M, Gould LH, Gwynn RC, Barbot O, Bassett MT. Community Health Profiles 2018, Brooklyn Community District 5: East New York and Starrett City; 2018; 29(59):1-20.
<https://www1.nyc.gov/assets/doh/downloads/pdf/data/2018chp-bk5.pdf>

PHYSICAL ACTIVITY, DIET AND SMOKING (percent of adults)

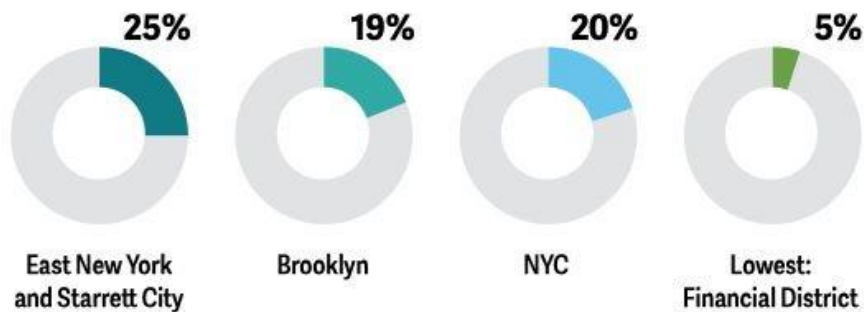
	East New York and Starrett City	Brooklyn	NYC	Highest %
 Any physical activity in the past 30 days	70%	72%	73%	90% Financial District, Greenwich Village-Soho
 At least one serving of fruits or vegetables per day	76%	86%	87%	96% Financial District, Greenwich Village-Soho
	East New York and Starrett City	Brooklyn	NYC	Lowest %
 One or more 12-ounce sugary drinks per day	31%	24%	23%	8% Financial District, Greenwich Village-Soho
 Current smokers	13%	14%	14%	8% Upper East Side

Source: NYC DOHMH, Community Health Survey, 2015-2016

Take Care New York 2020 (TCNY 2020) is the City's blueprint for giving everyone the chance to live a healthier life. For more information, visit nyc.gov/health and search for TCNY.

CHILDHOOD OBESITY

(percent of public school children in grades K through 8)



Source: NYC Department of Education, 2016-2017

OBESITY, DIABETES AND HYPERTENSION (percent of adults)

	East New York and Starrett City	Brooklyn	NYC	Lowest %
 Obesity	35%	27%	24%	4% Financial District, Greenwich Village-Soho
 Diabetes	14%	12%	11%	3% Financial District, Greenwich Village-Soho
 Hypertension	34%	29%	28%	15% Financial District, Greenwich Village-Soho

Source: NYC DOHMH, Community Health Survey, 2015-2016

ECONOMIC STRESS

	East New York and Starrett City	Brooklyn	NYC	Lowest %
Poverty (percent of residents)	30%	21%	20%	7% Upper East Side
Unemployment (percent of people ages 16 and older)	10%	9%	9%	4% Upper East Side
Rent Burden (percent of renter-occupied homes)	52%	52%	51%	37% Park Slope and Carroll Gardens

Note: Unemployment data may differ from rates presented in other published sources. See technical notes in the [public use dataset](#) for more details.

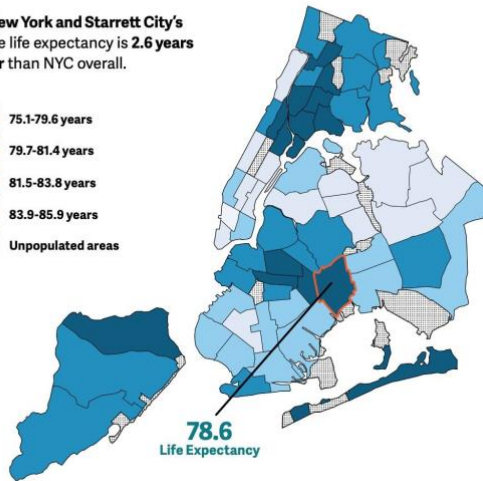
Sources: Poverty: American Community Survey as augmented by NYC Opportunity, 2012-2016 (community district and NYC), 2016 (borough); Unemployment and Rent Burden: U.S. Census Bureau, American Community Survey, 2012-2016; Avertable Deaths: NYC DOHMH, Bureau of Vital Statistics, 2011-2015

Many of the factors that affect health happen outside of a doctor's office. This includes access to quality education, jobs and safe spaces to live. Residents in high-poverty neighborhoods often lack these resources.



Life Expectancy by Community District

East New York and Starrett City's average life expectancy is **2.6 years** shorter than NYC overall.



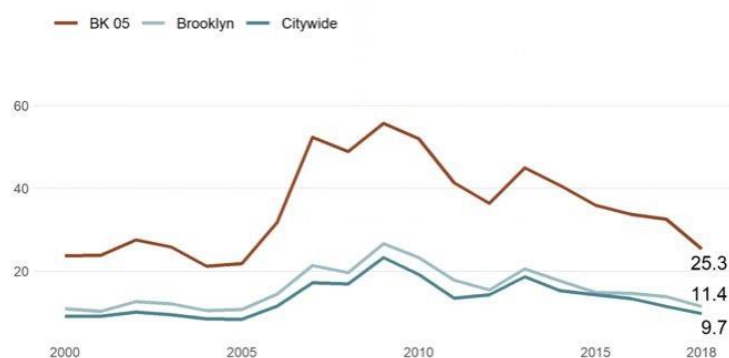
Source: NYC DOHMH, Bureau of Vital Statistics, 2006-2015

Figures 24-28: Physical Activity, Childhood Obesity, Obesity, Economic Stress, Life Expectancy (Source: NYC Health)

Median household income is \$42,060, lower than the citywide at \$64,850. The median gross rent has increased from \$1,090 in 2006 to \$1,260 in 2018, with 15.7% public housing units. The homeownership rate is 27.3% versus the average 32.8%. School performance is low, with 38.6% to 40.1% of students performing at their grade level compared to 49.4% to 49.6% citywide, depending on the subject. Property crime rate is 9.4 and the violent crime rate is 8.9 per 1,000 residents, both near double the city rate.

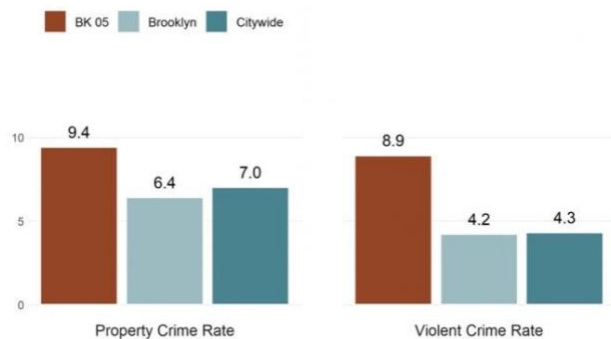
37.9% of households have children whereas 32% are single-person households. 67.2% of residents have a car free commute.²³

Rate of Mortgage Foreclosure Actions Initiated Per 1,000 1-4 Family Properties and Condominium Units 2000 - 2018



Sources: Home Mortgage Disclosure Act, NYU Furman Center

Serious Crime Rate Per 1,000 Residents, 2019



Sources: New York City Police Department, NYU Furman Center

Sources: New York City Police Department, NYU Furman Center

Figures 29 & 30: Foreclosures, Serious Crime Rate (Source: NYU Furman Center)

Currently during the COVID-19 Pandemic, institutionalized racism in policies such as redlining, gentrification, and disinvestment all are affecting minority communities much

²³ "East New York/Starrett City," NYU Furman Center, accessed December 13, 2020, <https://furmancenter.org/neighborhoods/view/east-new-york-starrett-city>

more. As of June 2020, Black residents were 60% more likely to contract the disease, and the number of deaths was double the white population in New York City. Due to lack of healthy food options and healthcare, both because of affordability and of geographic location, these results took place. Also, lower income workers were not given time off and were often on the front line of essential workers.²⁴

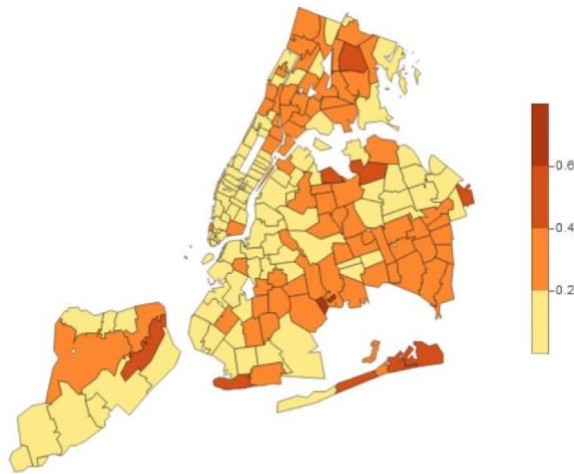


FIG. 5. Number of COVID-19 deaths per 100 residents.

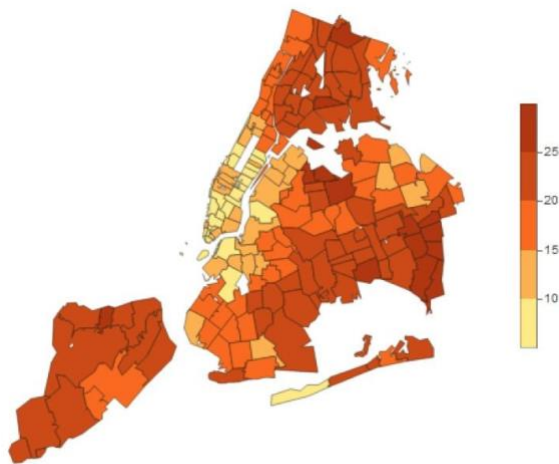


FIG. 4. Percentage of positive COVID-19 tests.

Figures 31 & 32: Number of Deaths, Percentage of positive tests (Source:
<https://math.mit.edu/research/highschool/primes/materials/2020/Choi-Unwin.pdf>)

²⁴ Choi, Yunseo, Unwin, James, "Racial Impact on Infections and Deaths due to COVID-19 in New York City", <https://math.mit.edu/research/highschool/primes/materials/2020/Choi-Unwin.pdf>

Culture

The large immigrant population and the strong cultural and ethnic diversity of the area are assets that can be used to really improve the quality of life. It is important to have diverse people working and living among each other as it will create a more productive, engaging, and caring social atmosphere in East New York. Next steps will be to further dive into the people who live here and if there can be a connection made between their heritage and the future proposals made by this design.

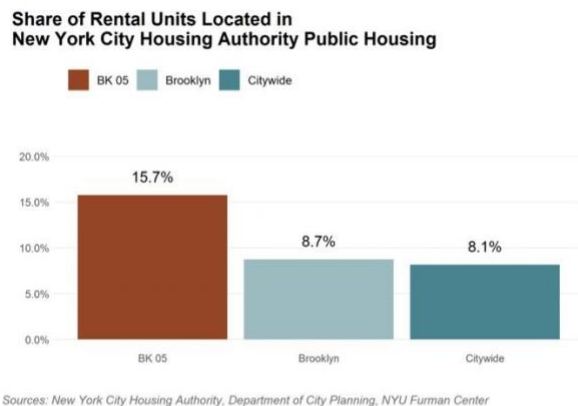
User Experience

An approach that this research and thesis design will take into consideration is that of the users of the proposal. Due to the diversity of the site and the need for community spaces that can combat issues like unemployment, crime, and low education, the program and site will both have to function for the variety of people who live in the area.

Chapter 6: Pre Design

Site Analysis

An analysis of the neighborhood of East New York was required in order to find appropriate sites for the intervention of this thesis. When studying the open space in the area, there are multiple small parks within the urban grid, but interestingly there are large swaths of land that are open and not developed. The neighborhood is on the south shore of Brooklyn and due to its location on Jamaica Bay, filled with marshes. These areas have been drained to allow for more stable ground to build on. Landfills make up the southernmost open areas in the neighborhood, which were constructed within the last few decades as well. Sandborn maps do not show a large proportion of this area, meaning it must have been developed after the last maps were completed in the 1970s. Since East New York has been disinvested over time, development has only recently started in the area, which still leaves many open lots and prospective sites.



Sources: American Community Survey, NYU Furman Center

Figure 33: Share of Rental Units (Source: NYU Furman Center)

The neighborhood has multiple food banks and food drop off areas, as well as many community gardens. The area is considered a food desert though, since there are only a

few supermarkets, and of these they are not within walking distance of a large proportion of the residences.

A substantial public transit system does exist, with many bus and subway lines running throughout the town. This does require a fee and time to get to supermarkets which enforce the inaccessibility of these stores to some residents.



Figure 34, Site Selection
(Source: Author)

	Jamaica, Queens	Jackson Heights, Queens	Corona, Queens	East New York, Brooklyn	Bushwick, Brooklyn
Environment: Runoff and Heat Island	3	2	2	3	2
Health: Food Desert/Food Swamp	2	1	1	3	3
Health: Rates of food-related diseases	2	1	1	3	3
Demographics: Income	1	1	2	3	3
Accessibility: Public Parks/Unused Lots	2	1	1	3	3
Context: Typological & Programmatic Diversity	3	2	2	3	1
Demographics: Homelessness & Housing Prices/Gentrification	2	1	1	1	3
Demographics: Poverty Line	1	2	3	3	2
Demographics: Majority- Minority Population	3	1	2	3	1

KEY
3- More likely
2- Likely
1- Less likely

Figure 35, Site Selection
(Source: Author)



Figure 36, Timeline
(Source: Author)

Chapter 7: Urban Agriculture as a Solution to Food Insecurity

East New York Examples

Studies have shown that community based programs help the development of children, with the skills of independence, competence, and interactions with others of all ages becoming more prevalent. Youth involvement helps these children learn new skills and avoid criminal or unsafe activities, and leads to involvement and commitment in future school, work, and community events. Other studies have shown that food in low income areas could be the same price or more expensive as in wealthier areas, meaning the locals are even less likely to afford it. By keeping the food in the neighborhood, it supports the local community and the transport and storage of food is lessened, so the nutritional value is at its highest. According to the USDA, farmers markets have exponentially grown in the past three decades, making over \$1 billion since the start of this century. These markets allow smaller farmers to thrive and keep a larger share of the wealth compared to the loops of distribution and packaging that large companies use. Farmers markets are also seen as more social, safe, friendly, and community-engaging compared to large supermarkets that are not designed for interaction. Community gardens have the same positive social outcomes. They protect community space, identity, the sense of control and connection, and spur environmentally friendly behavior. Access to nature also improves mental and physical recovery, which is even more important in areas plagued with poverty, disease, and crime.

East New York is in Brooklyn's District 5, around 5.6 square miles in the eastern portion of the borough. The neighborhood is infamously the murder capital of New York City. A Pratt Institute study found that between the 1970s and 1980s, the neighborhood lost 25%

of their buildings, resulting in lots of vacant lots. Many of these were redeveloped into affordable housing, and some became community gardens.

East New York Farms! has worked with local agencies to establish some of these community gardens and farmers markets, as well as volunteer and internship experiences. Offering these services helps concepts of maturity, job confidence, interpersonal skills, safe spaces, and improving and connecting to your community.²⁵

Following the Industrial Revolution, cities have grown and become centers of capitalism. Agriculture has become a business in the hands of large corporations instead of small family owned farms. As cities and suburbs grew, the farms were pushed and reduced to rural areas, far from interacting with the majority of people who eat the goods. Currently there are officially more people living in urban settings than not, and this trend is set to continue. This disengagement leaves people wondering where their food comes from, and if it is safe, healthy, and sustainable to follow these practices. There are many benefits to agriculture in the urban setting. Food shortages, stimulating local economies, practicing healthy eating, increasing community engagement, supporting physical activity, and bringing nature into the city to protect against climate change and the negatives that come with it are on the list of reasons to incorporate urban agriculture into society.

Urban areas across North America have the chance to spur development and bring farming back into areas usually abandoned by investment. While Manhattan is almost

²⁵ Yvonne Hung. "East New York Farms: Youth Participation in Community Development and Urban Agriculture." *Children, Youth and Environments* 14, no. 1 (2004): 56-85. Accessed November 13, 2020. <http://www.jstor.org/stable/10.7721/chilyoutenvi.14.1.0056>.

entirely developed and has extremely expensive land prices that would make farming unsustainable, the other boroughs and the rest of the metropolitan area are more attractive.

Prior to 1900, most of New York City was not urban, but filled with farms and estates. The real estate and planning markets won the fight over protecting and preserving this land once the subway was built and development exponentially increased in the city.

Even though the city seems like the last place you would find farms, there are over 700 community gardens, thousands of backyards filled with food, and programs that sponsor gardens and green roofs on schools and other commercial buildings. Tactical approaches that integrate farming into the city include using all the square footage available: roofs, backyards, parks, sidewalks, window boxes. All of these could significantly increase farming in the city. Planning, zoning, and tax policies are created to make land be used for the most profitable program. Farming in rural areas is much cheaper, with the appropriate zoning for agriculture, machinery, fertilizers, financing, and subsidies all already invested into these areas. Boundaries that urban farming must pass include changing the status quo as mentioned above. Also, flat roofs, appropriate irrigation and sunlight, and substantial diversity in produce are needed to make the farms function in the economy versus as a niche minimally affecting the community.

The city government has not proposed incentives for private farming, or for farming on city land, both of which would help bring about change. They have not engaged with the local communities and the gardens they have started on their own. Locating supermarkets in food deserts, as mentioned previously, is the furthest they have focused on this issue.

By focusing on the land and people within the city, urban agriculture can help the economy, the people, and the environment of New York City. The city must also deal with soil remediation and how these gardens will be run. Cooperatives instead of individual plots will strengthen the community and make for a more productive garden.²⁶

There are many urban agriculture organizations that are the starting point for creating gardens in the city. GreenThumb has been teaching and providing resources on farming for over 40 years and supports thousands of volunteers and hundreds of gardens. Farms at NYCHA is a program to provide food access and leadership development to strengthen public housing communities. The NYC Business Portal has an Urban Agriculture Guide and zoning applications make it easy to start a farm almost anywhere. NYC Office of the Director of Food Policy is in charge of increasing food security, bringing awareness and access to healthy food options, and supporting economic and sustainable opportunities. Grow to Learn is New York City's school gardening program with over 725 gardens registered. DSNY Food Scraps and Yard Waste is the city's organic collection program that helps create soil or renewable energy.²⁷

The USDA Urban Agriculture Food Kit is a guide on how to set up urban agriculture, from the issues of grants, financing, and infrastructure to the details of soil quality and irrigation.²⁸

²⁶ Angotti, T. "Urban agriculture: long-term strategy or impossible dream?: Lessons from Prospect Farm in Brooklyn, New York." *Public health* vol. 129,4 (2015): 336-41. doi:10.1016/j.puhe.2014.12.008

²⁷ "Resources," The City of New York, accessed December 13, 2020, <https://www1.nyc.gov/site/agriculture/resources/resources.page>

²⁸ "Urban Agriculture Toolkit," United States Department of Agriculture, accessed December 13, 2020, <https://www.usda.gov/sites/default/files/documents/urban-agriculture-toolkit.pdf>



Figure 37-39, East New York Farms
(Source: East New York Farms! Accessed May 11, 2021. <https://ucceny.org/urban-farm/>.)

Chapter 8: Design

This thesis proposes the development of a Food Hub, where locals can congregate and experience the full food cycle: from planting seeds to composting food scraps. A community space like this can support the residents and strengthen their relationships with each other and with the food they consume. This is especially needed in areas that have issues such as food insecurity, and specifically lack of access to healthy food.

Originally, six sites were analyzed to understand the town. This was narrowed down to one site, but the thesis proposes spaces that act as programmatic modules that could be replicated elsewhere.

There are some small shops around the focus neighborhood in east New York. These shops or bodegas often do not have all the necessary ingredients for meals, especially healthy options. If they do, they can often be more expensive than what can be found at supermarkets. For residents who are far from supermarkets and can't afford to go searching for affordable food at multiple locations, fast food is an alternative. This however causes health issues as mentioned before.

All the buildings use similar, easily constructible materials. The glazing utilizes glass curtain walls and metal mullions, while composite wood and steel framing enclosed other spaces. The roofs are metal split monitor roofs to allow for light to pass into the heart of each building. Brick is used in the outdoor spaces and flows into the buildings as well.

The programs within the proposal include an existing exterior garden surrounded by a new event and gathering space, package and storage rooms, prep kitchens, a greenhouse and tool area, and a marketplace. These can be laid out in many different ways depending on the site it is replicated on.

The existing site is run by East New York Farms! and has rows of plants and some small sheds. The weekly summer farmers market pops up on the sidewalk. This proposal will be a public-funded and run community center that offers spaces for any organizations in town. So, common users include schools, organizations, local businesses, and residents.

The site consists of four buildings surrounding centralized farm plots. Each building has a specific programmatic function. Sustainable features such as solar panels and rainwater harvesting cisterns sit on the site as well.

The design strategies for developing this layout follows guidelines from the building fabric, locating voids and facade details. The site is oriented for maximum sun exposure towards the southern edge. The buildings are built with a structural and organization grid in mind so that these spaces could easily be constructed and reconstructed elsewhere, following through on the modularity aspect of the proposal. The porosity of the buildings allows for free flowing circulation around and through the buildings.

As you can see on the floor plans, a layering of space exists, which allows for circulation paths in the core of the main buildings as well as transparent and open facades to move freely around the site. Porches cover the building sides and act as part of the architectural language of each building. The buildings relate to one another through the use of wood and glass facades, as well as metal

roofs. They do not compete with each other, as each has its own scale and use, and marry together well to become functional and fluid spaces.

The sequence of your experience allows for a view into any or all of the spaces a user would require when visiting a site. You are welcomed under a wooden trellis as you enter the space. The street edge is defined by trees, planters, and seating, as the site is on a main road in ENY. If you choose to stay outside, you can enjoy the farm or the many areas of seating. Rows of seasonal plants grow outside and inside. The greenhouse is another great space to learn about how to plant and farm so that these skills can be brought home. The produce can also be brought home to be enjoyed. Cooking spaces allow for the community to learn about how to cook food in healthy ways. As a public building, The Community can come together for events or to celebrate with the food they have grown, harvested, and prepared in the town on this site or any of the other community gardens. The marketplace introduces you to vendors from around the town as well as a selection of the produce from the site. Allowing for one site that incorporates all the food cycle activities results in a space that will attract users to each of these activities, creating a space that is used and activated throughout the day and year consistently.

The jury's comments were focused on the next steps of the proposal, as this typology could be replicated and adapted to other sites in East New York, another borough, or another city. At the large scale, questions arose about the details of the construction process as well as the modular capabilities on other sites. Detailed discussion about the edge conditions of the chosen site on New Lots Avenue was offered in order to make the space welcoming but also an oasis within the city, that is safe and secure from the elements and energy of city life. The conversation was helpful and offered integral feedback for the proposal to move forward into the future as a proposal.

Designing to combat issues including food deserts, income inequality, and health concerns is achievable. Open or abandoned lots of a city can be seen as unused square feet, prime for development to enrich the community. An urban farm is a community space for educating the public on the food they consume. Hands-on learning is possible and creates a stronger sense of community through the rituals around food production, preparation, and consumption. Revitalizing these spaces with infrastructure that allows for constant production and collaboration improves the lives of the locals and strengthens the community.



Figure 40, Focus Sites
(Source: Author)

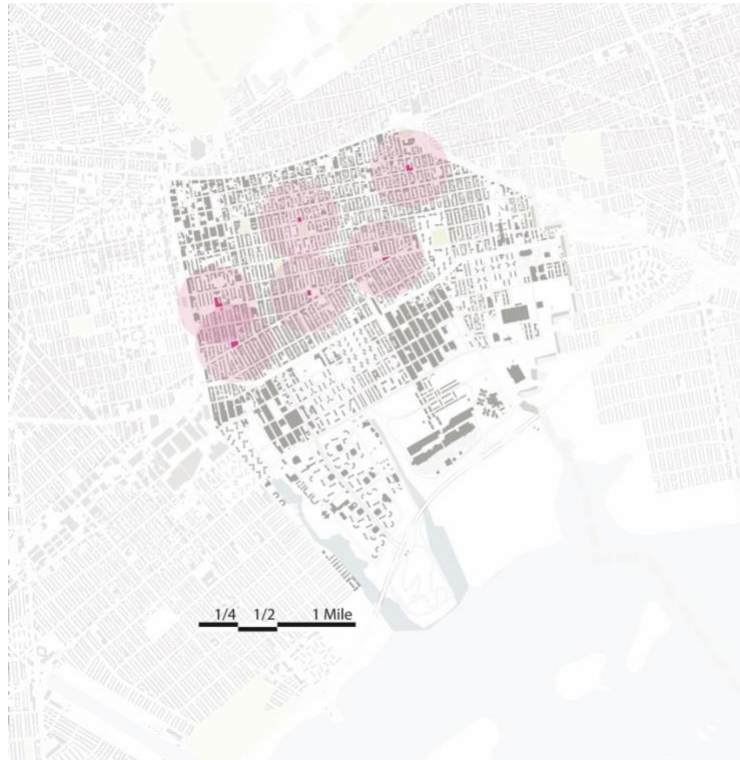


Figure 41, Site Radii
(Source: Author)



Figure 42, Food Network and Sites
(Source: Author)

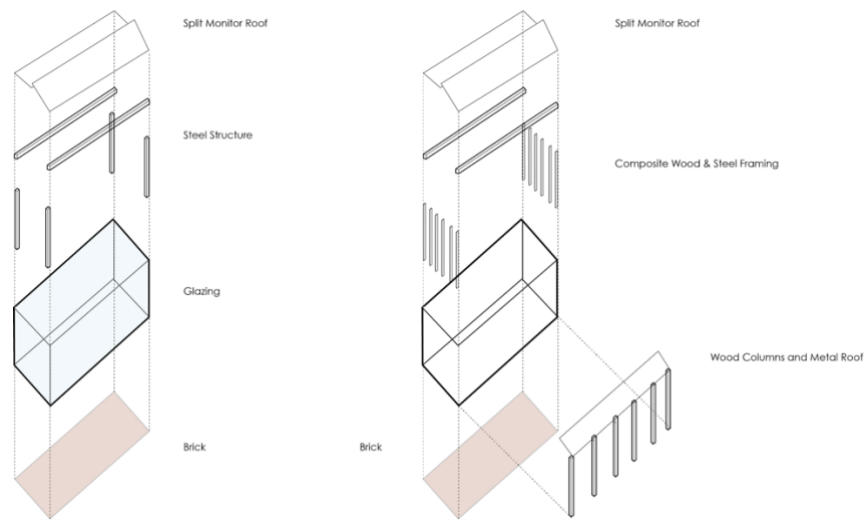


Figure 43, Structure
(Source: Author)

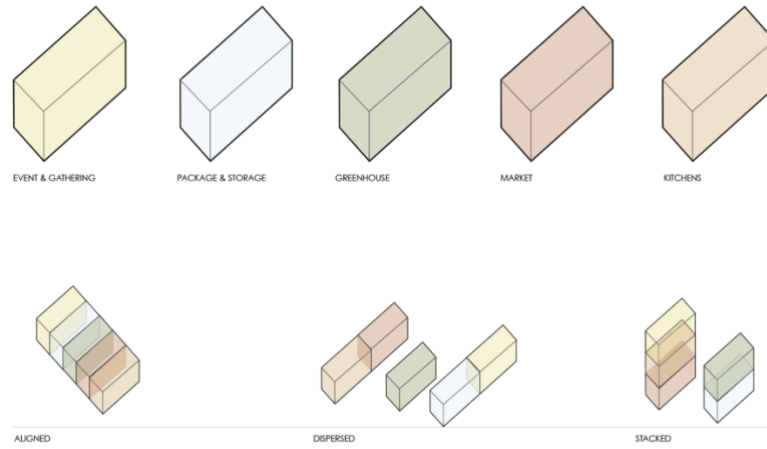


Figure 44, Program
(Source: Author)

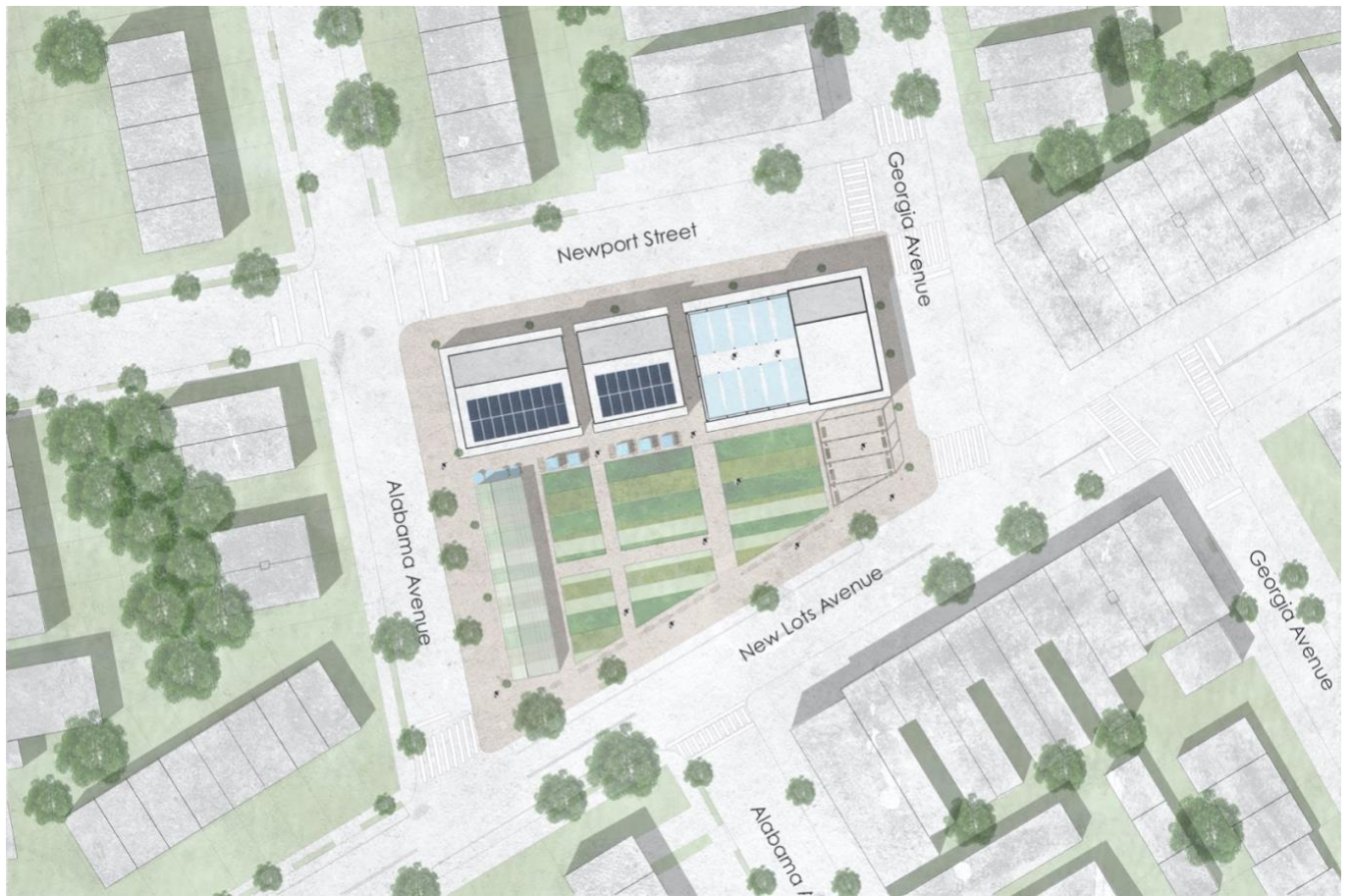


Figure 45, Site Plan
(Source: Author)



Figure 46, Design Strategies
(Source: Author)



Figure 47-48, Plans
(Source: Author)



Figure 49-52, Sections and Elevations
(Source: Author)









Figure 53-59, Perspectives
(Source: Author)

Bibliography

Anderson, Theresa, Gearing, Maeve. “Innovations in NYC Health & Human Services Policy: Food Policy.” *Urban Institute* (2014):1-13.

<https://www1.nyc.gov/assets/opportunity/pdf/policybriefs/food-policy-brief.pdf>

Angotti, T. “Urban agriculture: long-term strategy or impossible dream?: Lessons from Prospect Farm in Brooklyn, New York.” *Public health* vol. 129,4 (2015): 336-41.

doi:10.1016/j.puhe.2014.12.008

“Brownfields,” The City of New York, accessed December 13, 2020,

<https://www1.nyc.gov/site/sustainability/initiatives/brownfields.page>

“Characteristics and Influential Factors of Food Deserts” USDA Economic Research Service, accessed Oct 16, 2020,

<https://www.ers.usda.gov/data-products/food-access-research-atlas/documentation/>

Choi, Yunseo, Unwin, James, “Racial Impact on Infections and Deaths due to COVID-19 in New York City”,

<https://math.mit.edu/research/highschool/primes/materials/2020/Choi-Unwin.pdf>

Cohen, Nevin. "Unintentional Food Zoning: A Case Study of East Harlem, New York." In *Integrating Food into Urban Planning*, edited by Cabannes Yves and Marocchino Cecilia, 312-33. London: UCL Press, 2018. Accessed November 11, 2020. <http://www.jstor.org/stable/j.ctv513dv1.23>.

“Cool Neighborhoods NYC,” The City of New York, accessed December 13, 2020,

https://www1.nyc.gov/assets/orr/pdf/Cool_Neighborhoods_NYC_Report.pdf

“Documentation” USDA Economic Research Service, accessed Oct 16, 2020,

<https://www.ers.usda.gov/data-products/food-access-research-atlas/documentation/>

DuBose-Simons, Carla J. "Movin' on Up: African Americans in the South Bronx in the 1940s." *New York History* 95, no. 4 (2014): 543-57. Accessed November 13, 2020. <http://www.jstor.org/stable/newyorkhist.95.4.543>.

“East New York/Starrett City,” NYU Furman Center, accessed December 13, 2020,

<https://furmancenter.org/neighborhoods/view/east-new-york-starrett-city>

“Gentrification Explained,” Urban Displacement Project, accessed December 13, 2020,

<https://www.urbandisplacement.org/gentrification-explained>

Gordon, Cynthia, Marnie Purciel-Hill, Nirupa R Ghai, Leslie Kaufman, Regina Graham, and Gretchen Van Wye. “Measuring Food Deserts in New York City's Low-Income Neighborhoods.” *Health and Place* 17, no. 2 (2011): 696–700. doi:10.1016/j.healthplace.2010.12.012.

Herscher, Andrew. "Black and Blight." In *Race and Modern Architecture: A Critical History from the Enlightenment to the Present*, edited by CHENG IRENE, DAVIS CHARLES L., and WILSON MABEL O., 291-307. Pittsburgh, Pa.: University of Pittsburgh Press, 2020. Accessed November 13, 2020. doi:10.2307/j.ctv11cwb7.20.

Hinterland K, Naidoo M, King L, Lewin V, Myerson G, Noumbissi B, Woodward M, Gould LH, Gwynn RC, Barbot O, Bassett MT. Community Health Profiles 2018, Brooklyn Community District 5: East New York and Starrett City; 2018; 29(59):1-20.
<https://www1.nyc.gov/assets/doh/downloads/pdf/data/2018chp-bk5.pdf>

Kwate, N. O., Loh, J. M., White, K., & Saldana, N. (2013). Retail redlining in New York City: racialized access to day-to-day retail resources. *Journal of urban health : bulletin of the New York Academy of Medicine*, 90 (4), 632–652. <https://doi.org/10.1007/s11524-012-9725-3>

Li KY, Cromley EK, Fox AM, Horowitz CR. Evaluation of the Placement of Mobile Fruit and Vegetable Vendors to Alleviate Food Deserts in New York City. *Prev Chronic Dis* 2014;11:140086. DOI: <http://dx.doi.org/10.5888/pcd11.140086>

Modern-Day Redlining: The Burden on Underbanked and Excluded Communities in New York (2020)
<https://www.congress.gov/116/meeting/house/110580/witnesses/HHRG-116-BA15-Wstate-WeisbergJ-20200306.pdf>

New York Law School Racial Justice Project., "Unshared Bounty: How Structural Racism Contributes to the Creation and Persistence of Food Deserts. (with American Civil Liberties Union)." (2012). Racial Justice Project. Book 3.
http://digitalcommons.nyls.edu/racial_justice_project/3

"Outdoor Air Quality," The City of New York, accessed December 13, 2020, <https://www1.nyc.gov/site/doh/health/health-topics/air-quality-air-pollution-protection.page>

"Resources," The City of New York, accessed December 13, 2020, <https://www1.nyc.gov/site/agriculture/resources/resources.page>

Segal, Adi. "Food Deserts: A Global Crisis in New York City Causes, Impacts and Solutions." *Consilience* 3, no. 3 (2010): 197–214.
<https://journals.cdrs.columbia.edu/wp-content/uploads/sites/25/2016/10/120-237-1-PB.pdf>

"Stormwater Management," The City of New York, accessed December 13, 2020, <https://www1.nyc.gov/site/dep/water/stormwater-management.page>

"The Five Boroughs of the City of New York: A Brief Historical Description". October 7, 2017. Archived from the original on October 7, 2017. Retrieved July 10, 2020.

"The Fresh Approach to Food Insecurity: NYC's Market-based Food Movement-LIA Warner",

The Gallatin Research Journal, last modified April 22, 2019.
<https://wp.nyu.edu/compass/2019/04/22/the-fresh-approach-to-food-insecurity-nycs-market-based-food-movement/>

“Urban Agriculture Toolkit,” United States Department of Agriculture, accessed December 13, 2020, <https://www.usda.gov/sites/default/files/documents/urban-agriculture-toolkit.pdf>

“What Really Happens When a Grocery Store Opens in a ‘Food Desert’?”, New York University, last modified December 10, 2019.
<https://www.nyu.edu/about/news-publications/news/2019/december/what-really-happens-when-a-grocery-store-opens-in-a--food-desert.html>

Yvonne Hung. "East New York Farms: Youth Participation in Community Development and Urban Agriculture." *Children, Youth and Environments* 14, no. 1 (2004): 56-85. Accessed November 13, 2020. <http://www.jstor.org/stable/10.7721/chilyoutenvi.14.1.0056>.