COLUMBIA
GSAPP

sowing seeds

for urban agriculture in brooklyn

KI-SANG YI | GIS FALL 2023

acknowledgements

The cartographer acknowledges the traditional, ancestral, unceded territoritories of the Lenape People, which include the site in Harlem and Morningside Heights where the Columbia University Graduate School of Architecture, Planning & Preservation sits today. Lenape means real person, or original person, and it is important to remember that Lenape, collectively, are a living and breathing community.

The cartographer further acknowledges the long history of Black farmers in New York, which dates back to 1640 when Europeans ceded sections of Manhattan stolen from the Lenape people to formerly enslaved Black people to farm. Their ongoing work in stewarding the land and building mutual aid further highlights the systemic injustice and architecture of food apartheid that disproportionately impacts Black communities across America.

In recognizing the global interconnectedness of colonial projects, the cartographer reaffirms her support of the Palestinian people's in their struggle against Israeli occupation, apartheid, and ethnic cleansing. The genocide of the people in Gaza is also a genocide of the land and of every lifeworld it sustains. No viable future—human or otherwise—is possible under apartheid.

The cartographer commits to ongoing education and soidarity-building practices to end anti-indigenous and anti-Black racism, modern colonialism, and white supremacy and to creating equitable relations that honor and heal communities and the land that is essential for food sovereignty and ecological justice.

contents

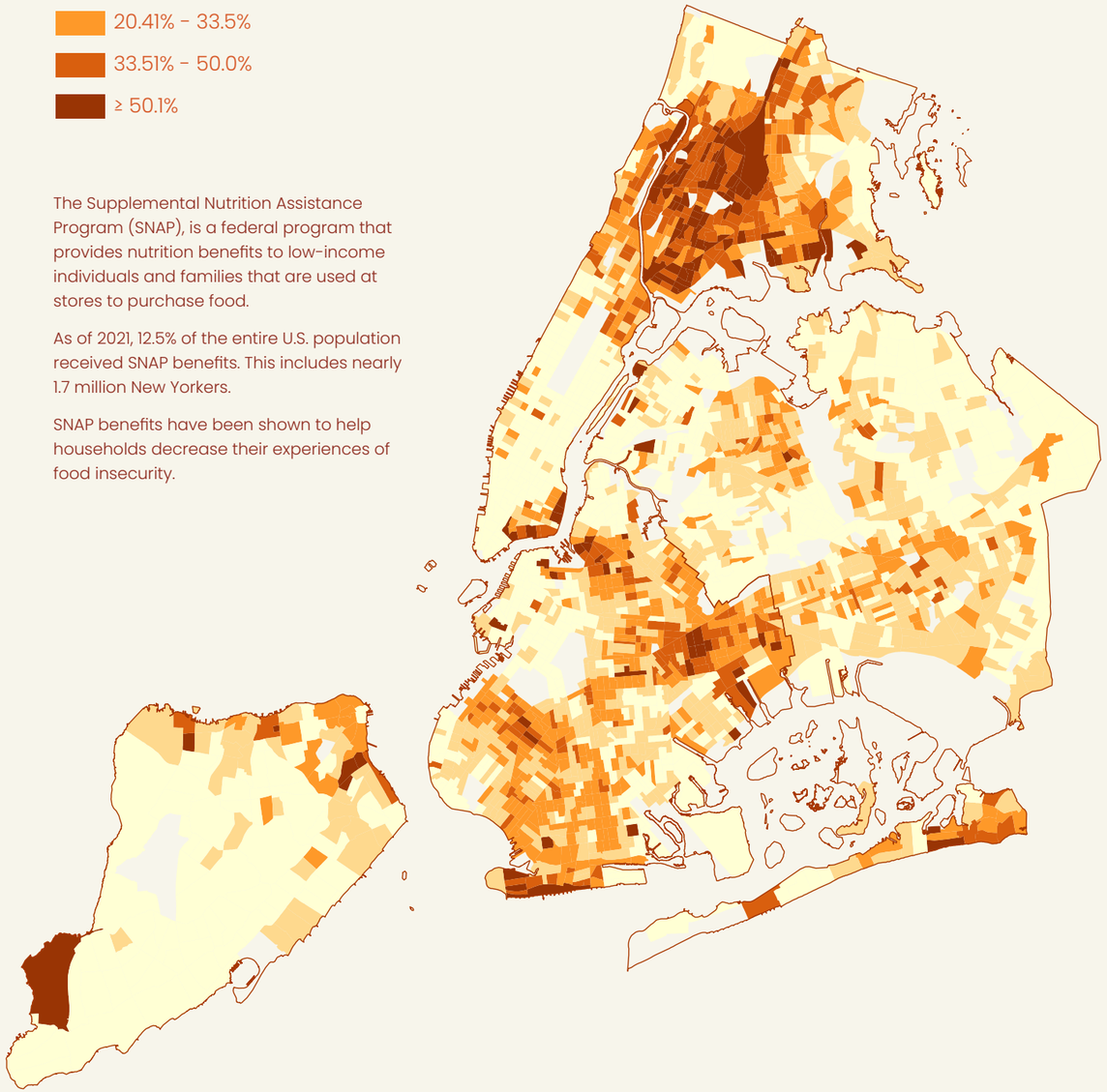
SNAP recipients

- ≤9.7%
- 9.71% - 20.4%
- 20.41% - 33.5%
- 33.51% - 50.0%
- ≥ 50.1%

The Supplemental Nutrition Assistance Program (SNAP), is a federal program that provides nutrition benefits to low-income individuals and families that are used at stores to purchase food.

As of 2021, 12.5% of the entire U.S. population received SNAP benefits. This includes nearly 1.7 million New Yorkers.

SNAP benefits have been shown to help households decrease their experiences of food insecurity.



introduction

The Office of Brooklyn Borough President published *Planning for Public Health in Brooklyn: Existing Conditions Report* in November 2022 and *The Comprehensive Plan for Brooklyn* in October 2023. These documents describe Brooklyn as being home to residents from over 100 countries and 7 of the 10 neighborhoods with the highest income growth from 2010 to 2020. However, the borough is also highly segregated and displaying a tremendous range in median household income across neighborhoods.

As part of its comprehensive plan to improve public health, the plan includes recommendations to reduce food insecurity, including advocating and/or funding local food hubs, food pantries, and school gardens.

In 2021, New York City passed Local Law 121 and Local Law 123 to establish the Mayor's Office of Urban Agriculture (MOUA) to expand urban agriculture, specifically to address historical barriers and inequities to food and climate justice.

In the MOUA's first report, *Cultivating Urban Agriculture in New York City* (2023), urban agriculture is advanced for its wide-ranging benefits, including, of course, produce local, sustainable food. As such, NYC leadership operates with the premise that urban agriculture can be a means to improve intersectional resiliency against food insecurity.

Having said that, there is a growing body of literature that suggests that urban agriculture, as a form of green infrastructure, may drive further gentrification.

This study seeks to examine whether urban agriculture in Brooklyn is spatially situated to serve communities who may benefit most from these green spaces. The findings should be part of the MOUA's considerations where-and how-to proceed with its urban agriculture initiatives to best target food insecurity.

scope

The geographic scope of this study is Brooklyn, New York and is temporally constrained to November and December of 2023.

This borough is home to both the densest population and the highest number of community gardens after Manhattan.

The primary study area unit is Brooklyn's 2020 census tracts.

research questions

1 Is urban agriculture located in communities in most need?

urban gardens:

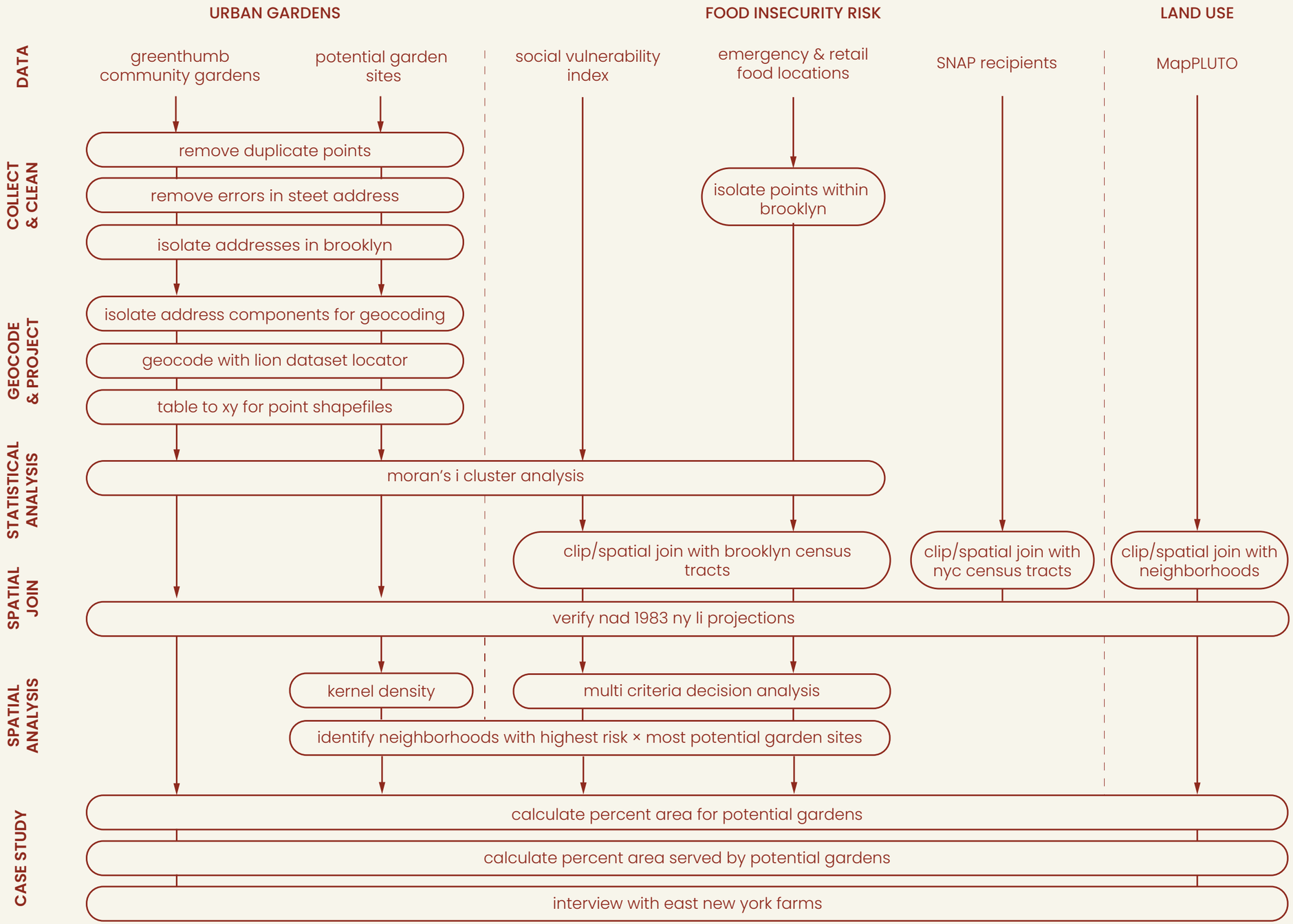
GreenThumb Community Gardens

communities in most need:

populations with highest risk of food insecurity, measured by social vulnerability and food access

2 If not, where could urban agriculture be implemented?

methodology

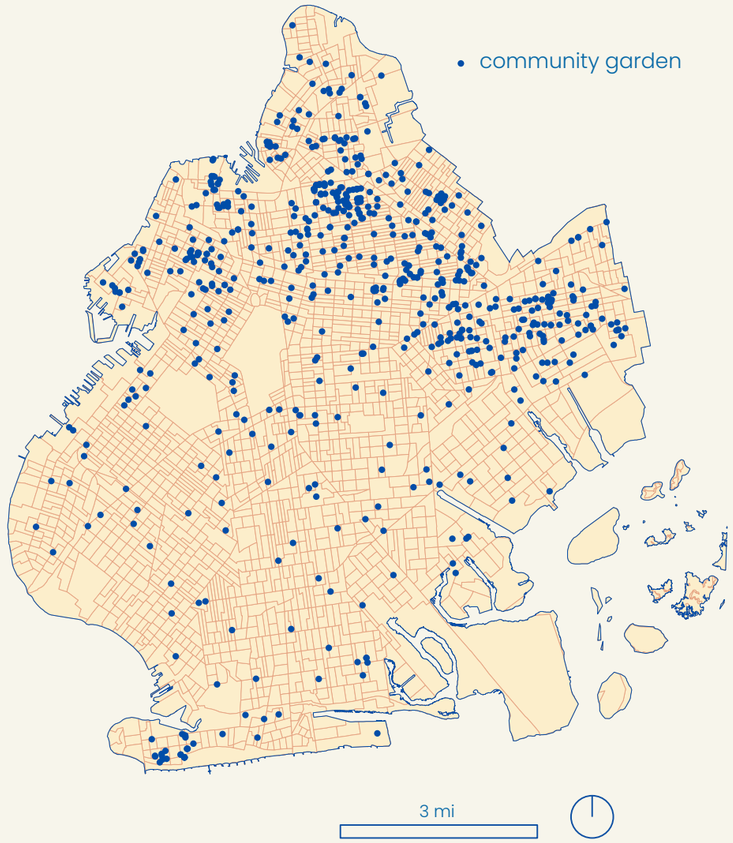


are brooklyn’s gardens located in communities in most need?

mapping communities in need

Given the intersectional nature of food insecurity, this study uses both socioeconomic and physical variables to measure need for agriculture.

Namely, it defines and visualizes need as a composite measurement of social vulnerability indices and physical access to food.

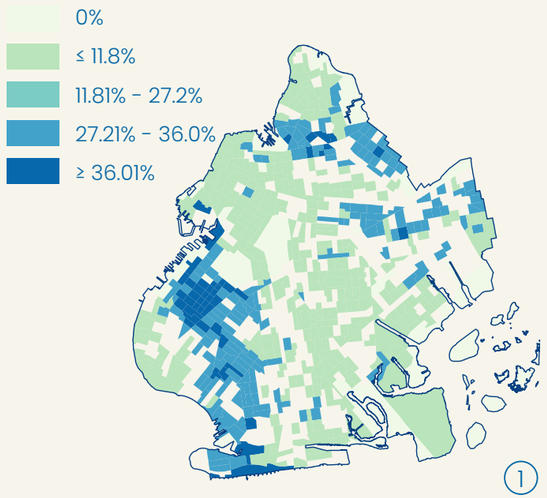


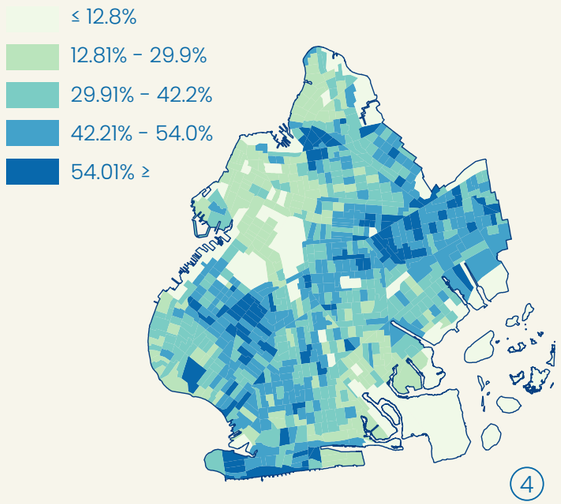
socioeconomic vulnerability

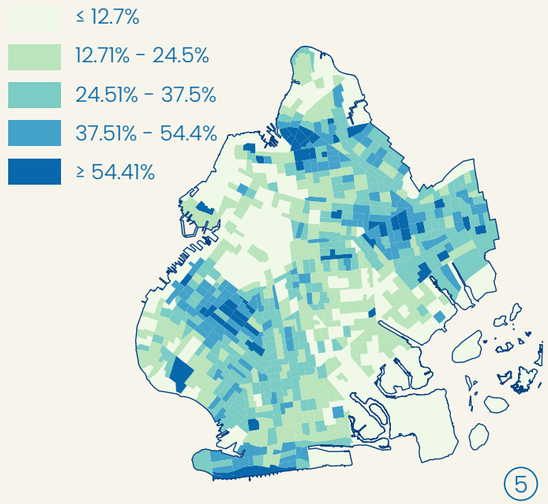
As of March 2020, up to two in five people lived with food insecurity with disparities across race, unemployment, age, and other socioeconomic characteristics. Furthermore, merely living in disadvantaged communities increased individuals' risk for food insecurity beyond individual risk vulnerbabilities.

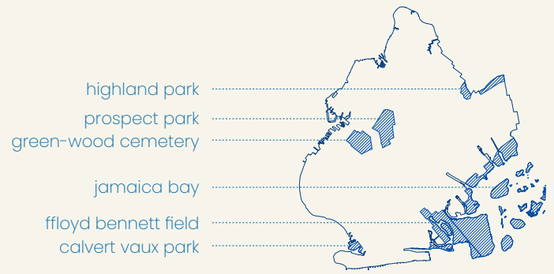
This study looks at the following socioeconomic components of food insecurity.

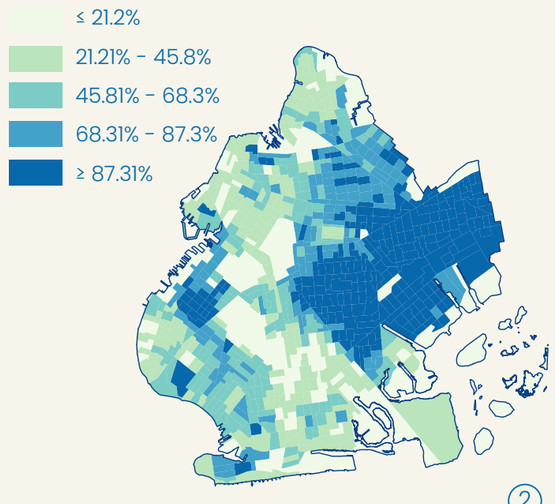
1. adults without high school diploma
2. racial minorities
3. unemployment
4. housing burden above 30% of income
5. income below 150% poverty line
6. population below age 18
7. population above age 65

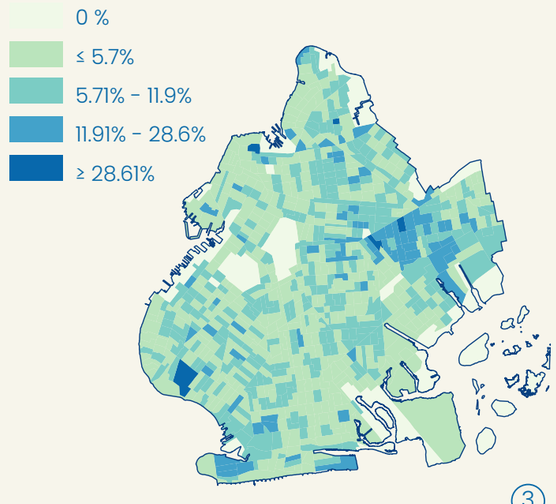


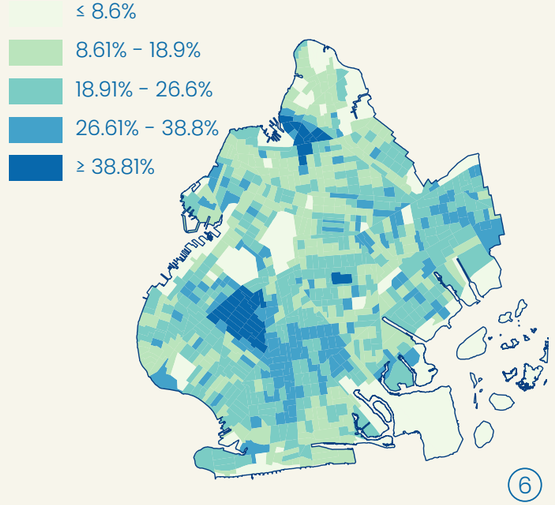


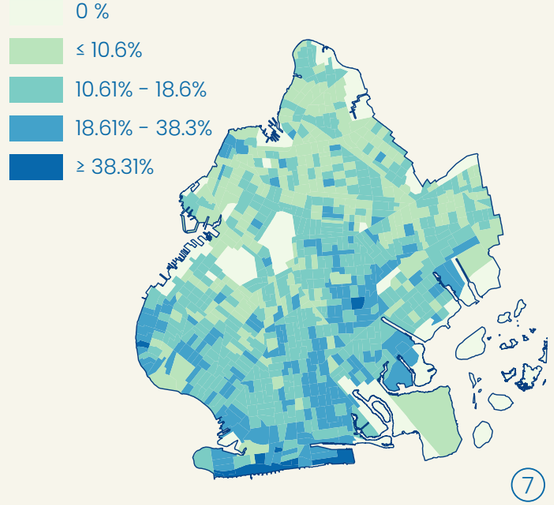


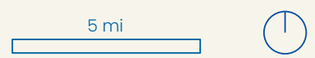










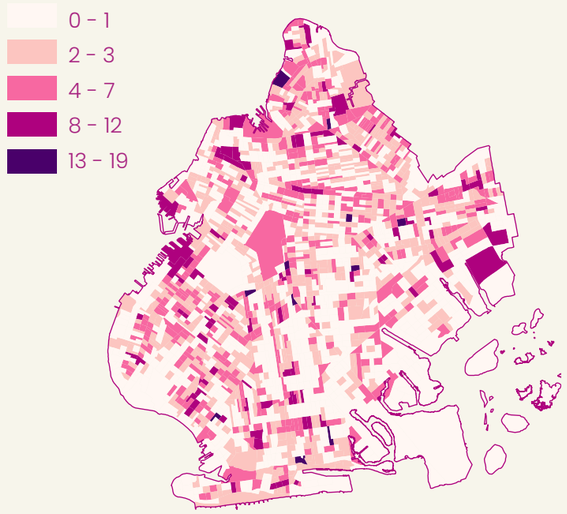


access to food

number of food retail stores and farmer's markets per census tract

Due to the density of NYC, typical spatial distributions of food inequity are less common throughout its five boroughs. Moreover, with NYC's FRESH Zones, most neighborhoods are able to access some form of fresh produce in most local bodegas.

Having said that, mere physical availability does not translate to realized access, costs can still be prohibitive for households. For this reason, this study also looked at nearby access to emergency food access points as a risk component for food insecurity.

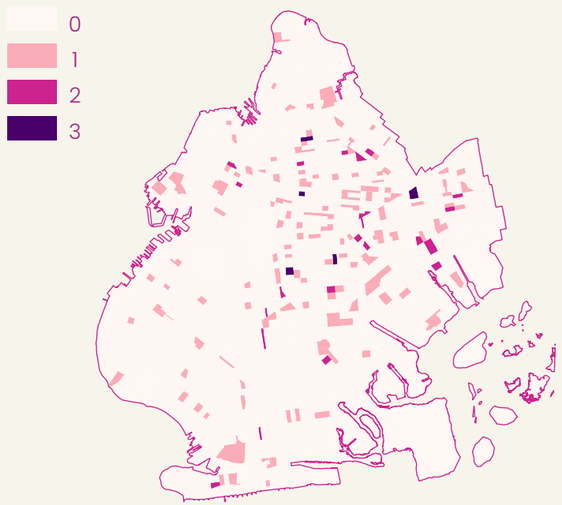


moran's I: 0.302
p-value: < 0.001
*farmer's markets only

number of emergency food access points per census tract

Emergency food access points (EFAPs), which include food pantries, food banks, soup kitchens, allow households to receive food without cost. Funding for EFAPs increased drastically during COVID-19 to respond to heightened food insecurity.

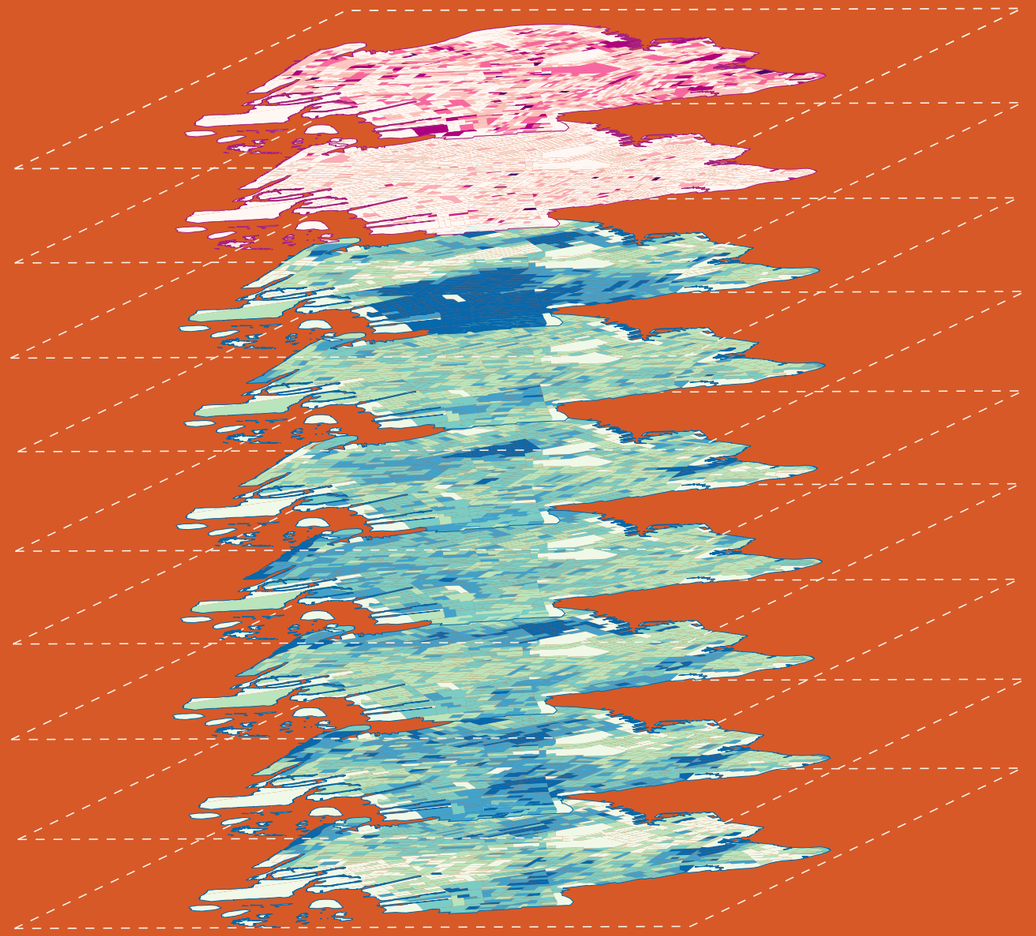
While an accessible support for households experiencing acute food insecurity, EFAPs rely on charity and conventionally exploitative systems of food production. As such, their spatial absence is considered as a component of food insecurity, rather than its main factor and potential long-term solution.



moran's I: 0.426
p-value: < 0.001

5 mi

food insecurity risk index



food insecurity risk index

multi criteria decision analysis

The social vulnerability and food access variables above were used to determine a compound risk index for food insecurity across Brooklyn.

Poverty and lack of emergency food access points are weighted twice as heavily as the other variables due to their critical correlation in exacerbating chronic and acute food insecurity.

social vulnerability

poverty × 2

racial minority × 1

rent burden × 1

education × 1

children × 1

elderly × 1

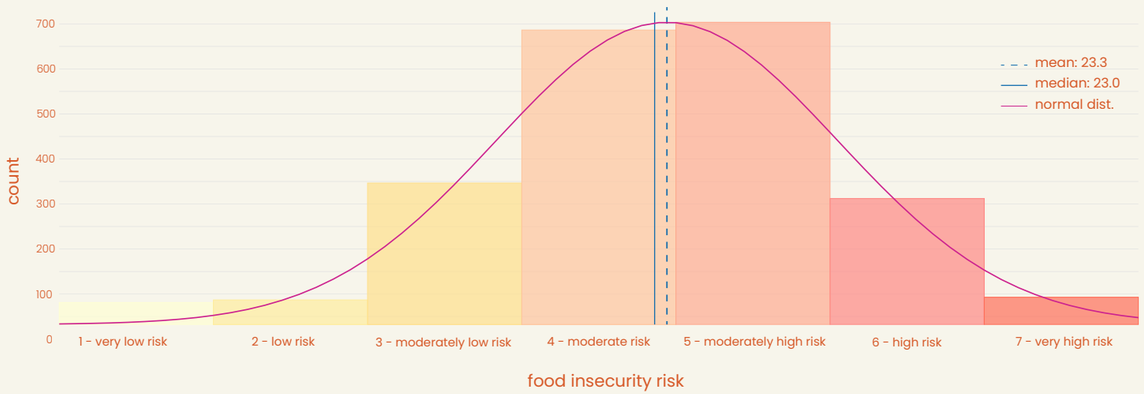
+

food access

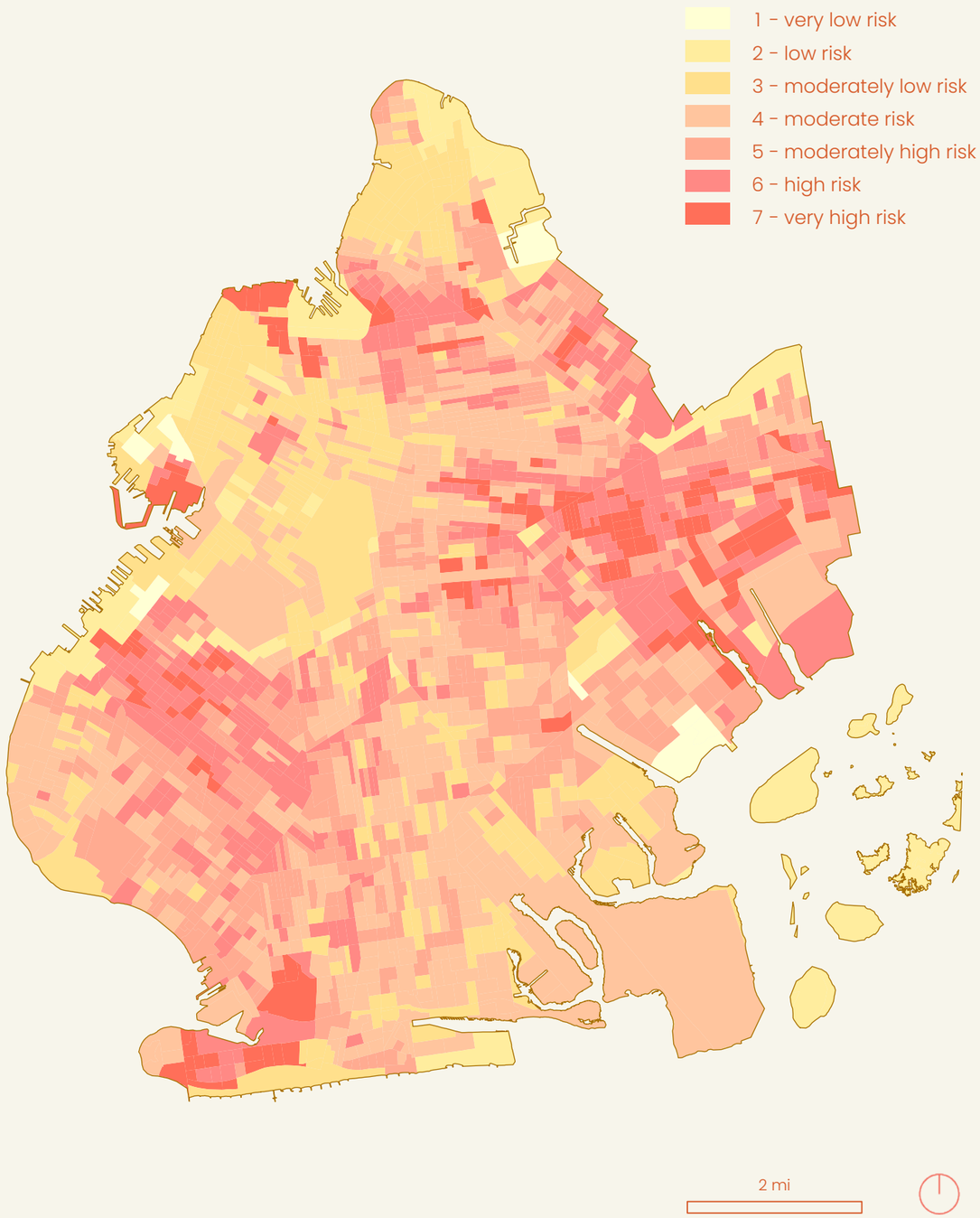
emergency food access points × 2

food retail locations × 1

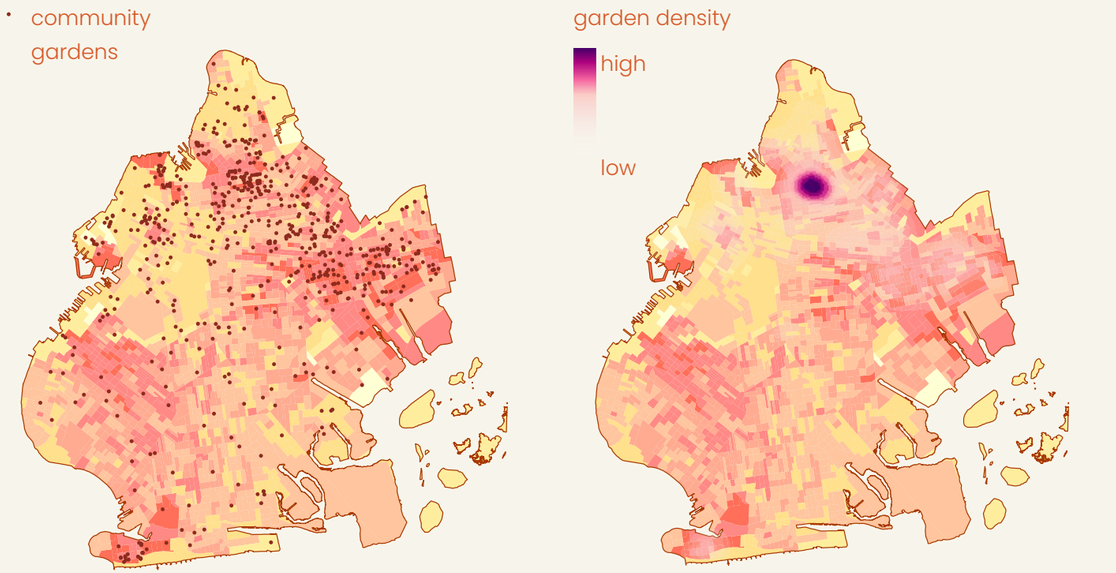
distribution of food insecurity risk in brooklyn



According to the MCDA over 27.7% of Brooklyn's population experiences high or very high risk of food insecurity.



are current gardens located in areas with highest food insecurity risk?



Existing community gardens are most densely centered around the intersection of Williamsburg, Bedford-Stuyvesant, and Bushwick in northern Brooklyn.

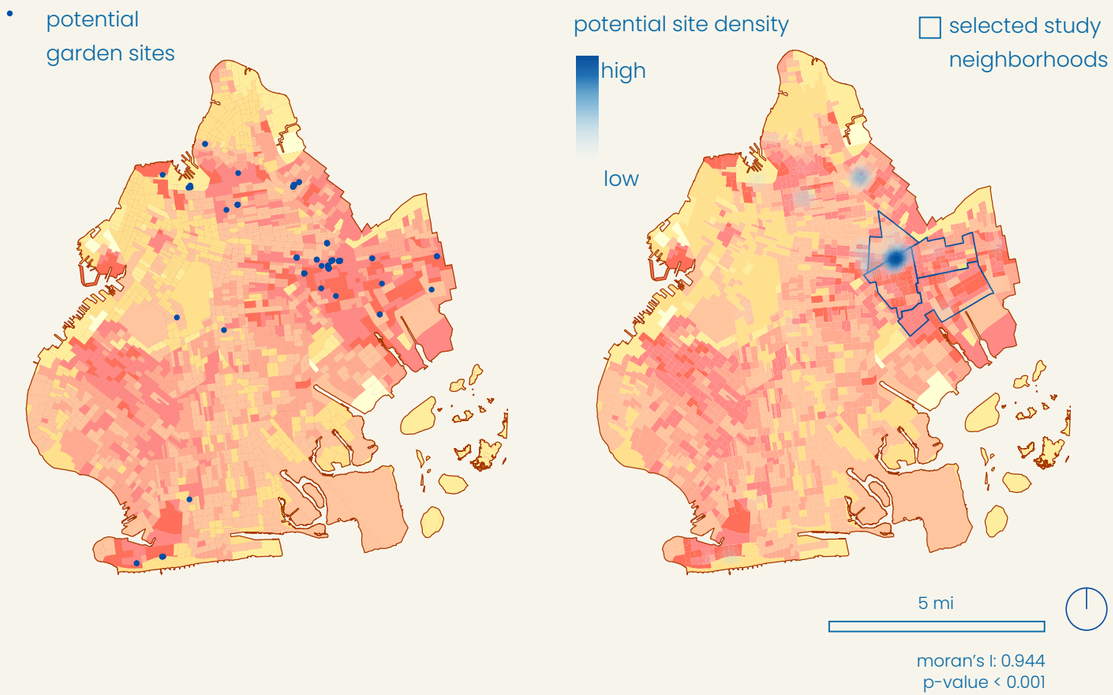
These neighborhoods also display a moderately high, high, and very high risk for food insecurity, which suggests that the gardens in this area are positioned to serve those who are in most need.

However, there are several other areas of high and very high risk that do not have a corresponding high density of gardens.

Can we hope for change in the near future?

where could urban agriculture be implemented in brooklyn?

are potential garden sites located in areas with highest food insecurity risk?



Potential garden sites were gleaned from the NYC Department of Parks and Recreation's master list of potentially suitable sites.

Of all the sites in the master list, the potential sites above represent those that are city-owned, larger than 25,000 sqft, and either vacant or open spaces.

The analysis above suggests that there is a high density of potential sites in the neighborhoods of Ocean Hill, Brownsville, and East New York.

Given that these neighborhoods also display high levels of food insecurity risk, can we plan future gardens nearby?

east new york
case study area

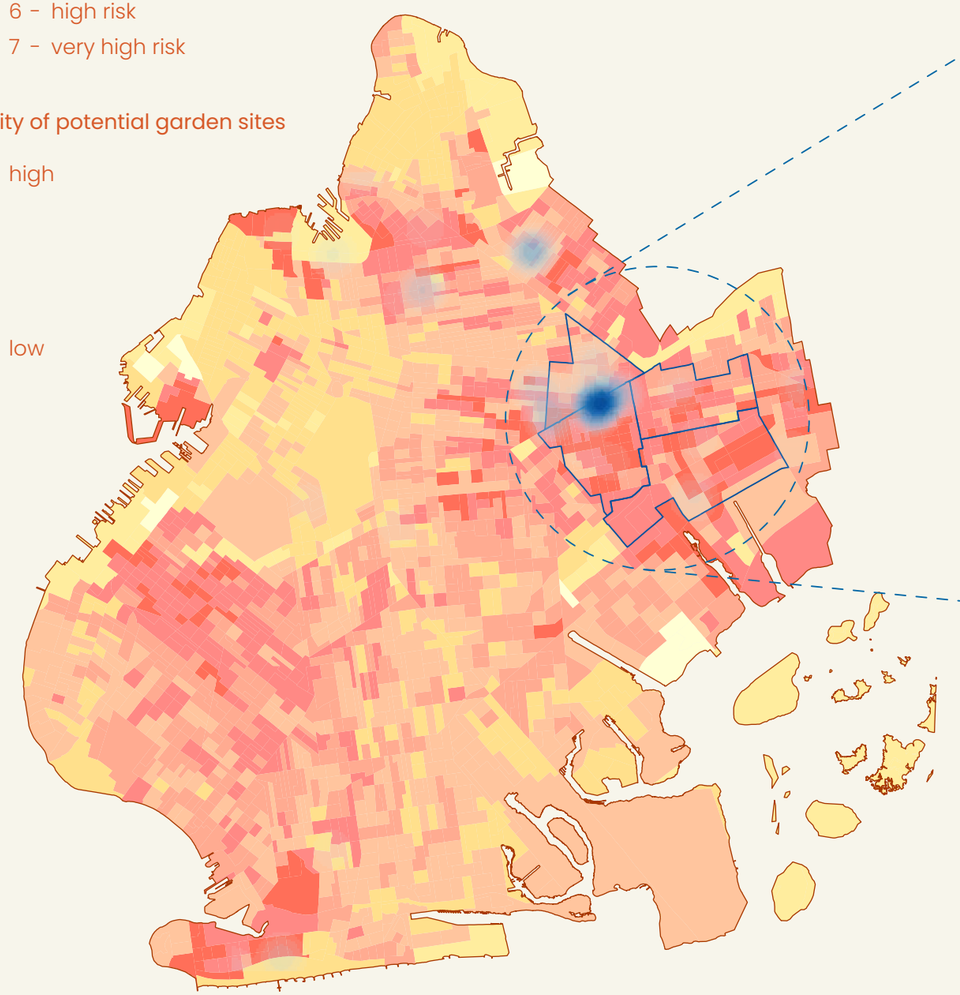
case study area

1 - very low risk
2 - low risk
3 - moderately low risk
4 - moderate riks
5 - moderately high risk
6 - high risk
7 - very high risk

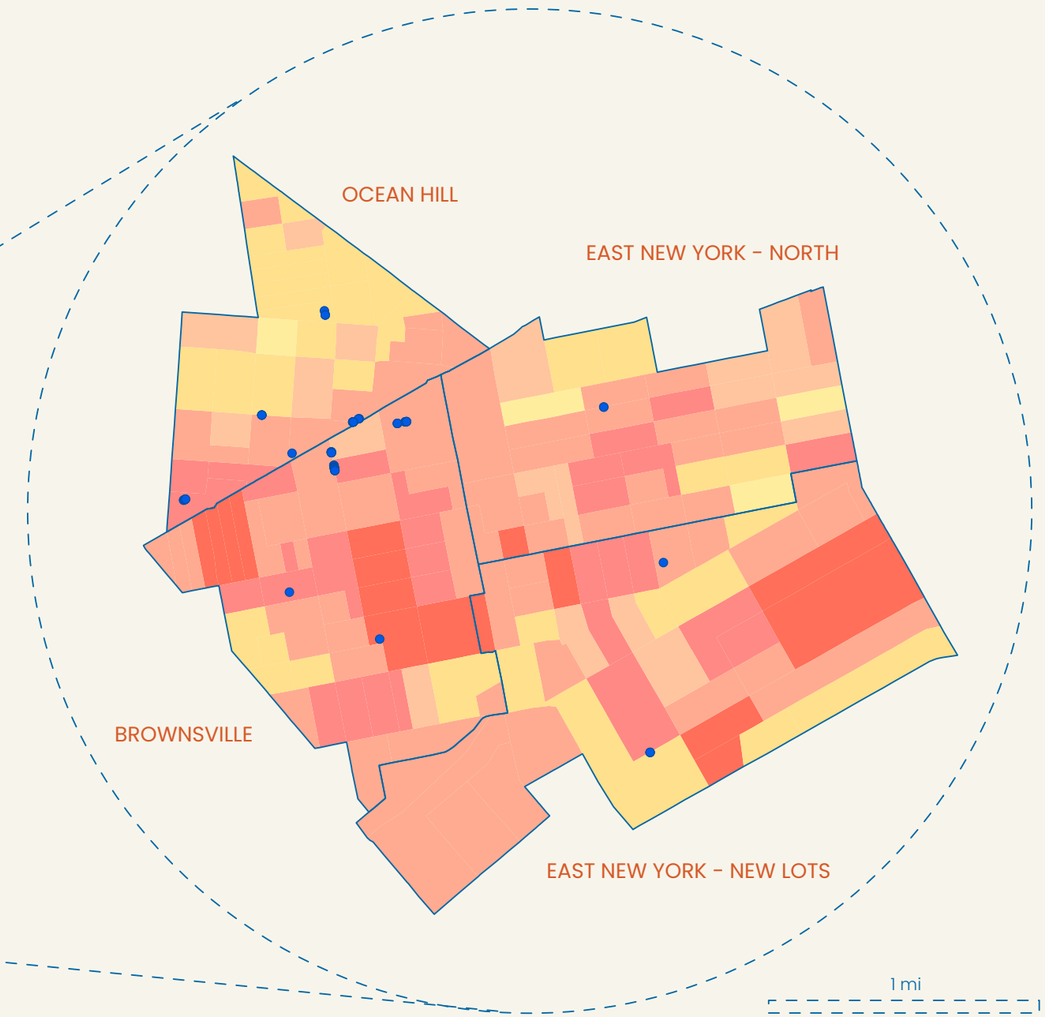
density of potential garden sites

high

low



3 mi



Even within our case study area, potential garden sites are not evenly distributed.

Potential city-owned sites are concentrated along the boundaries of Ocean Hill and Brownsville, while there is a relative lack of potential sites in East New York.

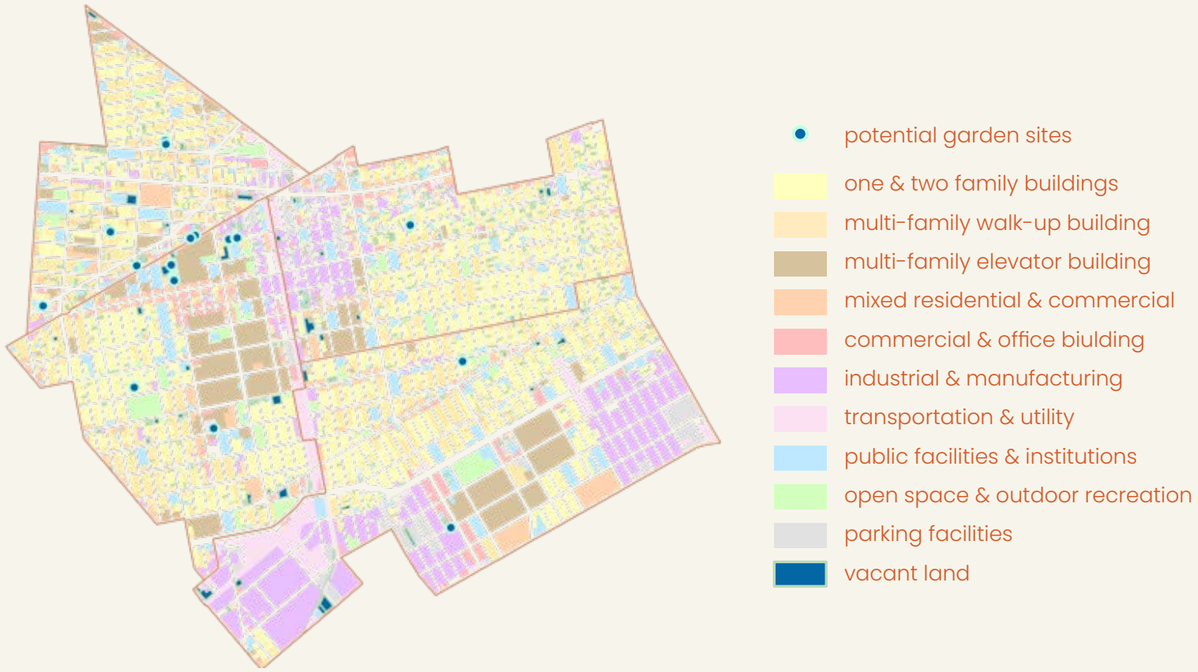
What can land use zoning tell us about this distribution this?

land use around urban agriculture

Urban agriculture movements are strongly tied to the land, and land in New York City is regulated by zoning laws.

Looking at New York City's Primary Land Use Tax Lot Output (PLUTO) data for context, potential garden sites are concentrated in mixed-use areas that feature more multi-family housing, commercial, public facilities & institutions.

Correspondingly, there are fewer potential sites in predominantly residential areas.



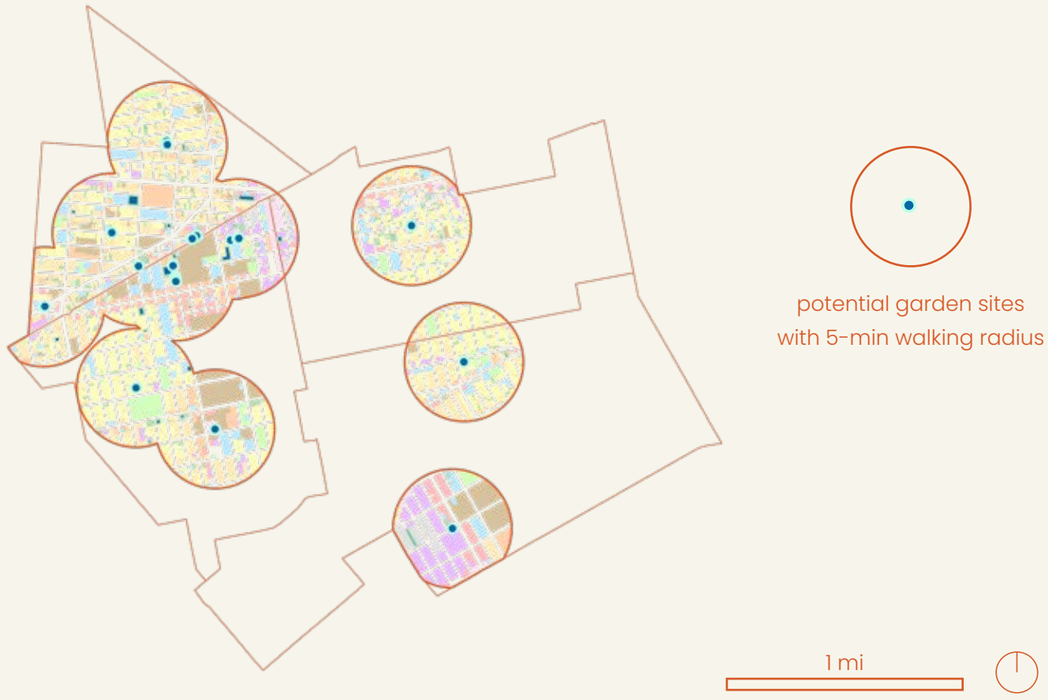
What is the urban agriculture potential for these sites?

the 5-minute garden network

To explore the impact of the potential garden sites, the study looked at the 5-minute walking buffers around these sites.

16.7% of the neighborhoods of Ocean Hill, Brownsville, East New York North and New Lots fall within these buffers and would be further served by fresh, local produce if each potential site was converted to an urban garden.

This translates to roughly 169,560 people who would be a 5-minute walk away from reducing their risk of food insecurity.



Having said that, the PLUTO data also reveal that there are a number of vacant lots in East New York that were not listed on NYC DPR's master list of potential sites.

Given the relative lack of potential sites in East New York, the study took a deeper dive to learn more about the reality and challenges of running urban agricultural programs in this neighborhood.

garden potential in east new york

Upon further exploration, the potential site in this neighborhood was identified as an existing garden operated by East New York Farms.

Meanwhile, PLUTO data revealed three additional city-owned vacant lots that were not listed on NYC DPR's master list of potential sites.

If all three lots were turned into urban gardens, they would increase percent garden coverage in this area by 34.6%, while potentially benefitting from the nearby existing network of urban agriculture.

How can New York City's vacant lots be used to support urban agriculture in Brooklyn?

east new york farms garden

sol bacio

assistant program director, east new york farms

East New York Farms currently operates four farms in the neighborhood.

Its various programs around intergenerational accessibility and cultural relevance with Indigenous practices and crops from the Carribean and West Africa heavily featured in their gardens.

Most of the crops grown on East New York Farms gardens are distributed directly to the community, with a portion of crops being sold at farmer's markets.

access to land

According to Sol, secure access to land is the most challenging part of working with NYC's GreenThumb program.

Most of East New York Farms' gardens are under the city's public program despite being started and cared for by community members since the 1960s and 1970s.

Sol identified ownership to land is the biggest issue for urban agriculture initiatives in East New York, citing private and public development of their leased farms as ongoing threats.

What can access to land look like in New York City?

community land trusts

collective ownership, collective security

The history of urban agriculture in New York City has always been rooted in communities reclaiming vacant lots for mutual aid and self-sustenance.

At its inception, the GreenThumb program operated by leasing NYC-owned properties to residents. However, in 1995, the practice of leasing properties was terminated in favor of temporary licenses, leaving community gardens vulnerable to developers across New York City.

Communities' main challenge in securing tenure is the lack of capital to purchase land. Currently, most community gardens rely on private donors and land owners for the basic means of operating an urban garden. There are, however, alternative means of securing access and tenure to land.

Across Brooklyn and New York City, community land trusts have been building coalitions with affordable housing advocates and policy-makers to push for greater transfers of vacant lots to local communities.

Community land trusts are nonprofit organizations that buy land off the private real estate market for collective ownership and decision-making over the land's use and development.

As of February 2023, New York City Council has been presented with a bill that could expedite the transfer of public lands to community land trusts. Intro 637, the Public Land for Public Good bill, would prohibit the mayor from selling public land to a for-profit developer unless no qualified non-profit or community land trust applied.

conclusion

Through a spatial analysis of urban agriculture in Brooklyn, the study explored the question of whether urban agriculture is positioned to serve communities in most need.

By creating a food insecurity risk index that accounts for both socioeconomic vulnerabilities and physical food access, the study found that over 27.7% of the borough's residents are at high or very high risk of food insecurity.

However, while there is a high number of community gardens in the Brooklyn borough, they are significantly clustered in specific neighborhoods, leaving other high-risk neighborhoods unserved.

In particular, the study focused on the neighborhoods of Ocean Hill, Brownsville, and East New York to find due to their high overlap of high-risk populations and density of potential NYC-owned garden sites. It found that converting each potential site into a garden would give 169,560 people additional access to fresh produce and community space within a 5-minute walk.

Looking specifically at East New York, the study found that there are additional NYC-owned vacant lots suitable for garden conversion.

Converting each NYC-owned vacant lot within a 5-minute walk of East New York Farms' existing gardens would increase garden area by 34.6%.

In recognition that collective access to land and food sovereignty are intimately correlated, this study recommends that New York City expedites the legislation of the Public Land for Public Good bill to facilitate transfer of vacant lots to community land trusts.

datasets

COMMUNITY GARDENS

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COMMUNITY GARDENS WORK FOR STAYING POWER

"Modern Community Gardens Work for Staying Power." *Scenic Hudson*, https://www.scenichudson.org/viewfinder/modern-community-gardens-work-for-staying-power/.

NYC RESOURCES TO TRANSFORM VACANT LOTS

596 Acres. https://596acres.org/nyc-resources-to-transform-vacant-lots/.

PLACE STILL MATTERS: SOCIAL VULNERABILITIES, PLACE-LEVEL DISADVANTAGE, AND FOOD INSECURITY

Fitzpatrick, Kevin M., et al. "Place Still Matters: Social Vulnerabilities, Place-Level Disadvantage, and Food Insecurity during COVID-19." *Nutrients*, vol. 15, no. 6, Mar. 2023, p. 1430. DOI.org (Crossref), https://doi.org/10.3390/nu15061430.

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