

A Grocery Store for the Big Apple

Research Question

Where does a new, full-line grocery store belong in New York City?

To answer this question, a needs assessment was performed based upon available data for population, income, and existing grocery stores. Research on food insecurity in New York City was utilized to identify a selection of priority neighborhoods. The specific spatial mechanism is walking distance to a full-line grocery store in identified food insecure neighborhoods.

Methodology

Step 1

Utilizing Census data, existing research on food insecurity in New York City, and zoning priorities outlined by the Food Retail Expansion to Support Health (FRESH) program, **identify study areas** in New York City that would benefit from the installation of a new, full-line grocery store.



In order to spatially address the income aspect of food insecurity, FRESH polygons were utilized. These are areas that NYC EDC has identified as priorities for building and expanding existing grocery stores. This program provides special tax incentives to developers who invest in these low-income neighborhoods and to store operators seeking to expand their full-line grocery stores. To collect descriptive statistics on these areas, population density was mapped utilizing Census data from the 2010 block-level estimates.

Step 2

Collect business data from the ReferenceUSA dataset on existing grocery stores in these priority areas, **determine the validity**, and convert to a features layer on the map.

To filter the results of the business data, I utilized 5 zip codes for the 4 neighborhoods: 11207 and 11208 (East New York), 11212 (Brownsville), 11231 (Red Hook), 10029 (East Harlem). The North American Industry Classification System (NAICS) code 445110 was utilized within the ReferenceUSA dataset: “supermarkets excluding convenience stores and wholesalers.” The results of the search totaled 1,547 stores within the 5 zip codes.

To verify the validity of existing grocery stores, I searched all of the addresses on Google. **Out of the original 1,547 results, only 62 were true, full-line grocery stores.**

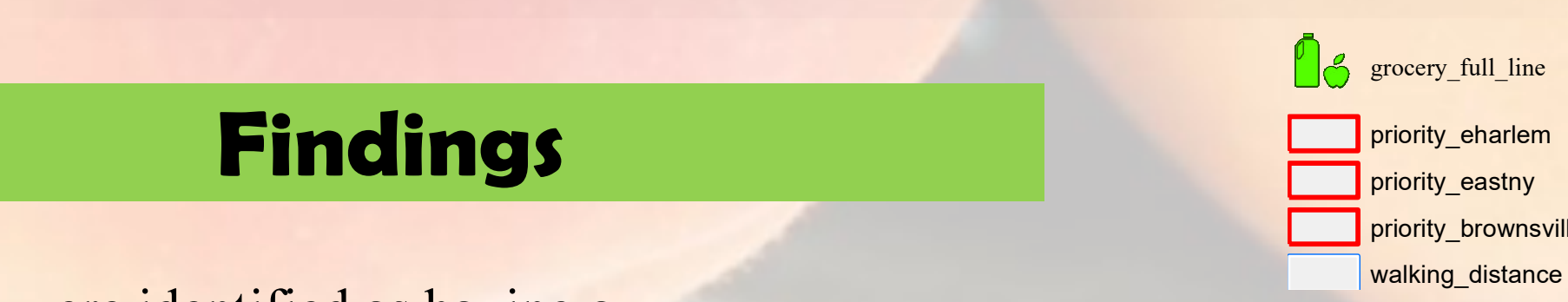
Step 3

Create buffer zones of one-half mile (800 meters) to **show reasonable walking distance** surrounding each grocery store.

Step 4

Identify the areas within the bounds of these priority neighborhoods that are outside the half-mile walking distance buffer as potential locations for a new grocery store.

I estimated the population served in this area by utilizing the Census blocks having their centroid in the polygon.



Findings

Three areas were identified as having a need for a full-line grocery store.

East New York

- Approximate population in 2010: 147,640
- Based on farthest point, the distance to the closest grocery store is over 0.8 miles
- Priority area is estimated at 4,242 people

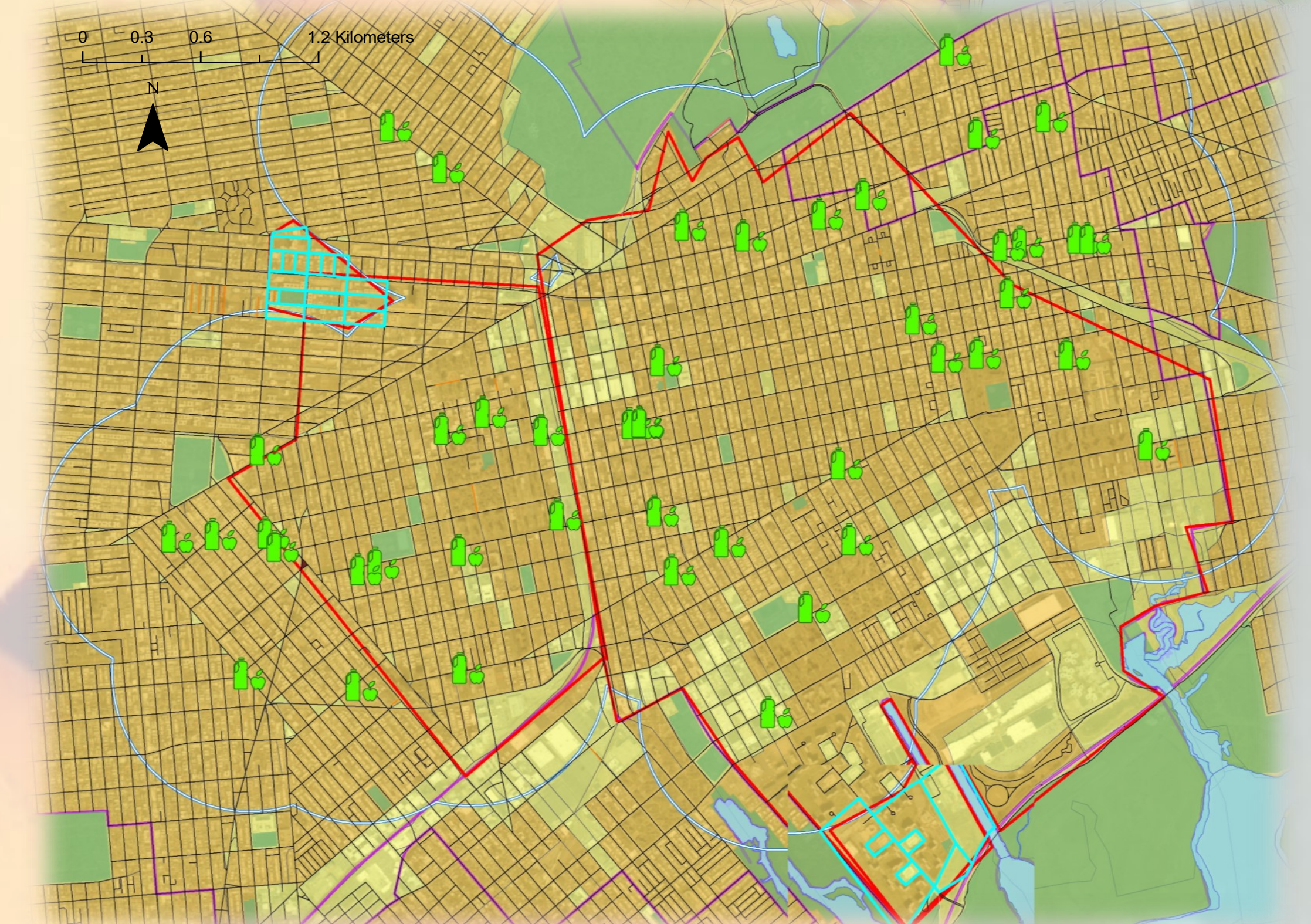
Brownsville

- Approximate population in 2010: 70,518
- Based on farthest point, the distance the closest grocery store is over 0.8 miles
- Priority area is estimated at 4,017 people

East Harlem

- Approximate population in 2010: 119,000
- Based on farthest point, the distance to the closest grocery store is 1.3 miles
- Priority area is estimated at 12,731 people

The red polygon represents the boundaries of East Harlem, blue boundaries represent 0.5 mile walking distance from the existing grocery stores, the purple boundaries represent FRESH zones, and the blue highlight is the identified priority area.



The red polygon represents the boundaries of Brownsville (left), and East New York (right), blue boundaries represent 0.5 mile walking distance from the existing grocery stores, the purple boundaries represent FRESH zones, and the blue highlight polygons are the identified priority areas.

Limitations and Future Work

The use of walking distance as a mechanism to describe access to grocery stores is limited in the sense that it does not describe or address any of the conditions of the roads: sidewalks, slope and terrain, street lighting, crime and other safety concerns.

A major aspect of this study is that it aims to address food insecurity (and, to a certain extent, economic development) from the standpoint of access to full-line grocery stores, due to the incentives that exist from the FRESH program. It does not address the fact that convenience stores fulfill an important need in the community. Where possible, convenience stores were included when it could be determined that they offered “full-line” products, such as dry goods, fresh produce, and meat. However, convenience stores were largely disregarded for their presumed limited availability. This analysis is merely a tool for evaluating a pilot study area. A finer-tuned decision tool will make more specific recommendations based upon whether the defined area is in true bounds of a FRESH zone. Another interesting aspect is the fact that even several full-line stores within the walking buffer may not accommodate these population-dense areas. Further work could aim to assess whether these stores can support the volume they demand.

Projection: NAD 1983 State Plan New York Long Island FIPS 3104 Feet
© Maps, background photo and analysis: Hattie Brown, 2018 | NUTR 231, Tufts University

GIS Resources:
NYC Department of Information Technology and Telecommunication: Hydrography and Openspace polygons (2005), LION basemap data: streets (2018), 2010 Census: block-level data, NYC Economic Development Corporation: FRESH Zones (2016), ReferenceUSA: grocery store data (2017)
Literature:
• Ver Ploeg M, Breneman V, Farrigan T, Hamrick K, Hopkins D, Kaufman P. (2009). *Access to Affordable and Nutritious Food: Measuring and Understanding Food Deserts and Their Consequences*. United States Department of Agriculture Economic Research Service. Retrieved from: https://www.ers.usda.gov/webdocs/publications/42711/12698_ap036fm_1_.pdf?v=41055
• Platkin C, Kwan A, Zarcadoolas C, Dinh-Le C, Hou N, Cather A.(2018). *Understanding Local Food Environments, Food Policies, and Food Terminology: A Study of Two NYC Neighborhoods*. Hunter College New York City Food Policy Center, Hunter College. Retrieved from: <http://www.nycfoodpolicy.org/wp-content/uploads/2018/01/FINALREPORT2.pdf>

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Research Question

Which of the existing grocery store locations are accessible to low-income residents of New York City and where does a new, full-line grocery store belong?

To answer this question, a needs assessment was performed based upon available data for population, income, and existing grocery stores. Research on food insecurity in New York City was utilized to identify a selection of priority neighborhoods. The specific spatial mechanism is walking distance to a full-line grocery store in identified food insecure neighborhoods.

Methodology

Step 1

Utilizing Census data, existing research on food insecurity in New York City, and zoning priorities outlined by the NYC Economic Development Corporation Food Retail Expansion to Support Health (FRESH) program, **identify study areas** in New York City that would benefit from the installation of a new, full-line grocery store.

To focus the study area, several reports were utilized on food insecurity in New York City. These reports focused on the neighborhoods of East Harlem, Brownsville and East New York. I further focused on Red Hook, Brooklyn from personal interest and experience.

In order to spatially address the income aspect of food insecurity, FRESH polygons were utilized. These are areas that New York City's EDC has identified as priorities for building and expanding existing grocery stores. This program provides special tax incentives including locking in pre-improvement rates, waiving city and state sales tax on construction materials and reducing mortgage taxes to developers who invest in these low-income neighborhoods and to store operators seeking to expand their full-line grocery stores. Each of the aforementioned neighborhoods are included in the FRESH zones.

To collect descriptive statistics on these areas, population density was mapped utilizing Census data from the 2010 block-level estimates.

Step 2

Collect business data from the ReferenceUSA dataset on existing grocery stores in these priority areas, determine the validity, and convert to a features layer on the map.

To filter the results of the business data, I utilized 5 zip codes for the 4 neighborhoods: 11207 and 11208 (East New York), 11212 (Brownsville), 11231 (Red Hook), 10029 (East Harlem). These codes were determined by boundaries from Google Maps and the NYC Department of Hygiene and Mental Health.

The North American Industry Classification System (NAICS) code 445110 was utilized within the ReferenceUSA dataset. This code is described as "supermarkets excluding convenience stores and wholesalers."

With these parameters, the results of the search totaled 1,547 stores within the 5 zip codes. To verify the validity of these stores, I searched all of the addresses on Google and filtered out all of the convenience stores, restaurants, and pet stores (among other erroneous inclusions). Out of the original 1,547 results, only 62 were true, full-line grocery stores. Exclusion criteria focused on the availability of a full-line of dry goods, meat, fish, and fresh produce. The basis for this is the convenience of having a centralized point to serve all of one's dietary needs, the greater likelihood of accepting SNAP/EBT, and the incentives available through the FRESH program only being available for full-line stores.

Step 3

Create buffer zones of one-half mile (800 meters) to show reasonable walking distance surrounding each grocery store.

This distance was utilized based upon an estimate of reasonable walking distance by the USDA Economic Research Service paper on the consequences of food deserts.

Step 4

Identify the areas within the bounds of these priority neighborhoods that are outside the half-mile walking distance buffer as potential locations for a new grocery store.

By drawing polygons to simulate the boundaries of these study neighborhoods, it is easier to illustrate the area that was analyzed and captured by the business data search. We can then relate this area to the FRESH zones and walking buffers surrounding the existing full-line stores. By drawing a polygon in the concentric areas inside the neighborhood bounds and FRESH zone, but outside the walking buffer, I then estimate the population served in this area by utilizing the Census blocks having their centroid in the polygon.

Findings

In analyzing these neighborhoods, several pilot areas were identified as being potential areas for installation of a full-line grocery store, according to the priorities of the FRESH program. Three areas were identified as having a need for a full-line grocery store.

East New York

- Approximate population in 2010: 147,640
 - Priority area is estimated at 4,242 people

Brownsville

- Approximate population in 2010: 70,518
 - Priority area is estimated at 4,017 people

East Harlem

The upper bounds of East Harlem do not appear to be serviced by any full-line grocery stores as of the most-recent data. The entire neighborhood is included in a FRESH zone, so the installation of a store would benefit from tax incentives.

- Approximate population in 2010: 119,000
- Based on farthest point, the distance to the closest grocery store is 1.25 miles; don't know what other neighborhoods
 - Priority area is estimated at 12,731 people

Red Hook was not found to be a high-priority neighborhood given the parameters utilized by this needs analysis. Within a half-mile buffer, nearly all of Red Hook is serviced by a full-line grocery store.

- Approximate population in 2010: 10,227

Limitations

The use of walking distance as a mechanism to describe access to grocery stores is limited in the sense that it does not describe or address any of the conditions of the roads: sidewalks, slope and terrain, construction, street lighting, crime and other safety concerns.

A major aspect of this study is that it aims to address food insecurity (and, to a certain extent, economic development) from the standpoint of access to full-line grocery stores, due to the incentives that exist by participation in the FRESH program. It does not address the fact that convenience stores fulfill an important need in the community. In many cases, these convenience stores sell many items that one can find in a full-line grocery, such as fresh produce and meat. This analysis is limited in that it does not take into account in a complete way the offerings provided by convenience stores. Where possible, these stores were included when it could be determined that the store offered “full-line” products, such as dry goods, fresh produce, and meat. However, convenience stores were largely disregarded for their presumed limited availability. This analysis is just one approach to needs assessment.

This analysis is merely a tool for evaluating a pilot of a general study area. A finer-tuned decision tool will have to make more specific recommendations based upon whether the defined area is in true bounds of a FRESH zone. That aspect is somewhat limited in this study by virtue of the fact that the priority areas are hand-drawn polygons, subject to error. To have more precise landscape of income in the area, one might include income data to better understand the distribution within each zone.

Future work

Analysis further exploring true walkability in these neighborhoods would be an important aspect to address. Another interesting aspect is the fact that even several full-line stores within walking buffer may not accommodate these population-dense areas. Another store could very well benefit these areas and it is a limitation of this needs assessment as to whether these stores can support the volume they demand.

Resources:

NYC Department of Information Technology and
Telecommunication: Hydrography and Openspace
polygons (2005)

LION basemap data: streets (2018)

2010 Census: block-level data

NYC Economic Development Corporation: FRESH
Zones (2016)

ReferenceUSA: grocery store data (2017)

Ver Ploeg M, Breneman V, Farrigian T, Hamrick K, Hopkins D, Kaufman P. (2009). *Access to Affordable and Nutritious Food: Measuring and Understanding Food Deserts and Their Consequences*. United States Department of Agriculture Economic Research Service. Retrieved from: https://www.ers.usda.gov/webdocs/publications/42711/12698_ap036fm_1.pdf?v=41055

Platkin C, Kwan A, Zarcadoolas C, Dinh-Le C, Hou N, Cather A.(2018). *Understanding Local Food Environments, Food Policies, and Food Terminology: A Study of Two NYC Neighborhoods*. Hunter College New York City Food Policy Center, Hunter College. Retrieved from: <http://www.nycfoodpolicy.org/wp-content/uploads/2018/01/FINALREPORT2.pdf>

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