An aerial photograph of New York City, showing the Hudson River, the East River, and the dense urban grid. A large, semi-transparent blue rectangle is overlaid on the top half of the image, containing the title text.

UNDERSTANDING NEW YORK CITY'S FOOD SUPPLY

PREPARED FOR NEW YORK CITY MAYOR'S OFFICE
OF LONG-TERM PLANNING AND SUSTAINABILITY
BY COLUMBIA UNIVERSITY

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ACKNOWLEDGMENTS

We would like to thank our faculty advisor, Steve Cohen, for his support and guidance. We would also like to thank Kizzy Charles-Guzman, Adam Freed, and Rohit Aggarwala at NYC Mayor's Office of Long-Term Planning and Sustainability, as well as all those involved in NYC's food supply system who took the time to speak with us.

THE WORKSHOP IN APPLIED EARTH SYSTEMS AND POLICY ANALYSIS

The MPA in Environmental Science and Policy program at Columbia University's School of International and Public Affairs' year-long workshop program culminates in the spring semester project requiring students to work with a government or nongovernmental agency client on a policy or management problem it faces. The Workshop in Applied Earth Systems Policy Analysis is a practical, real-world application of the skills acquired from the summer and fall workshop semesters, describing an environmental problem and then creating an operational and implementation plan to address the issue.

The following report is comprised of a food supply study completed as part of the Workshop in Applied Earth Systems Policy Analysis. The project, completed on behalf of NYC Mayor's Office of Long-Term Planning and Sustainability, involved mapping NYC's food supply system as the first step toward possible incorporation of a food chapter into PlaNYC.

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EXECUTIVE SUMMARY

The complex, interconnected system that supplies food to New York City is, in many ways, a mystery even to those who consider themselves to be “food-literate.” There are few reliable sources of data available about the system as a whole, and piecing it together from disparate sources can be extraordinarily difficult. By combining national datasets to provide a macroview of New York City’s food system and local case studies to provide a microview, this study begins to elucidate aspects of the system, revealing major patterns, vulnerabilities, challenges, and areas that require further study. The system we’ve come to know is complex, involving many stakeholders at many different levels; it is built on relationships, between producers and distributors, suppliers and retailers, and retailers and consumers; and it is changing to meet customer demands.

Our study revealed four main themes that define the New York City food system and will be useful to understand while engaging in long-term planning for the system’s future. The first is that there are far more similarities than differences among various points of consumption (restaurants, food retailers, public and nonprofit institutions, and schools and universities) and that suppliers and distributors are selected based on three main criteria: price, quality, and convenience.

The second is that the primary differences in food supply were identified between conventional retailers and those that specialize in organic or locally grown products. Organic retailers tend to use specialized suppliers that deal exclusively in organic food, despite the fact that more conventional retailers are beginning to carry organic product lines. Retailers that specialize in supplying locally grown foods often rely on personal relationships with local producers.

The third key theme is that there is an overall lack of awareness regarding food origin at the endpoint level of the supply chain. Most stakeholders interviewed were unaware of the origins of their food, beyond the immediate distributor. This could pose challenges to improving food safety, increasing consumer demands for information about food, and the City’s ability to plan for the food system through 2030 and beyond.

Finally, and perhaps most importantly, the food system is highly resilient, able to adapt to changing conditions without major interruption. Despite the resiliency built into the system, it is not without challenges, such as those posed by infrastructure and transportation needs, a lack of food traceability, and economic fluctuations. Infrastructure and transportation needs will become increasingly

apparent, as food movement into and within the New York City region is projected to increase by 61 percent by 2035, placing additional strains on the City's bridges, roads, and other essential infrastructure. The current recession has impacted all aspects of the food system, and planning for how to deal with future economic downturns should be a major consideration.

While this study is a first step toward a comprehensive understanding of the system, more work must be done to better understand exactly how much food enters the City, where it comes from, and where it goes when it gets here. We hope MOLTPS will use aspects of our study as starting points for future research. Other cities have conducted studies such as *The Greater Philadelphia Food System Study* and *The San Francisco Foodshed Report* that would be useful tools to begin designing a more robust study of New York City's food system.

Some key steps the Mayor's Office of Long-Term Planning and Sustainability (MOLTPS) could take to address some of the challenges identified by our study are: the creation of a Food Policy Council to address supply, distribution, and sustainability issues; promote consumer awareness of food origin and work with stakeholders to achieve greater food traceability, support efforts to upgrade, modernize, and expand the Hunts Point Terminal Produce Market, conduct a feasibility study on ways that the City can better link upstate farmers with the New York City market, and work with the Mayor's Office of Industrial and Manufacturing Businesses to explore the economic impacts of public investment in the local food manufacturing sector.



WHY IS FOOD SUSTAINABILITY IMPORTANT?

As of July 1, 2008, the population of New York City reached 8,363,710 residents, an increase of more than 4.4 percent since the year 2000.¹ While most other major cities in the Northeast United States have experienced slowed growth or even declining populations in recent years, New York City continues to grow. At this rate, the City's population could exceed 9,500,00 by the year 2030, an increase of more than a million citizens in just 20 years.¹ How can NYC, a metropolis originally founded almost 400 years ago, sustain this level of growth while continuing to be the financial and cultural capital of the world? How can the City ensure that the needs of future residents are met while simultaneously meeting the needs of current residents?

Few needs are more fundamental than food. City dwellers obtain food from a variety of locations: the local bodega or grocery store, the Halal truck on the corner, the office or school cafeteria, or the Indian restaurant down the street. Rarely does one consider where this food comes from, how it gets here, or what might have happened along the way. With important exceptions, the majority of New Yorkers know only that food eventually gets to where it needs to be: on their plates. In order to predict how New York City will feed future residents and visitors, it is vital to understand how they are fed today.

Furthermore, the New York City food system does not operate in a vacuum: food security is tightly intertwined with economic development, public health, social justice, and environmental resilience. For this reason it is critical to gain an understanding of the process by which the City's food is produced, transformed, distributed, consumed, and disposed of or recycled. This report aims to help provide the basis of that understanding.

¹ This estimate uses growth rate of 0.6% compounded annually (not continuously – i.e., a conservative estimate) over 22 years.

HOW DID WE DEVELOP OUR UNDERSTANDING OF THE NEW YORK CITY FOOD SYSTEM?

Currently, there is no single centralized source of data regarding the NYC food system. While most observers believe that the system is vast and extremely complex, the subtleties of how it functions are not well documented. In order to make informed policy decisions and address growing concerns regarding food sufficiency, safety, traceability, human health, and environmental protection, these subtleties must be better understood.

The purpose of this project is to identify major elements of NYC's food supply chain to better understand how food "flows" from production to consumption. Our intention is that this will provide the MOLTPS with a basic understanding of NYC's food supply system from which to make informed long-term planning decisions, and to suggest aspects of the system needing additional study.

SOME OF THE MAJOR QUESTIONS WE SOUGHT TO ANSWER THROUGH THIS STUDY INCLUDE:

- How is food transported into New York City and then distributed for consumption?
- What percentage of the food consumed in NYC is produced and/or processed in New York City versus the region and the rest of the country?
- Where are production, processing, distribution, and consumption occurring?
- What are the major modes of distribution of food to places of consumption?
- Does the food supply system differ depending on factors such as the type of food, size of the store or restaurant, or consumer targeted?
- Are distribution patterns and methods different among the boroughs and neighborhoods of the City?

Addressing these objectives allowed us to describe how the system operates, its potential vulnerabilities, key incentives or impediments faced by major food supply chain stakeholders, and areas where further study is required.

WHAT DO WE ALREADY KNOW ABOUT THE FOOD SYSTEM?

EXISTING FOOD SYSTEM STUDIES AND POLICY EFFORTS

New York City has accelerated policy efforts in recent years to increase awareness about food issues and explore food sustainability. One initiative, FRESH (Food Retail Expansion to Support Health), has been created by the NYC Economic Development Corporation (EDC) to promote the development and retention of grocery stores in underserved communities across the five boroughs.ⁱⁱ Out of this initiative grew “FoodWorks New York,” a new effort by the City Council to produce the first comprehensive plan to use NYC’s food system to create jobs, improve public health, and protect the environment.ⁱⁱⁱ The most robust area of research conducted thus far concerns the state of food in the NYC Public School System. One example is a study entitled “Lessons Learned in the NYC SchoolFood Plus Evaluation,” an analysis of the effectiveness of incorporating fresh, local produce into school lunches and snacks.^{iv} Several nonprofit organizations have formed to facilitate the increase of sustainable foods in the NYC school system; these include FOCUS (Food Options for Children in Urban Schools)^v and the NY Coalition for Healthy School Food.^{vi}

Studies have also been conducted exploring a variety of other segments of the NYC food system. One is emergency preparedness. The Food Bank of New York City, an independent nonprofit organization, features on its website information detailing the origin and distribution of emergency foodstuffs.^{vii} Another research topic is food manufacturing in New York City. A 2007 report by the New York Industrial Retention Network and the Fiscal Policy Institute, titled “More Than a Link in the Food Chain,” and prepared for the Mayor’s Office of Industrial and Manufacturing Businesses, provided a study of the economic impacts of food manufacturing in NYC.^{viii} Many organizations have conducted studies on the environmental impacts of urban food systems. Topics assessed include: the relationship between climate change and global food security, the energy-effectiveness of local food, the impacts of meat production and processing, food system planning, and urban farming.

GAPS IN EXISTING RESEARCH

Despite the increasing number of studies focused on specific issues or policy initiatives, there are areas of the NYC food system that require additional study.

Much of the information on food entering NYC revolves around the Hunts Point Food Distribution Center (Distribution Center), the center of NYC food

distribution. However, little research has been conducted on the origins of food at the Distribution Center. Furthermore, there is very little information available on distribution to or from the Distribution Center: how food gets from the distributor to points of consumption. Additionally, limited information exists on food processing in NYC. Organizations and entities including the New York State Farm Bureau,^{ix} the Federal Highway Administration, and the United States Department of Agriculture (USDA)^x provide information about the amounts of food commodities traded and the variety of food suppliers and food processors, but exact volumes are still unknown.



HOW DID WE STUDY NEW YORK CITY'S FOOD SUPPLY?

The NYC food system is a complex network of transportation, distribution, and retail that works in coordination to feed over eight million residents of the City.^{xi} Comprising approximately 20,000 restaurants, 13,000 food retailers, 1,600 public schools, numerous hospitals, and other nonprofit service providers, as well as 90 farmers' markets,^{xii} the food system is decentralized and highly complex. Thus, our study required a structured methodology to systematically and efficiently collect information critical to the system within a short timeframe.

Existing research provided insights into possible approaches. Two major studies, *The Greater Philadelphia Food System Study* and *Northeast Farms to Food: Understanding Our Region's Food System*, presented the most applicable approaches to understanding New York City's food supply, some of which informed the methodological framework used in this study.

Research and anecdotal evidence shows that the interconnections in NYC's food system are comprised mainly of person to person networks. There is no central database that tracks food entering or leaving the city, no single pattern that can be applied to the supply of food from one place to another. Because of this, our approach was structured around two complementary methodologies to effectively yield a complete picture of NYC's food supply. The strategic approach includes analyzing the food supply from a macroview using a national dataset, while using representative case studies to offer a microanalysis of food movement within the City.

HOW DID WE ANALYZE THE LARGER PICTURE OF NYC'S FOOD SUPPLY?

In order to construct a macroview of the New York City food system, we used the Freight Analysis Framework (FAF), a national dataset managed by the U.S. Federal Highway Administration (FHA) that estimates commodity flows and related freight transportation activity among states, regions, and major international gateways. While the FAF dataset cannot be used to identify where food products originate or are consumed, it is a useful tool for analyzing the volume, dollar value, and transportation mode of food commodities flowing into, within, and out of the New York City region.

WHAT IS THE FREIGHT ANALYSIS FRAMEWORK?

The Freight Analysis Framework is a public database of commodity-based, origin-destination freight flow. It integrates data from several public sources to provide information regarding the flow of different commodities among regions of the United States. It is often used for transportation analyses such as evaluating strategic investments in transportation infrastructure or impacts of road-pricing policies.

Data in the 2002 Commodity Flow Survey was obtained by the U.S. Census Bureau, U.S. Department of Commerce, and U.S. Department of Transportation.^{xiii} The primary source of data for the FAF comes from the 2002 CFS, which comprises approximately 65 percent of FAF weight data and 60 percent of the tonnage data.^{xiv} The CFS data is collected through a survey given to select industries, which asks about commodities shipped, their value, weight, and mode of transportation, as well as the origin and destination of shipments. While the first version of the FAF (FAF1) included proprietary freight data, the analysis provided in this report relied upon the second iteration (FAF2), which includes only publicly available data. As a result, the data is available for public use, but it lacks the level of detail that proprietary data could provide.

The FAF uses geographic regions established by federal agencies, such as the Office of Management and Budget and the Census Bureau, using population data collected during the 2000 Census. The FAF uses 114 Metropolitan Statistical Areas to define the domestic regions for which origin and destination data is collected. New York City is contained within FAF Region 68, comprising 13 counties in southern New York State, including the five boroughs of New York City.

Food is categorized into eight groupings (detailed descriptions of these commodity classifications are located in Appendix 1: Food Commodity Summaries):

1. Cereal grains
2. Other agricultural products
3. Animal feed
4. Meat/seafood
5. Milled grain products
6. Other foodstuffs
7. Alcoholic beverages

For example, “other agricultural products” includes most fresh fruits and vegetables as well as nuts, oil seeds, fresh cut flowers, and raw cotton, whereas “other foodstuffs” includes frozen fruits and vegetables, processed nuts, milk and milk products, juice, and sugar. Despite these idiosyncrasies, the FAF does seem to account for every imaginable type of food.

HOW DID WE STUDY THE COMPLEXITIES OF THE NEW YORK CITY FOOD SYSTEM?

While the FAF data provided a broad understanding of food entering and leaving the City, it yielded no insights into the movement of food within the City. Thus, we have paired the macroanalysis provided by the FAF data with case studies of representative points of consumption within New York City. Points of consumption were grouped into categories of places where food is purchased, served, and consumed: food retail, food service, schools and universities, other public and nonprofit institutions, and the markets at Hunts Point.

Owing to the sheer number of places of food consumption within the City, and constraints in time and resources, each category attempted to include a representative sample of case studies that would elucidate similarities and differences among points of consumption. Within each category, we sought to select a sample of case studies representing various sizes, locations within NYC, business models or missions, consumer types, and ethnicities.

The information for case studies was collected primarily via in-person or telephone interviews with knowledgeable people affiliated with each point of consumption. Interviews were conducted in order to provide an understanding of each point of consumption's food supply chain. Food was then tracked back through its various supply and distribution nodes.

A standard interview guide was developed (see Appendix 2) focusing on collecting data for each component of the food supply chain (production, transformation, distribution, consumption, and post-consumption). All interviews were conducted using this interview guide to ensure a standardized approach.

Although each study attempted to include a representative analysis, it would be naive to assert that this report provides a comprehensive understanding of New York City's food supply. In some instances, businesses were unwilling to provide insights due to public image constraints or unwillingness to reveal "trade secrets." This was especially true of large corporations involved in many aspects of the food supply chain (for example, large distributors with a vast array of suppliers). Thus, in some cases a complete understanding of their role in the food system could not be obtained.

WHAT CONSTITUTES A FOOD SUPPLY SYSTEM?

WHAT IS A FOOD SUPPLY CHAIN?

A food supply chain is characterized by the movement of a food product from where its raw materials were produced to where it is consumed in its final form. Between those two points, many steps of processing and distribution often take place. For the purposes of this study, we also considered the post-consumption stage of the food supply chain.

WHAT ARE THE COMPONENTS OF THE FOOD SUPPLY CHAIN?

The food supply chain, as defined in this study, includes production, transformation and processing, distribution, consumption, and post-consumption. The definitions of these components are outlined below.

Production: where the food is grown, raised, or manufactured. Since we did not attempt to identify where manufacturers obtain the raw ingredients for processed goods, these manufacturers themselves are considered the origin of a food chain.

Transformation and processing: any changes to food from its original form. This can include preparing fresh food for market, such as by washing and packaging it, or otherwise preparing raw fruits, vegetables, grains, and animal products for human consumption.

Distribution: movement of food from the point of origin to the point of consumption, through various types of suppliers and distributors. The term “suppliers” used herein refers to the source of food for the point of consumption; this includes name-brand manufacturers, food wholesalers/distributors, or farmers. Any transportation of food among producers, distributors, storage facilities, processors, and points of consumption is considered distribution. Often, there are many players in the distribution phase of the food supply.

Consumption: where food is purchased by or served to a consumer. Points of consumption may include supermarkets, restaurants, convenience stores, hospitals, and so forth. In this study, “point of consumption” is also referred to as the “endpoint.”

Post-consumption: how unconsumed food and food-related wastes, including unused food from production or preparation, are disposed of or recycled at endpoints.

HOW MUCH FOOD IS BROUGHT INTO NEW YORK CITY AND HOW DOES IT GET HERE?

WHAT QUANTITIES OF FOOD ARE COMING INTO NYC AND WHERE ARE THEY COMING FROM?

The FAF tracks the inbound, outbound, and intraregional movement of goods. This is useful for determining the volume or value of food commodities as they move between Region 68 and other regions.

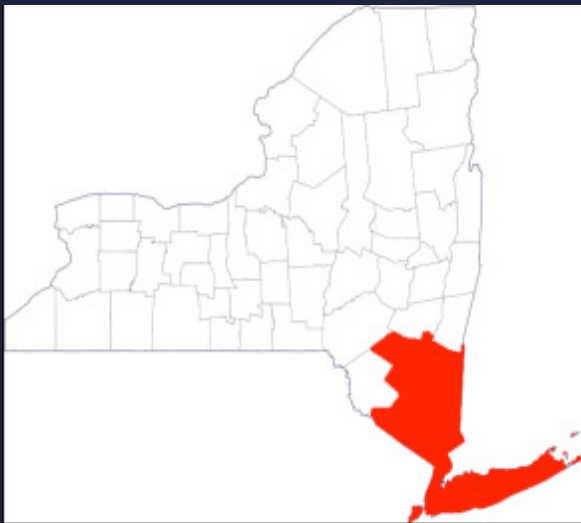


Figure 1. Area included in FAF Region 68 (Map source: USDA Census of Agriculture: 2007 Census Publications, State and County Profiles, New York).

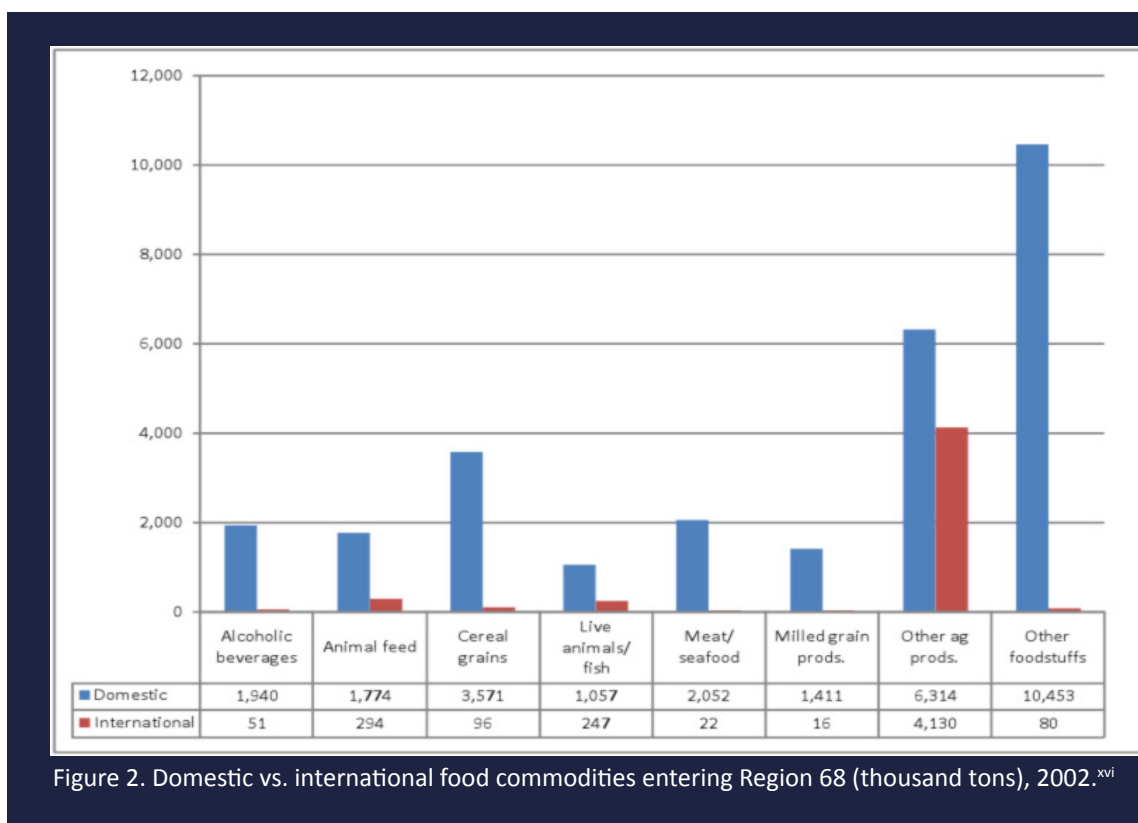
As mentioned above, New York City is contained within FAF Region 68, which comprises 13 counties in southern New York State, including the five boroughs of New York City. The FAF Region 68 is shown in red, in Figure 1.

Year 2000 population totals for each New York county included in FAF Region 68 are listed in Appendix 1, Table 1. We utilized these population figures to weight the FAF Region 68 commodities when extrapolating commodity movement specifically for New York City. Since FAF data is not aggregated to the county level, an analysis for New York City alone is not feasible without manipulating the data. In 2000, the five boroughs of New York City accounted for about two-thirds of the total population of FAF Region 68.

A comparison of food with domestic origins versus food with international origins indicates that the majority of food entering Region 68 has domestic origins. Approximately 12.2 million tons of food with a domestic origin (the equivalent weight of 12.2 million small cars) moves into Region 68 each year, while approximately 16.4 million tons moves within Region 68, for a total domestic movement of 28.6 million tons.

“Other foodstuffs” (37 percent) and “other agricultural products” (22 percent) together comprise almost 60 percent of the food commodities by *weight* entering Region 68 from domestic regions. However, when examining food commodities

by *value*, “other foodstuffs” (31 percent) and “meat and seafood” (28 percent) together comprise almost 60 percent of the food commodities entering Region 68 from domestic origins. This is not surprising, considering meat costs considerably more per unit weight than, for example, produce and grain.



An analysis of FAF data indicates that almost 75 percent of food entering Region 68 has an origin within the Northeast, as compared to other U.S. regions and international origins.^{xv} However, taking into consideration intraregional movement, it is clear that the majority of this food changes hands within Region 68, indicating that Region 68 *in and of itself* accounts for a considerable amount of food movement within the Northeast region. Note that this does not indicate that 48 percent of food entering Region 68 was necessarily *produced* in the Northeast United States, simply that 48 percent of food entering Region 68 *had an origin* within the Northeast. If we exclude Region 68 as an origin from within the Northeast region, we see that the Northeast remains a significant hub (48 percent) for food entering Region 68.

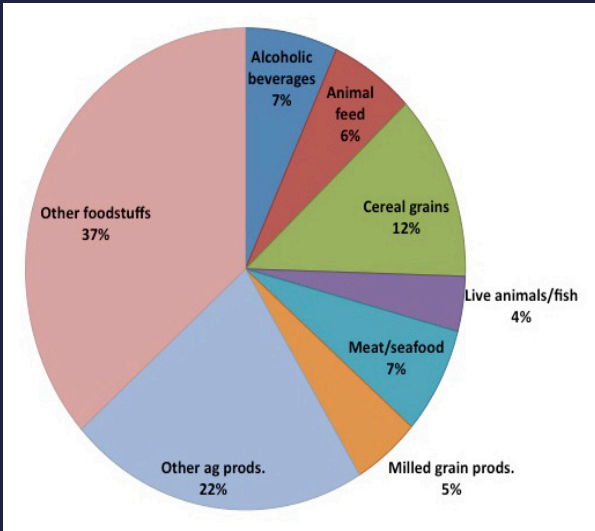


Figure 3. Food commodities entering Region 68 from domestic origins by percentage weight (total: 28.6 million tons), 2002.^{xvii}

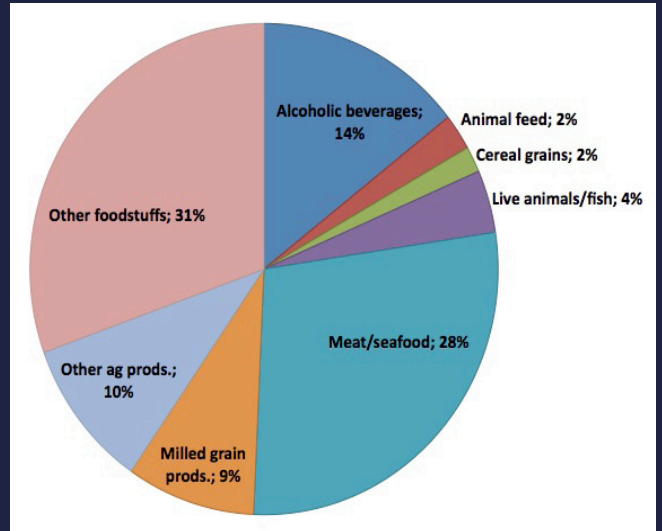


Figure 4. Food commodities entering Region 68 from domestic origin by percentage value (total: \$29.4 billion), 2002.^{xviii}

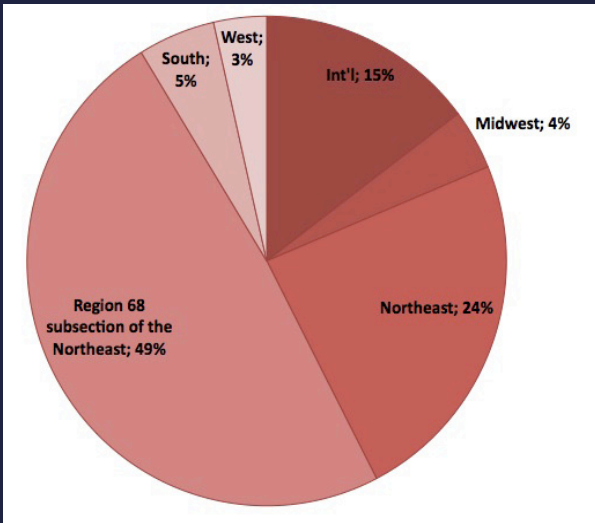


Figure 5. Regional origin of food commodities entering Region 68 by percentage weight, 2002.^{xix}

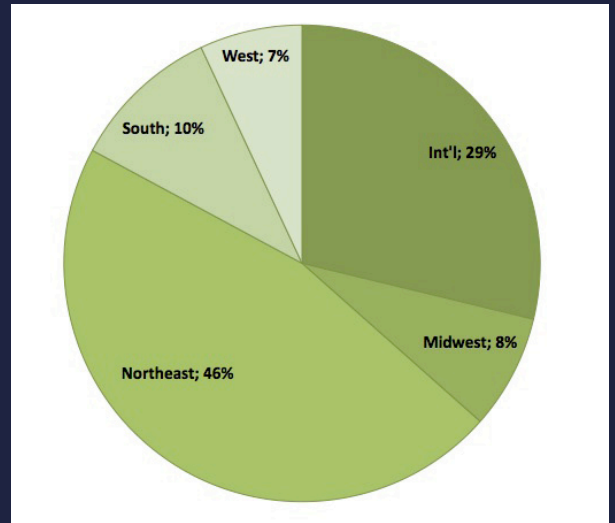


Figure 6. Regional origin of food commodities entering Region 68 by percentage weight, with Region 68 removed as an origin, 2002.^{xx}

The large proportion of intraregional flow indicates that food commodities in the region are likely not transported directly to points of consumption from other regions, but instead are transported to a distribution center within the region first. For example, apples grown in Washington State may be transported to Hunts Point Terminal Produce Market, or to another produce distributor in Region 68 (such as Baldor Specialty Foods or ShopRite), where it is subsequently distributed outside of Region 68. Upon arriving at a distribution center in Region 68, those apples are considered a commodity from “within” the region, rather than an import from a different region. As a result of the large proportion of intraregional flow, it is very difficult to trace the origin of food entering the region. However, this finding indicates a large transportation burden is placed upon the transportation infrastructure within Region 68, and that Region 68’s distribution centers are crucial to our food system.

BY WHAT MEANS DOES FOOD TRAVEL TO NYC?

96 percent of food moving into and within Region 68 from domestic origins is via truck, as opposed to one of the other transportation modes (rail, water, air, truck and rail, intermodal, and unknown) identified by the FAF, highlighting the food system’s reliance upon a well-functioning highway infrastructure.

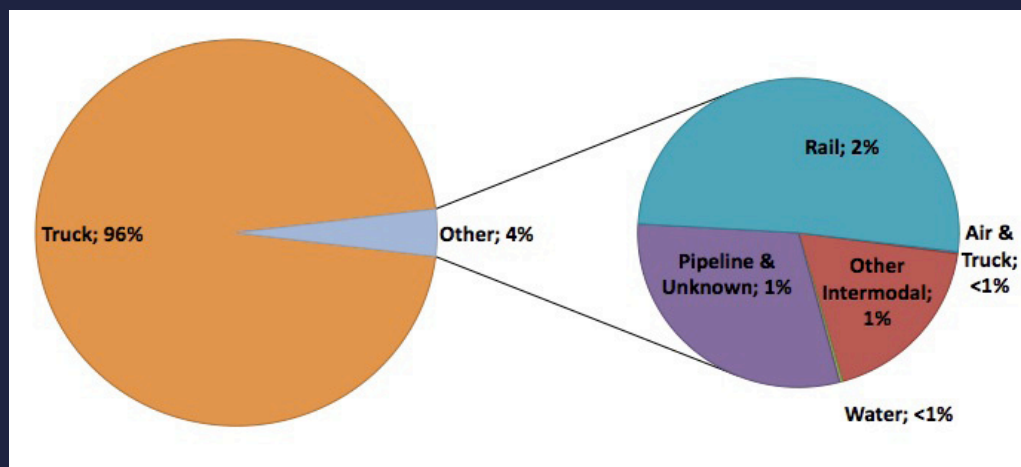


Figure 7. Aggregated food commodities entering Region 68 from domestic origins by mode of transportation by percentage weight, 2002.^{xxi}

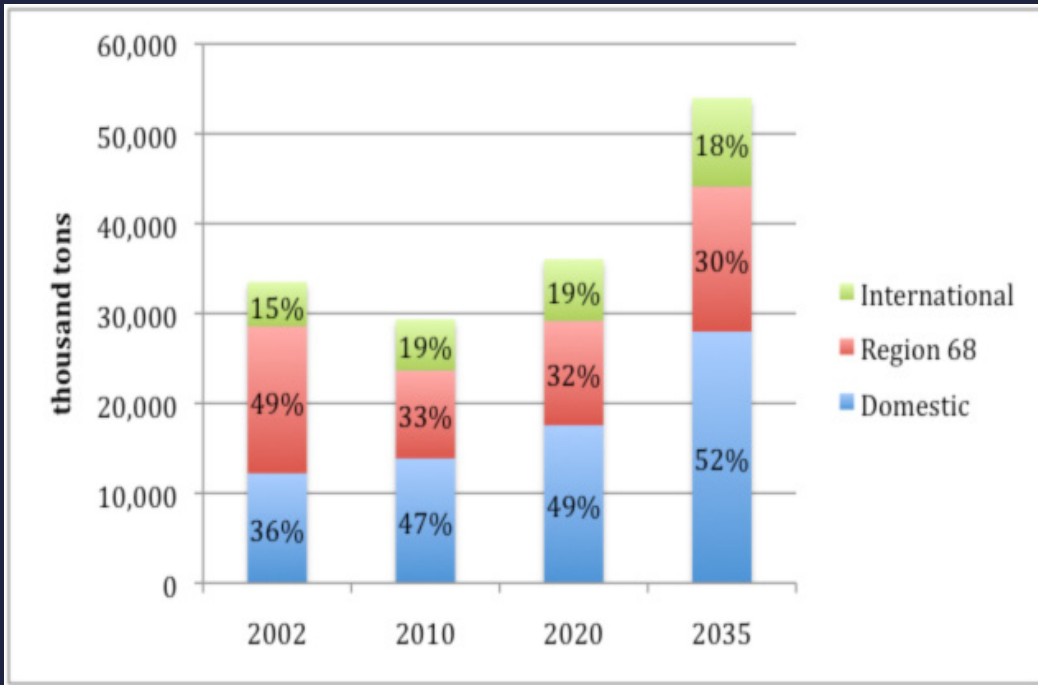


Figure 8. Projected total food commodities entering Region 68 (thousands of tons), 2002.^{xxii}

WHAT ARE THE FUTURE PROJECTIONS OF COMMODITY FLOWS AND CHANGES IN THE SUPPLY SYSTEM?

While the FAF is based on 2002 data, it also includes projections of freight transport to 2035. It can therefore be used to predict consumption patterns and planning for needed infrastructure.²

Total food inbound food movement is projected to rise from 33.5 million tons in 2002 to 54 million tons in 2035—a 61 percent increase. While the proportion from international origins is projected to remain relatively constant, the proportion from intraregional flow will decrease as the proportion from other domestic origins increases. Thus, the total food moving into the region will increase, but the amount of food moving within the region will not, perhaps as a function of the transportation infrastructure having reached full capacity.

The projections through 2035 indicate that food movement into Region 68 will increase by nearly 20.5 million tons, placing a large burden upon the transportation infrastructure and distribution centers within the region.

² FAF projections to 2035 are based on Global Insight's Business Demographics Model (BDM) and Business Transactions Matrix (BTM), which extrapolate from employment data associated with industry activity forecasts such as the value of output or purchases.

HOW DOES FOOD GET TO NEW YORK CITY'S CONSUMPTION ENDPOINTS?

Food in New York City comes from a myriad of sources before we are able to purchase or consume it at endpoints such as the food retail sector, the food service sector, the public and private school system, other nonprofit and public institutions, and Hunts Point Distribution Center.

The following section provides a window into the New York City food system from production to consumption. Each case study has been summarized to emphasize the key findings, while more detailed information gleaned from each study can be found in Appendix 3.

WHO ARE THE SUPPLIERS AND DISTRIBUTORS?

There are a wide variety of players involved in the distribution of food to NYC's stores, restaurants, schools, and hospitals. Since these stakeholders are referred to throughout the case studies, it is important to first define who they are.

Food manufacturers. This includes large brand-name manufacturers (such as Coca-Cola, Pepperidge Farms, and Ben & Jerry's) as well as smaller, local food manufacturers. Large brand-name manufacturers sometimes deliver directly to retail stores and are more apt to do so for larger supermarkets as compared to smaller stores and bodegas. Therefore, many retail stores rely on middlemen (described below) to purchase and pick up food from these manufacturer distribution centers and deliver it to stores.

Local food manufacturers primarily use their own delivery fleet for distribution, but also make use of delivery services (such as UPS, DHL, and FedEx) and middlemen, including distributors and jobbers (described below).^{xxiii} A 2007 survey of NYC food manufacturers by the New York Industrial Retention Network and the Fiscal Policy Institute found that 47 percent of respondents relied on their own distribution fleets to deliver food directly to clients.^{xxiv}

Store-owned distribution centers. Some large chain supermarkets have their own distribution centers that supply their individual stores. In addition to supplying their own stores, these distribution centers often act as third-party distributors to other smaller stores. Whole Foods has their own distribution center that supplies produce, meat, dairy, and processed goods to Whole Foods stores.^{xxv} One other large supermarket chain in NYC, which preferred not to be identified, has its own distribution center in the Bronx that supplies produce and meat.^{xxvi} In addition to

utilizing its own distribution centers, these stores sometimes supplement their stock from other distributors, including the Hunts Point Terminal Market.^{xxvii}

Distributors and wholesalers. Some food retailers, such as large supermarkets and bodegas, rely primarily on third-party distributors and wholesalers (many of whom fulfill both roles). Sometimes these distributors will deliver directly to stores, though in many cases independent middlemen are relied upon to purchase and deliver these products. This category also includes large food service distributors such as Sysco, which supply and deliver food to restaurants and cafeterias. These larger wholesalers and distributors are mostly located outside of the City, in New Jersey or upstate New York.

Specialty distributors. Several companies act as both suppliers and distributors of particular products, such as Lucky's Real Tomatoes or Mountain View Farm (produce and beef). These specialty distributors grow, raise, or process a particular product and deliver it directly to stores and restaurants. Several distributors were identified that act as wholesale distributors specifically of organic foods, or other specialty items. Some specialty distributors operate on a national level, such as United Natural Foods International, while others operate on a regional or local level, such as Baldor Specialty Foods and Regional Access. Some buy, store, sell, and deliver food, while others act solely as transporters of specialty foods from supplier to retailer (such as Regional Access).

Independent middlemen. The term "middleman" was used frequently to describe deliverymen who operate independently of distribution companies and manufacturers. Also termed "jobbers," these middlemen purchase food on behalf of clients from distribution centers, wholesalers, or manufacturers and deliver it directly to clients. Food brokers, independent salespeople who carry a catalog of products for retail and restaurant clients, and receive a commission from the sales, represent another type of middleman.^{xxviii}

Cash-and-carry wholesalers. These are stores from which retailers and restaurants purchase food directly, including Restaurant Depot (which supplies restaurants) and Jetro (which supplies primarily bodegas but also some restaurants).

CASE STUDIES



FOOD RETAIL



FOOD SERVICE



SCHOOLS AND UNIVERSITIES



PUBLIC AND NONPROFIT INSTITUTIONS



HUNTS POINT DISTRIBUTION CENTER

FOOD RETAIL

Key players: mainstream supermarket chains, specialty markets (including those with an organic focus), bodegas, co-ops, and greenmarkets.

Interviews conducted: two large mainstream supermarket chains (names withheld by request), Whole Foods, Park Slope Food Co-op, Back to the Land (independent organic grocer), five independently owned bodegas in Washington Heights, Hong Kong Supermarket and Kam Man Supermarket in Manhattan's Chinatown, and a selection of vendors at the Columbia Greenmarket.

Although there are a wide variety of food retailers in NYC, there are more similarities among them than differences. The main differences are related not to scale or location but to the types of food they primarily carry, either conventional or organic.

The differences between conventional and organic retailers lay not so much in the process of supply, but in the quantity and type of distributors they utilize. Conventional retailers use a wide array of large distribution companies (including White Rose, Krasdale, and Sysco), while organic retailers rely on a more limited set of distributors that focus on specific organic products (including United Natural Food International, Albert's Organics, Tree of Life, and Regional Access).

The supply chain for conventional food retailers in New York City is a huge, multilayered, and high-functioning system. Some large chains and specialty supermarkets may employ as many as 200 suppliers to stock each store. Other retailers may rely on one main wholesale distributor, such as White Rose Food or United Natural Foods International, that is able to stock nearly 100 percent of a retail facility with the full spectrum of food and home goods demanded—from ketchup, sugar, and eggs to batteries, laundry detergent, and cereal.

All food retailers we spoke with lacked knowledge about where food arriving on the delivery trucks had been originally grown or produced. While retailers could name the distributor the food was purchased from, little data was available at the retail level as to how and where the distributor acquired the food. For retailers other than retail stores with a local focus, food origin was not a concern. The primary determinants of the supplier selected were price, delivery speed and efficiency, and the quality of the food.

For conventional food retailers, a reliance on middlemen for both selection and delivery of products was noted during several interviews—for large chain supermarkets and bodegas

alike. Most middlemen we spoke with could be identified as a kind of intermediary supplier, operating independently, using their own trucks, and selecting their own delivery routes to deliver food to retail customers. Middlemen have established relationships with distribution centers, manufacturers, and direct processing sites (such as Kosher Valley chicken processing plant in upstate New York), and often purchase for and deliver goods to their own customers with whom they have established relationships throughout New York City. While distributors are often the lifelines between the origin of food on a farm to the processing and distribution sites (which are sometimes the same location), middlemen can be the lifeline between distribution centers and retailers.^{xxix}

None of the retailers interviewed felt challenges in meeting supply needs, due to a vast network of potential distributors and suppliers to call on. The primary challenge in the food retail case study, noted particularly by food retail distributors, was parking.



FOOD SERVICE

Key Players: restaurants and catering companies.

Interviews Conducted: McDonald's, Restaurant Associates (a corporate caterer), a quality-focused Vietnamese restaurant in Manhattan, two price-focused diners in the Bronx and one in Manhattan, a quality-focused hamburger restaurant in Manhattan, a price-focused family restaurant in Staten Island, and a price-focused Mexican restaurant in Brooklyn.

The supply chain for restaurants in New York City varies widely depending on the type of restaurant and whether it is independent or part of a larger chain. The biggest determinant for how restaurants choose their suppliers is whether they are focused primarily on supplying food inexpensively to their customers or on supplying the highest quality food.

Independent or small chain restaurants that are quality-focused, as opposed to price-focused, appear to rely on a common set of wholesalers and distributors, depending largely on their location. The owner of a quality-focused Vietnamese restaurant indicated that most of the upscale restaurants in Manhattan all use the same main distributors, regardless of the cuisine.

Restaurants that are more concerned with price tend to purchase from large wholesalers or distributors, where they can purchase most of their food at one time.^{xxx} For example, two price-focused restaurants interviewed in the Bronx and one in Staten Island all get the majority of their food from Restaurant Depot. A diner in Manhattan purchases its food exclusively from Sysco, and a Mexican restaurant in Brooklyn purchases most of its food, except for its meat, from Jetro.^{xxxi} Caterers for large cafeterias appear to operate in a similar manner, purchasing their food almost exclusively from a large food service distributor.

Only the most quality-focused restaurant owners interviewed had an understanding of where their food comes from beyond the supplier. Even these restaurants, however, choose suppliers in order to obtain the best quality, regardless of origin. Only some specialized high-end restaurants, such as Union Square Café, purchase a large percentage of their food from local sources.^{xxxii}

All restaurant owners interviewed stated that they did not experience any difficulties getting the food they need or storing it. They only occasionally have difficulties with produce becoming too expensive out of season. The main challenge that they cited was parking tickets, which their distributors often complain about.

SCHOOLS AND UNIVERSITIES

Key Players: public and private schools, including colleges and universities.

Interviews Conducted: Essex Street Academy, SchoolFood, The Dalton School, and Columbia University.

Within the breadth of educational institutions in NYC, we have isolated three main categories and have chosen a case study from each. These three categories are: public/charter K-12 schools, independent/private K-12 schools, and institutions of higher education.

SchoolFood is the organization responsible for ensuring that 1,200 New York City public schools get the food their students need. The organization does not distribute food directly to schools; rather, it relies on four major distributors: Driscoll's, located in New Jersey, which delivers to Queens and the Bronx; Teri Nichols, located in Brooklyn, which distributes to Manhattan and parts of Brooklyn; Maramont, which delivers to parts of Brooklyn; and Chef Choice, also located in Brooklyn, which delivers to Staten Island. SchoolFood first provides a menu of basic items to school cafeteria managers, who then place orders for these basic items. Managers can vary the final recipes based on student preference.

The cafeterias and dining services of private schools and universities operate in a manner largely similar to public schools, purchasing the majority of their food from one major supplier. The Dalton School's dining services, for example, are managed by Flik Independent, a branch of Compass Group North America. The largest supplier used by Flik for the Dalton School is the Performance Food Group, located in Elizabeth, New Jersey, where approximately 85 percent of food and paper products are purchased.^{xxxiii} Similarly to Dalton, Columbia University Dining Services purchases the majority of its food from one large distributor: Sysco. However, a major difference between the private schools and universities interviewed and SchoolFood is their use of a variety of other food suppliers. In addition to Performance Food Group, Dalton uses other food suppliers and distributors as well, several of which are local. The director of dining services for Columbia University also noted that they place a heavy emphasis on using local vendors.

When asked, all schools interviewed named two main challenges: storage and transportation and parking. All three facilities had a severe dearth of storage space, requiring frequent deliveries.

PUBLIC AND NONPROFIT INSTITUTIONS

Key Players: hospitals, shelters, food banks, and various food assistance programs.

Interviews Conducted: Food Bank for New York City, Homes for the Homeless, Health and Hospitals Corporation, and City Harvest.

Most public and nonprofit institutions that provide food are focused on affordability and will select the suppliers that offer the lowest bids. The recession has only amplified this norm, as budgets are even tighter and there is more demand for food assistance for those in need.

Food Bank for NYC (FBNYC) obtains all of its food through a variety of donations. The majority of these donations are received from vendors at the Hunts Point Distribution Center. Processed and packaged foods are received from a national network of food manufacturers, wholesalers, and retailers. Produce is received through these sources as well as Hunts Point Terminal Produce Market, government agencies, the Feeding America fresh produce program, and through a direct relationship with a farm in Orange County, New York. Fresh fish is donated through the New Fulton Fish Market, and meat and poultry are obtained through Pathmark grocery store and smaller local distributors. This food is then distributed to over 1,000 food assistance programs in New York City that feed hundreds of thousands of people each week.

Homes for the Homeless (HFH) provides food in two of its shelter kitchens, the Saratoga kitchen and the Prospect kitchen. Although the majority of shelters in NYC receive food through FBNYC, all of HFH's food is provided by Ambassador Food Services located in Long Island City, Queens.

The food supply for Health and Hospitals Corporation (HHC) is completely outsourced. HHC has large food supply contracts with Sodexo and U.S. Foodservice. Patient and resident meals are produced at a Cook-Chill Plant (CCP) located at Kings County Hospital in Brooklyn. In total, HHC food operations produce approximately 17,000 meals per day.^{xxxiv} Although HHC formerly produced patient and resident meals in its own network of 17 separate kitchens, they decided to outsource food supply and production in 2003 due to aging infrastructure and equipment, lack of standardization, inefficiencies, and increasing labor and food costs.^{xxxv}

HUNTS POINT DISTRIBUTION CENTER

Key Players: Hunts Point Cooperative Market, Hunts Point Terminal Produce Market, New Fulton Fish Market, private vendors such as Baldor, and the New York City Economic Development Corporation.

Interviews Conducted: Vista Food Exchange, Inc., Monte's Seafood Emporium, Baldor Specialty Foods, and the New York City Economic Development Corporation.

The Hunts Point Distribution Center is comprised of three independently managed markets: the Hunts Point Cooperative Market, Hunts Point Terminal Produce Market, and New Fulton Fish Market, as well as many private distributors and vendors. The New York City Economic Development Corporation (EDC) is the property manager and landlord of the 329 acres of Hunts Point that make up the food distribution center. Over 115 firms operate out of the Distribution Center, and over 10,000 individuals are employed there.^{xxxvi}

Food arrives to the Distribution Center mainly via truck, but the Terminal Produce Market and some of the companies operating out of the Distribution Center, including Baldor Specialty Foods, receive deliveries via train and ship as well. According to Baldor, rail and ship are used for products that are heavier and would require more trucks for delivery to comply with weight regulations, such as citrus, potatoes, and onions. Additionally, ship is a mode of transport considered when the food products have a long shelf life, because it is cheaper than truck transport.^{xxxvii}

The most recent data on food entering the Hunts Point markets is the Hunts Point Truck Survey, conducted in 2003 by consultants on behalf of New York State Department of Transportation. Truck drivers surveyed identified points of origin throughout the United States; however, the majority of drivers at the Cooperative Market and the Terminal Produce Market indicated that their trips originated within New York City, while 13 percent came from other areas in New York State and 13 percent came from New Jersey.^{xxxviii} Deliveries to the Fish Market originated from several states along the East Coast.^{xxxix} While these data do not indicate the point of origin of the food products being delivered (only where the particular truck trip originated), it is interesting to note that a separate report by the EDC has found that more than 50 percent of the vendors at the Terminal Produce Market carry New York State produce.^{xl} The New Fulton Fish Market receives 60 percent of its fresh fish "wild-caught from the East Coast, between Maine and Florida."^{xli} The remaining supply comes from both farms and fisheries in and outside of the United States.

The Cooperative Market and Terminal Produce Market do not carry out any food transformation or processing. Of the private companies operating at the Distribution Center, Bazzini Nuts is one of the few that engages in value-added processing (coating nuts with chocolate). Processing before consumer sale typically occurs either prior to arrival at Hunts Point, or at the point of consumption. “Break bulk activity” is the closest activity resembling a value-added process at the Terminal Produce Market, and this involves breaking down large palette deliveries into smaller amounts.^{xlii}

The New Fulton Fish Market engages in more processing, in addition to vending, than the other Hunts Point markets. Some vendors fillet fish at the market, which can be considered processing. However, Baldor Specialty Foods also does a great deal of processing of produce onsite, including the washing, peeling, skinning, cutting, and packaging of fruits and vegetables. Baldor also provides packaged food for a variety of companies onsite.^{xliii}

The Distribution Center’s customers include supermarkets, convenience stores, restaurants, and hotels, but the clientele for each market is slightly varied. The Terminal Produce Market primarily serves independent and ethnic grocers around the city, which do not require HACCP safety standards.³ Supermarkets generally work with suppliers for extended contracts and do not purchase from the Terminal Produce Market unless they have shortages that require immediate restocking.^{xliv} The Cooperative Market and the New Fulton Fish Market have a similar customer base: “large chain store supermarkets, most of the region’s top restaurants, hotels, and country clubs, as well as independent butcher shops.” However, the New Fulton Fish Market also has a strong ethnic market base; one wholesaler noted that about 20 percent of the buyers are Chinese, and 30 to 40 percent are Korean.^{xlv}

There are three main methods, which appear to be equally used, to distribute food to consumers from the Distribution Center. Some endpoints pick up their orders themselves, while wholesale vendors typically will distribute orders to customers. All three markets own their trucks or lease them for distributional purposes. “Jobbers,” or middlemen, may also be used for distributional purposes. In this case, the jobber will make purchases and then distribute them on behalf of clients.^{xlvi} At Baldor, most of the products are delivered directly to the customer; on average about 160 refrigerated trucks trips are made per day for deliveries.

The major challenges currently faced by the Distribution Center are largely concentrated in the Terminal Produce Market. Storage capacity is the most significant issue. Also, a representative of EDC indicated that inbound rail and truck delivery conflicts and traffic congestion are major

³ Health Analysis and Critical Control Points (HACCCP) is a system of ensuring food safety with regard to biological, chemical, and physical hazards along the supply chain (from point of origin to consumption).

issues, creating significant delays for suppliers and forcing them to do business elsewhere. At the Cooperative Market and New Fulton Fish Market, vendors could not identify specific challenges their businesses face. According to the warehouse manager at Vista Food Exchange, Inc., there are no pertinent challenges or issues, as the company has well established relationships with its suppliers and can rely on them to fulfill orders. Additionally, Baldor noted that its largest challenge is dealing with parking tickets accumulated by their 70 trucks delivering within New York City.



KEY FINDINGS: WHAT ARE THE MAJOR PATTERNS IN THE FOOD SUPPLY SYSTEM?

THEME 1: THERE ARE MORE SIMILARITIES THAN DIFFERENCES BETWEEN VARIOUS POINTS OF CONSUMPTION.

Supply

Despite the size and complexity of NYC’s food system, a good deal of the food supplied to retail stores, restaurants, schools, and nonprofit and public institutions comes from a relatively small number of sources. Some common trends among different points of consumption have emerged from our case studies.

Various points of consumption choose their suppliers for three main reasons: price, quality, and convenience. Institutions and large chains that must feed large numbers of consumers purchase from wholesale suppliers and distributors because they are less expensive and more convenient. These points of consumption often rely on only one or a few large suppliers to fulfill all of their needs. Chain restaurants, such as McDonald’s, have highly automated supply systems that provide all of their food from regional warehouses at the push of a button.

In contrast, quality-focused restaurants and specialty stores make use of a wide spectrum of suppliers, privileging those that provide the highest quality and perhaps sacrificing a degree of affordability and convenience. They are able to charge premium prices; thus, they are able to provide meals prepared with premium ingredients.

The markets at the Hunts Point Distribution Center are utilized, to varying degrees, by both the food retail and food service sectors.

Due to budgetary constraints, most public and nonprofit institutions that provide food put out requests for proposals and almost always end up selecting the lowest bidder to provide food services.

Transformation and Processing

Case studies revealed that, overall, transformation and processing of food occur very early within the supply chain, prior to arrival at points of consumption and many distribution centers.

Even at the Hunts Point Distribution Center, identified as the “origin” of food by many points of consumption, most processing has occurred prior to arrival. Most produce undergoes minimal processing in local facilities, namely washing to

remove excess soil from lettuce and root vegetables. Dairy and egg products, for example, arrive on site at food retail locations, restaurants, schools, and hospitals already processed and packaged.

Of all foods, it appears that meat products undergo the most processing at various points of consumption, particularly within the food retail sector. We didn't observe any large-scale butchering occurring on site at points of consumption, but stores and restaurants typically buy and then portion larger pieces of meat than those sold for individual consumption. Meat is transformed through cutting, grinding, packaging, and relabeling in the grocery store setting. While fish and other seafood are transformed on site at both food retail sites and restaurants, the New Fulton Fish Market does additionally process some fish, based on customer demand.

Schools and restaurants engage in the most processing of food of all the cases studied, though this is mainly related to meal preparation. Most chain restaurants receive 100 percent of their food pre-processed, the only transformation required is assembling items, heating, and cooking.

Distribution

Although distribution is largely consistent, the type of supplier or distributor used varies by endpoint. Food retailers rely heavily on middlemen to streamline the purchase and delivery of products from a wide variety of suppliers and distributors. By contrast, in the food service sector, distributors typically deliver directly unless restaurants purchase from cash-and-carry wholesale distributors. Schools, cafeterias, and hospitals usually rely on large food service distributors that supply and deliver the food.

Although all forms of transportation, including truck, train, air, ship, and bicycle, are used to transport food, the primary method of transportation to food service, food retail, education, and nonprofit establishments is truck or tractor-trailer. Food arrives to the Hunts Point Distribution Center mainly via truck, but the Terminal Produce Market and some of the companies operating out of the Distribution Center, including Baldor Specialty Foods, also receive deliveries via train and ship.

Storage

There were no notable differences in methods of food storage throughout the points of consumption. Food products at all establishments, including the distributors that supply them, are typically stored in freezers or refrigerators.

Within the food retail sector, much of the meat purchased by suppliers, including Dairyland and Restaurant Depot, is Cryovaced (vacuum packed) prior to arrival. Suppliers have strict quality standards for storing goods, particularly perishable items.

Food Waste

A common goal among all points of consumption is the minimization of food waste. In general, large chains generate the most waste, while smaller restaurants and retailers generate the least. Some retailers are able to find markets (discussed below) for food waste to reduce volume. The food service industry minimizes waste by tracking demand so that they know on average how much food they will need on a given day.

Methods of waste minimization vary by point of consumption. Waste from the food retail sector is minimized by reusing food in other aspects of the food retail business, such as prepared meals sold for home consumption. The NYC school system eliminates excess waste by serving food that children are more likely to eat or by making it more difficult for students to take large portions they are not likely to finish, achieved by eliminating trays. At the Hunts Point Distribution Center, the Terminal Produce Market participates in the NYC WasteLe\$\$ Business Project to reduce waste levels and increase energy and water efficiency. Additionally, some food waste from the Hunts Point Distribution Center is collected from the Fish Market to be processed into pet food.^{xlvii}

Food providers utilize regular paid waste pick-up, daily or weekly. However, recycling and composting are not always used equally. Hunts Point and some organic markets compost waste, but composting does not generally take place within the food service sector.

Many places of consumption within the food service and retail sectors, the Hunts Point Distribution Center, and the public and private school system donate excess food to food banks and other nonprofit institutions. Nonprofit and public institutions freeze excess food for use at a later date or donate to local charities or composting programs.

THEME 2: DIFFERENCES IN SUPPLY ARE PRIMARILY IDENTIFIED BETWEEN CONVENTIONAL AND SPECIALTY RETAILERS.

Organic products have not yet fully entered the mainstream at most points of consumption, although some retailers noted an increasing demand from their customers. For the most part, the growing demand is coming from higher end restaurants, specialized supermarkets (such as the Park Slope Co-op and Whole Foods Market), and private schools. Purchasing is driven by this demand; if organic products are selling at retailers and restaurants or demanded by parents at private schools, they will be made available.

Although many large, conventional food retail distributors are beginning to carry organic lines, stores with an organic focus still rely on a limited list of distributors that specialize in such products.

It is evident from the cases we studied that the use of locally grown foods is still very much a niche market for retailers and restaurants. As noted above, choice of supply depends primarily on price, quality, and convenience. Those that do carry locally grown foods (regardless of price, quality, and convenience) are mission-driven organizations committed to supporting and supplying local foods, serving customers that demand these foods. For example, Whole Foods provides a selection of locally produced meats as a function of their mission and customer demand.^{xlviii}

Although the supply of organic foods to retailers does not differ greatly from that of conventional products, the supply of locally grown foods draws on an entirely different supply chain. Buying local requires a personal relationship with the local producer. Often, it is difficult to transport local produce to the City due to lack of vehicle access by both the supplier and the purchaser.^{xlix} Some regional distribution companies (such as Angelo's and Regional Access) have been established based on this need. However, due to the underdeveloped nature of this industry, prices charged by these regional distributors are prohibitive for many small and medium sized retailers.¹ Thus, affordable and reliable access to local food is generally lacking.

Farmers' markets provide the most consistent access to local foods. Local farmers bring their food to over 90 locations throughout the City. Patrons of the farmers' markets are typically willing to pay a premium for locally grown and locally

produced goods. Additionally, some restaurants have relationships with farmers' market vendors.ⁱⁱ

Differences among points of consumption in the distribution and delivery components of the food system relate to the types of suppliers and distributors used and the reliance on middlemen.

THEME 3: THERE IS AN OVERALL LACK OF AWARENESS REGARDING FOOD ORIGIN AT THE ENDPOINT LEVEL.

In general, aside from some restaurants, farmers' market vendors, and organic retailers, there is a lack of awareness of where food comes from before it reaches its point of consumption. Few retailers and restaurants have direct relationships with farmers and other producers of food and rely solely on their distributors and middlemen to procure food for them. While some referenced Hunts Point Distribution Center as the source of their food, they were not aware of the origins of the food before it reached the Distribution Center.

Baldor was one of the few stakeholders that has invested in food traceability and has put in place a system for tracking its food from production to consumption.

THEME 4: ALTHOUGH CHALLENGES EXIST, THE SUPPLY SYSTEM IS HIGHLY RESILIENT.

Across the board, most of those interviewed initially found it difficult to identify challenges to their businesses. In terms of sourcing food, owners and managers have a network of distributors that make it easy and efficient to purchase what they need. If a particular food is unavailable from one distributor, they are able to acquire it from another. This complex, interconnected web of suppliers, distributors, and middlemen provides resiliency in the supply system, minimizing challenges in supply for all stakeholders. Upon pressing further, however, interviewees identified challenges that deal with four main issues: transportation, storage, weather-related issues, and the economy at large.

Transportation Challenges

Regional farmers and producers appear to be particularly constrained by a lack of access to the New York City market. Likewise, retailers that focus on buying regional foods find it challenging to source these products. It seems that small, regional

farmers are still largely on their own in terms of getting their products to New York City, as opposed to larger farms that are part of an established distribution network. Regional distribution companies have developed in response to this need but have not been in the business long enough to market their products as competitively as more established companies.

Infrastructure issues and high population density make it challenging to transport food into and within New York City. Ubiquitous traffic congestion in the New York City metro area has shaped the way food can flow through the food system. To avoid the crippling traffic delays, many food distributors make deliveries between midnight and six o'clock a.m. Late-night and early morning deliveries are common in New York City, as are noise complaints due to idling trucks in mixed-use neighborhoods that have adjoining commercial and residential properties. At The Dalton School on the Upper East Side, for example, food deliveries are typically made in the morning when trucks compete with rush-hour traffic and school buses for a position at the front of the building. Other food distributors rely upon extensive experience and routing technology to navigate the complex grid of city streets.

The majority of those interviewed identified inadequate parking as a major roadblock for profitable and efficient food supply. Narrow, congested streets and limited parking opportunities define the urban space and leave very little room for large delivery trucks. The removal of designated loading zone parking in many neighborhoods of the City has exacerbated the problem. Many truck drivers are forced to park illegally at the risk of receiving expensive parking tickets that are sometimes administered separately for the cab and the trailer. One truck driver estimated his typical parking fines to exceed two hundred dollars per delivery. Parking fines for food deliveries are so prevalent that it has become a budgeted cost of business—a cost that is passed on to consumers.^{lii} Baldor Specialty Foods estimates that they spend approximately \$180,000 on parking tickets annually.^{liii}

Large food distribution centers such as the Hunts Point Terminal Produce Market face similar transportation issues, including traffic congestion and inbound rail and truck delivery conflicts. The Terminal Produce Market infrastructure dates back to 1967, and its facilities were meant to have stations to accommodate both rail and truck unloading. Today, however, as delivery modes have shifted, this creates a constant shuffling back and forth between these two delivery means—wasting time and money pulling a boxcar back to allow a truck delivery, then pushing

the boxcar out again.^{liv} The Terminal Produce Market is currently threatening to relocate to New Jersey unless renovation demands are met.

Storage Issues

Schools and universities specifically cited lack of storage space as a problem—something that none of the restaurants or food retailers interviewed identified. Schools also seemed more concerned about transportation and parking issues than the food service and retail industries.

Storage space is also one of the primary challenges facing the Hunts Point Terminal Market. As a result of limited space at the Market, only 50 percent of the product volume can be stored within the facilities. The other 50 percent is stored in diesel-powered trucks on the property, known as “flex storage.” On a daily basis, there are 600 to 1,000 trucks used for this purpose. In addition to Hunts Point, some food service distributors interviewed also noted food storage space as a challenge.

Weather-related Challenges

Many interviewees cited inclement weather as a challenge to business operations. Food industry operations across all consumption points will be understandably affected if suppliers and distributors cannot transport food products to where they are demanded. Local weather, such as the February 2010 snowstorms, impacted the ability of some of the independent restaurants to obtain the food they ordered, although the disruption did not last long. Most successfully run food service and distribution operations have developed a resiliency that accommodates weather-related interruptions to supply flow.

Economic Challenges

The recent economic downturn has not left the food system unscathed. The nonprofit institutions studied, such as City Harvest and the Food Bank for New York City, identified the economic recession as a major constraint to their ability to provide services; this is likely due to the fact that they depend upon food donations, which are not as forthcoming during recessions. Unfortunately, as food donations are decreasing due to the recession, demand for food aid is increasing.

Some food retailers cited increasing costs of operations—high taxes, for example—as a constraint to their business.

CONCLUSIONS AND RECOMMENDATIONS

WHAT ARE THE LIMITATIONS OF THIS STUDY?

Limitations of FAF Data^{iv}

The FAF dataset is a useful tool for understanding important aspects of the New York City food system, because it provides publicly available data about the movement of freight within the United States by mode of transportation, dollar value, and annual tonnage. However, it cannot be used to fully understand the larger picture of the New York City food system because of several limitations. The first is that New York City does not exactly match any of the regions identified by the FAF, and the food groupings, as described above, provide few details about the movement of specific food items. Furthermore, the FAF does not account for temporal variation. That is, the data estimates are based on annual averages and do not take into account seasonal or daily variation in commodity flow.

Although the FAF is useful for determining the volume or value of specific commodity types that move between Region 68 and another regions, it does not indicate when a commodity passed through Region 68 on its way to another destination region (for example, a shipment between Florida and Boston that passes through New York City would not be included). Most importantly, the FAF does not track consumption of commodities, only their movement. The volume of food moving into, within, and out of Region 68 is not necessarily indicative of a commodity's original production location or of consumption by residents. FAF data does not account for international shipments that are rerouted through a U.S. city. For example, bananas from Ecuador that arrive in Houston, where they are separated for trucking are considered a domestic inbound shipment, rather than an international shipment.

It is important to recognize that commodities can be double counted. Raw products that are processed in Region 68 and then move within or out of the Region are counted once as the raw product, and a second time as a fraction of the finished product. In addition, when a product moves into Region 68, for example into a warehouse, it is counted as an inbound movement. When that same product is then distributed to another location within Region 68, it is double counted as an intraregional movement.

Although the FAF can elucidate trends in the flow of food through New York City and surrounding areas (Region 68), it cannot “track” food through the supply chain. This inability to more accurately trace the origin and pathway of food

entering New York City supply raises questions regarding food safety and New York City's government and industries' abilities to respond to emergencies such as food contamination outbreaks. Finally, it should be noted that because the FAF uses 2002 data as a baseline for future projections, these projections do not account for more recent changes, which may be due to changes in fuel costs or consumption preferences.

There is currently no reliable data that describes precisely how much food is consumed by New Yorkers. However, there are a variety of methods using federal statistics that can be utilized to estimate regional food consumption per capita. The ERS maintains the Food Availability (Per Capita) Data system, which provides yearly estimates of food availability that can be used as an indirect measure of food trends. Within this system is the Loss-Adjusted Food Availability Data series, based on records of all food produced in the United States, adjusted for imports and exports, divided by total population. Because it is not based on direct observations, these data do not break down consumption estimates to the city or county level. The Food Commodity Intake Database, developed by the USDA's Agricultural Research Service, surveys dietary intake based on reported diets at the national level.

The Greater Philadelphia Food System Study used the ERS's Food Availability Data System to estimate consumption rates, while there are transportation analyses being performed to develop methodology for disaggregating FAF data to the county level.⁴ Another option is to purchase Global Insight's TRANSEARCH data, which is commodity freight data with greater county-level information. If MOLTPS wishes to develop a more accurate understanding of food consumption in NYC, we suggest that these methods be pursued further.

One fact highlighted by the FAF study is that there is a large movement of food within the region, and food movement into and within Region 68 is projected to increase by 61 percent by 2035 from 2002 levels. As 96 percent of food volume is moved by truck, these factors, taken together, indicate that infrastructure planning is an important consideration for ensuring the long-term viability of New York City's food supply chain.

⁴ Some examples of these analyses are: Viswanathan, K., Beagan, D., Mysore, V., & Srinivasan, N. (2008). Disaggregating Freight Analysis Framework Version 2 Data for Florida: Methodology and Results. *Transportation Research Record: Journal of the Transportation Research Board*; and Opie, K., Rowinski, J., & Spasovic, L. (2009). Commodity-Specific Disaggregation of 2002 Freight Analysis Framework Data to County Level in New Jersey. *Transportation Research Record: Journal of the Transportation Research Board*.

Limitations of the Case Studies

While every effort was taken to interview a representative set of stakeholders within the New York City food system, given the time and resource constraints of our study data gaps surely exist. Some stakeholders were wary about being interviewed or very difficult to contact due to odd hours or general unresponsiveness, particularly those associated with Hunts Point Terminal Produce Market and Cooperative Market and some of the larger chain stores, food service companies, and distributors. Despite these limitations, general trends were revealed that allowed us to draw conclusions about the system as a whole.

WHAT TRACEABILITY ISSUES EXIST WITHIN THE FOOD SUPPLY CHAIN?

It is difficult to trace exact food movements from production to consumption. Additionally, a comprehensive analysis of New York City's per capita food consumption has not been performed by federal, state, or city agencies. According to the USDA's Economic Research Service (ERS), it is not known if such data exists or where it can be found.^{lvi}

There is also a lack of data regarding food coming into Hunts Point Distribution Center. Baldor Specialty Foods was the only Hunts Point business interviewed that tracks its food in any way. At the point of consumption level, many of the food retailers interviewed expressed a lack of knowledge about their food's origins. Most were able to trace the food only as far back as their immediate distributor, and certainly not to the place where it was originally grown or produced. While the complexity of the New York City food system is beneficial in many ways, providing resiliency and choice, it can also be burdensome when attempting to track the origins of food entering the City. Tracking systems are expensive and complicated, and require additional staff to maintain, which may explain the lack of comprehensive data. Many of the businesses at Hunts Point and elsewhere throughout the City likely do not have the money or the motivation to begin tracking their food's origins.

As consumers read about food recalls and other problems and become more educated about the food system, the demand for traceability is growing. Finding ways to increase the City's ability to more accurately track the food system warrants further study.

WHAT ARE POTENTIAL VULNERABILITIES IN THE FOOD SUPPLY SYSTEM?

A key vulnerability, expressed by many interviewees, is a general lack of information about where food comes from before it reaches New York City, as indicated in the traceability section above. Without a more thorough and accurate database of information about food supply and origin, New York City's food may be vulnerable to exogenous factors such as contamination. A lack of detailed information could hinder the City's ability to respond to an emergency such as a serious food recall and, more generally, strips the City of an ability to engage in informed long-term planning concerning the food system. With food movement into and within the New York City region projected to increase by approximately 61 percent by 2035, the City's aging infrastructure could become a major vulnerability. Since 96 percent of this food movement occurs by truck, the confluence of population growth, increased traffic, aging bridges and roads, and budget difficulties could imperil the food system if not planned for carefully.

WHAT ARE THE COMMONLY IDENTIFIED OPPORTUNITIES FOR IMPROVEMENT?

Despite the challenges faced by participants in the New York City food supply system, most of those interviewed presented a system that is complex but resilient. Most restaurants studied have been in the business long enough to work within the system efficiently and, especially for the quality-focused independent restaurants, to identify food trends that make their business more appealing to customers. Most retailers seem confident in the reliability of supply, barring any catastrophic interruption. If one supplier doesn't have a product, another will provide it. With a projected increase in demand as population rises, most interviewed parties seemed confident they would be able to continue to supply desired goods at a reliable rate.

Many of the changes sought by food system participants are inexorably linked to the four major challenges described herein. Regarding transportation and parking issues, a nongovernmental agency called Transportation Alternatives is looking into removing parking spots to create extra spaces for food delivery activities. Many think the proposed congestion pricing plans will only exacerbate the delivery burden of food distributors. Consolidation, driven by economies of scale, enables producers and distributors to organize around pockets of demand, thus creating arterial pathways through which food products can flow more efficiently.

Weather and the economy are largely exogenous to the food supply system, but inventory analysis could enable food system participants to better plan for temporary disruptions to the supply chain. Automated ordering can help better link suppliers with customers to minimize spoilage and waste. Streamlined supply chains may enable meaningful dialogue between growers and distributors, allowing farmers to align production with market demand for fresh produce.

In general, the minimal opportunities for improvement suggested by food industry stakeholders is a testament to the resiliency of the system in terms of supply. Other changes sought by local politicians and non-profit groups are typically related to nutritional or environmental concerns, or to the economy surrounding the food industry at large, and therefore are not the same day-to-day concerns shared by most food businesses.

RECOMMENDATIONS FOR FURTHER STUDY

While we have been able to provide a general overview of the New York City food system, the time constraints of the project have prevented us from delving more deeply into its intricacies, collecting detailed raw data, and gaining access to a wider array of high-level officials who know the system well. These unavoidable gaps in our study present an opportunity for MOLTPS to take what we have completed and pursue further studies of the system. The information obtained through the case studies begins to paint a fascinating picture of a complex, interconnected system, and further studies utilizing this methodology may be worth pursuing on a larger scale.

The FAF is a useful tool for analyzing food movement into, within, and out of the New York City region. However, commodity flow data is not available at the county level, meaning that it is not currently feasible to trace food movement to and among only the five boroughs. The Mayor's Office or another New York City government agency might consider developing its own survey of shippers and/or distributors to develop a more detailed understanding of the infrastructure required to support continued food movement into and within the City. *The Greater Philadelphia Food System Study* is the best example of a report that utilized the FAF data, and we would recommend using this study and the Delaware Valley Regional Planning Commission as a resource for performing a more in-depth analysis of the FAF data.^{ivii}

The City might consider comparing the results of our analysis to U.S. trends and general commodity flow projections to find out if the data we've presented for New York City is on par with averages, expected to grow, or vary in another significant way. An additional comparison of Region 68's commodity flow to that of other domestic regions would provide further insight into the role that New York City plays in the movement of goods within the United States.

Other cities have successfully used datasets such as the Loss-Adjusted Food Availability Data series, based on records of all food produced in the United States, adjusted for imports and exports, and divided by total population; and the Food Commodity Intake Database, developed by the USDA's Agricultural Research Service, which surveys dietary intake based on reported diets at the national level to gain an understanding of food consumption in their city. *The San Francisco Foodshed Report* compared the above-mentioned datasets to develop a range of estimates for total food consumed in San Francisco. *The Greater Philadelphia Food System Study* also used the ERS's Food Availability Data System to estimate consumption rates. If MOLTPS wishes to develop a more accurate understanding of food consumption in NYC, it is suggested that these methods be pursued further.

POLICY RECOMMENDATIONS

These recommendations are preliminary steps the Mayor's office could take to move toward addressing the specific challenges and vulnerabilities of the food system identified in this report, including food infrastructure and transportation issues, as well as food traceability. While the food system appears to be resilient in terms of having an adequate supply in New York City, this resiliency does not indicate that food is distributed equitably throughout the City, or that the food system is sustainable in terms of its environmental impact. Although this study does not specifically address issues of health or the environment, our recommendations do reflect these considerations.

General Recommendations

- 1.** Engage in partnerships with local groups currently working on food issues within the City, as a means to not duplicate efforts and to foster collaboration among groups with similar goals. These stakeholders can offer important insights on environmental, social, and economic food-related issues.

2. Establish a New York City Food Policy Council (Council) that would specifically address supply, distribution, and sustainability issues within the food system. The Council, consisting of stakeholders from a variety of sectors of the food system, would work closely with the Mayor's Office of the Food Policy Coordinator and other offices within the NYC government that address food, health, and industry issues, such as the Department of Health and Mental Hygiene and the Department of City Planning. Several U.S. cities, including Oakland, Hartford, and Baltimore, have established Councils over the past twenty years and have experienced varying degrees of success. Councils have helped to raise awareness about food-related issues through initiatives including educational programming, the expansion of community gardens and even the creation of a "Connecticut Farm Map" (a guide to local produce around the state), though challenges cited have included obtaining adequate funding, operating within an often labyrinthine political system, and pinpointing ways to measure success (See <http://www.foodfirst.org/en/foodpolicycouncils-lessons> for a review of the past successes and failures of these councils, as well as issues they addressed).

Food Traceability

1. Promote the awareness of food origin among consumers as important for their health, the environment, and the local economy. This initiative could emulate MOLTPS's "Small Steps, Big Strides" campaign to promote energy efficiency and other "green" habits.

2. Promote increased transparency in information regarding food origin among food industry stakeholders.

a. Conduct a feasibility study regarding the potential to implement a modernized food tracking system at Hunts Point Distribution Center, to increase our knowledge of the quantity and origin of food entering the Distribution Center. This will provide baseline information as to how the current tracking system (or lack thereof) can be modernized to maintain better records. Additionally, this study should address the potential for these records to be made accessible to the City.

b. Consider spearheading a voluntary pilot program to add a label to food sold at retail outlets and restaurants that identifies the origin of food.

Food Infrastructure/Transportation

1. Continue to support efforts to upgrade, expand, and modernize the Hunts Point Terminal Produce Market. In particular, addressing ongoing issues with storage capacity, refrigeration, outdated and deteriorating infrastructure, and traffic congestion are imperative. EDC recommendations and costs estimates have been outlined in the *Hunts Point Vision Plan*, created in 2004. EDC is currently working toward implementing these upgrades; financing is the key obstacle. Managing these infrastructural deficiencies is integral to keeping the Terminal Produce Market operational and located in New York City.

2. Conduct a feasibility study for improving upstate farmer accessibility to the New York City market in collaboration with regional farmer organizations. Independent local and organic stores identified the inability of upstate farmers to transport their products into the City as a barrier to market entry. Potential partners could include, but are not limited to, the Northeast Organic Farm Association, the Greenhorns, Lancaster Farm Fresh Coop, the Lower Hudson-Long Island Resource Conservation and Development Council, GrowNYC, and the Farmers' Market Federation of New York. The feasibility study should include evaluation of methods of transport, including alternatives to private trucks, such as the use of rail and boat or a co-op truck system. Currently, the Lower Hudson-Long Island Resource Conservation and Development Council is proposing a feasibility study to evaluate the use of a barge to collectively bring produce from upstate farmers down the Hudson River to the Hunts Point Distribution Center. This study may have important implications useful to the Mayor's Office.

3. Design an economically and politically feasible system for truck unloading that takes into consideration noise complaints and parking ticket costs. Case studies conducted revealed that the costs of parking tickets are an issue for suppliers and distributors and increases the cost of food. Furthermore, the system needs to balance timing such that trucks can utilize low-traffic periods and address the concerns of residents above the loading zones who are disrupted by the noise from the unloading process.

Economy

1. Increase City support of low-income residents during times of economic crisis by cooperating with food banks to determine how to best meet their needs when donations are decreased. The findings of this report identified food banks as the most vulnerable consumption point in NYC's food system in regard to supply.

2. Work with the Mayor's Office of Industrial and Manufacturing Businesses to conduct a study to determine the amount of additional revenue and jobs that can be created through public investment in the local food manufacturing sector. A 2007 study for the Mayor's Office, performed by the New York Industrial Retention Network and the Fiscal Policy Institute, evaluated the impacts of the food manufacturing sector on the citywide economy. The report, titled *More Than a Link in the Food Chain*, suggests that public investment in the food manufacturing sector could yield significant returns. Given the predicted rise in food traveling through the city by 2035, highlighted in this report, these findings, taken together, could further justify policy incentives aimed at supporting the food manufacturing industry in NYC.



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APPENDIX 1: FREIGHT ANALYSIS FRAMEWORK DATA

Food Commodity Summariesⁱ

01 Animals and Fish (live)

Live bovine animals
Live swine
Live poultry
Live fish, including live eels
Other live animals, (except live shellfish, crustaceans such as crabs and lobsters, squid, octopus, and other aquatic invertebrates)

02 Cereal Grains (including seed)

Wheat
Rye
Barley
Oats
Other cereal grains, including rice (excludes soy beans, and other oil seeds)

03 Agricultural Products Except for Animal Feed

Vegetables, fresh, chilled, or dried
Potatoes, fresh or chilled (except sweet potatoes)
Tomatoes, fresh or chilled
Onions, shallots, garlic, leeks, and onion sets, fresh or chilled
Lettuce, fresh or chilled
Leguminous vegetables, fresh or chilled
Other fresh or chilled vegetables
Leguminous vegetables, dried (includes those for use as seed, but excludes milled vegetables)
Other dried vegetables (includes those for use as seed, but excludes milled vegetables)

Fruit and nuts, fresh, chilled, or dried
Oranges, fresh or chilled
Grapefruit, fresh or chilled
Other citrus fruit, fresh or chilled
Bananas and plantains, fresh or chilled
Grapes, fresh or chilled
Melons, fresh or chilled
Other fresh or chilled fruit (excludes olives)
Dried grapes (includes raisins and “currants”)
Other dried fruit (includes mixtures of dried fruit)
Corn (except sweet)
Grain sorghum
Apples, fresh or chilled
Nuts in the shell (not including peanuts)
Shelled nuts not further processed (not including peanuts)
Other agricultural products
Soy beans
Peanuts, unroasted
Linseed (flaxseed)
Colza (rape) or canola seeds
Sunflower seeds
Cotton seeds
Mustard seeds
Other oil seeds and nuts
Bulbs and roots and similar products, live trees and other plants, and mushroom spawn
Other seeds for sowing
Fresh-cut flowers
Tobacco, not stemmed or stripped
Stemmed and partially stemmed tobacco
Raw cotton (not carded or combed)

ⁱ“2002 Commodity Flow Survey Commodity Codes.” Census.gov. US Department of Commerce, 1 Oct. 2001. PDF file. Web. 3 March 2010.

Unprocessed coffee and unfermented tea
Sugar beet and sugar cane
Other agricultural products, including cotton linters, seaweed, and forestry products (except forage products and cereal straw, raw spices, natural rubber and gums, and plants processed for ornamentation)

04 Animal Feed and Products of Animal Origin

Cereal straw or husks and forage products
Inedible flours, meals, and pellets of meat, fish, or seafood, and greaves
Bran, sharps, and other residues of cereals or leguminous plants
Oil cake and other solid residues from manufacture of vegetable fats or oils
Eggs in the shell
Raw hides and skins (including furskins)
Shorn or pulled greasy wool, animal hair not carded or combed, silk-worm cocoons suitable for reeling, and raw silk
Other residues and waste from the food industries used in animal feeding, and products of animal origin
Dog or cat food put up for retail sale
Other animal feed preparations, including premixes and supplements

05 Meat, Fish, and Seafood, and their Preparations

Meat except poultry, fresh or chilled
Meat except poultry, frozen

Poultry, fresh or chilled
Poultry, frozen
Meat, salted, in brine, dried, or smoked; and pig or poultry fat, not rendered
Fresh or chilled fish
Frozen fish
Fish, salted, in brine, dried, or smoked, and edible fish meal
Aquatic invertebrates, live, fresh, chilled, frozen, salted, in brine, or dried, and crustaceans in shell cooked by steaming or by boiling in water
Preparations, extracts, and juices of meat including poultry (except soups and broths)
Preparations, extracts, and juices of fish or seafood (aquatic invertebrates) (except soups and broths)

06 Milled Grain Products and Preparations, and Bakery Products **Milled grain products**

Wheat flour, groats, and meal
Malt
Milled rice
Corn flour, groats, and meal
Starches and modified starches
Inulin; wheat gluten; milled cereals and other vegetables; and grains otherwise worked, (except milling byproducts)
Bakery products and preparations of cereals, flour, starch or milk
Breakfast cereal foods, swelled or roasted
Pasta (including stuffed, canned, frozen, or dried) and couscous

Rice preparations, instant rice, and partially cooked rice
Mixes and doughs for preparing bakery products, including batters
Food preparations of cereals, flour, starch, or milk, other, including tapioca, malt extract, ice cream and milk shake mixes, puddings, and infant formula
Baked snack foods (excludes cookies and crackers)
Frozen baked products, including quiche, pizza, and waffles
Perishable baked products (including fresh bread, pastries, pies, pizza, and quiche)
Dry baked products (including cookies, crackers, and taco shells)

07 Other Prepared Foodstuffs, and Fats and Oils Dairy products (except beverages and preparations)

Milk and cream, unconcentrated and unsweetened
Milk and cream, in powder, granules, or other solid forms
Other milk and cream
Cheese and curds
Ice cream, ice milk, sherbets, and ices (excludes frozen yogurt, and ice cream and ice milk mixes)
Butter and other fats and oils derived from milk
Other dairy products, (excludes mixtures of butter and vegetable oil, preparations based on milk, eggnog and flavored milk drinks)
Processed or prepared vegetables,

fruit, or other nuts, and juices
Frozen vegetables and vegetable preparations (including french fries and vegetable mixtures)
Potato chips
Other processed or prepared vegetables, (including canned and pickled vegetables and relishes, but not including: frozen or dried vegetables; milled vegetables; soup mixes; tomato sauces; or other sauces)
Jams, jellies, marmalades, fruit or nut purées, and fruit or nut pastes
Processed or prepared nuts, peanuts, or seeds (except purées and pastes, but including roasted nuts and peanut butter)
Other processed or prepared fruit, including canned fruit (except dried)
Frozen fruit and vegetable juices (does not include beverages based on juices, such as ades or nectars)
Non-frozen fruit and vegetable juices (does not include beverages based on juices, such as ades or nectars)
Coffee, tea, and spices
Processed coffee (including roasted or ground)
Processed (fermented) tea
Spices, including unprocessed spices
Animal or vegetable fats and oils and their cleavage products, prepared edible fats, animal or vegetable waxes, and flours and meals of oil seeds
Animal fats and oils and their fractions, not chemically modified (does not include inedible flours, meals, and pellets)

Soy-bean oil
Colza (canola) oil
Corn oil
Other fixed vegetable fats and oils and their fractions, other, not chemically modified (except byproducts of wet corn milling, and oil seed waste and residues)
Non-liquid margarine(for liquid margarine)
Shortening
Other chemically modified fats and oils, animal or vegetable waxes, and prepared edible fats
Flours and meals of oil seeds (except flours and meals of mustard, and oil seed waste and residues)
Sugar confectionery, and cocoa and cocoa preparations
Raw cane or beet sugar, in solid form
Refined cane or beet sugar and chemically pure sucrose, in solid form
Glucose (corn sugar) and glucose syrup (corn syrup)
Other sugars in solid form, molasses, and sugar syrups with no added flavoring or colorings, including maple sugar and syrup (excludes byproducts of sugar extraction, syrups with added flavor/color)
Sugar confectionery not containing cocoa, including glacé products (except sugarless gum)
Chocolate confectionery
Cocoa beans, paste, butter, and powder, and cocoa preparations
Other edible preparations
Tomato sauces (including ketchup and

chili sauces)
Sauces and sauce mixes, prepared mustard, mustard flours and meals, and mixed condiments and seasonings, including salad dressings
Soups and broths (including mixes), and baby or dietetic foods
Syrups and concentrates used in food preparations or beverages
Flavoring powders, extracts, or essences
Processed eggs including egg albumin
Yeasts and baking powder
Sugar syrups with added flavors and/or colors, including table syrups
Other edible preparations, including protein concentrates and vinegar
Non-alcoholic beverages and ice
Carbonated soft drinks
Other sweetened or flavored water
Water, neither sweetened nor flavored
Other ice and non-alcoholic beverages

08 Alcoholic Beverages and Tobacco Products

Beer (malt beer) (excludes non-alcoholic beer)
Wine and other fermented beverages
Denatured ethyl alcohol, and undenatured ethyl alcohol that is 80% or more alcohol by volume
Spirits, liqueurs, and other spirituous beverages, and undenatured ethyl alcohol that is less than 80% alcohol by volume
Cigarettes
Other tobacco products, (except leaf tobacco)

County	Census Population April 1, 2000
Putnam	95,745
Rockland	286,753
Westchester	923,459
Orange	341,367
Nassau	1,334,544
Suffolk	1,419,369
Dutchess	280,150
Ulster	177,749
Total population of non-NYC counties in FAF 68	4,859,136
Total population of New York City	8,008,278
Total	12,867,414

Table 1. Population of FAF Region 68

Source: Ranking Tables for Metropolitan Areas: 1990 and 2000, U.S. Census Bureau (<http://www.census.gov/population/www/cen2000/briefs/phc-t3/tables/tab01.pdf>)

	Weight (k tons)	Percent
Alcoholic beverages	1940.203	7
Animal fed	1774.04	6
Cereal grains	3571.13	12
Live animals/fish	1056.57	4
Meat/seafood	2051.76	7
Milled grain prods.	1411.205	5
Other ag prods.	6314.249	22
Other foodstuffs	10452.647	37
Total	28571.804	100

Table 2. Predominant domestic food commodities by weight.

Source: Federal Highway Administration, Freight Analysis Framework (FAF), Version 2.2

	Value (\$ million)	Percent
Alcoholic beverages	4230.61	14
Animal fed	697.54	2
Cereal grains	500.314	2
Live animals/fish	1210.3	4
Meat/seafood	8256.13	28
Milled grain prods.	2616.71	9
Other ag prods.	2900.17	10
Other foodstuffs	8961.82	31
Total	29373.594	100

Table 3. Predominant domestic food commodities by value.
Source: Federal Highway Administration, Freight Analysis Framework (FAF), Version 2.2

APPENDIX 2: CASE STUDY INTERVIEW GUIDE

This list was compiled from specific questions generated by case study teams to maintain consistency throughout the case study process. We will use a common set of questions, applied as appropriate for specific cases, to enable uniform write-ups of case studies that will allow for easier comparative analysis and report organization. Before doing your interview, think about how to make these questions as specific as possible to the person you're interviewing.

For most case studies, interviews occurred in two rounds: first with the identified points of consumption, and then with distributors and/or suppliers identified during those initial interviews.

Question List for Points of Consumption

Supply

1. Who are your suppliers for fresh produce, meat/dairy, and manufactured goods? Who do you work with when making food purchases? (ie: directly with supplier, middleman, wholesaler?)
2. What are your main reasons for using that supplier? What do you think about most when you decide where to get your food from? (i.e. price, ease of access, time, quality...) Does where you get your food from change depending on season? If so, how?
3. What is the breakdown of fresh produce, meat/dairy, and manufactured goods that you purchase, and with what frequency do you have to order? (Try to get quantities and actual percentages if possible.) Who do you sell or provide/serve this food to? (Follow-up for schools/restaurants/hospitals/shelter)
4. How much of your food purchases (approx. percentages), if any, are organic? What are your reasons for buying or not buying organic? How does purchasing process for organic products differ from that of other products? If the business is one of a chain of locations, how do organic sales vary depending on location?
5. How much of your food purchases (approx. percentages), if any, are locally grown/raised? What are your reasons for buying or not buying local? How does purchasing process for local products differ from that of other products? If the business is one of a chain of locations, does your use of local foods vary depending on location?

Distribution + Transformation

6. How is food transported to your establishment?
7. How is food stored at your establishment?
8. What processing, if any, is done in-house? For what foods do you require processing prior to delivery to your business? Could an increase/decrease in pre-processing improve the lead time from purchase to sales?
9. Are you aware of the production/manufacturing origin of the foods you purchase? To what extent, if any, does this influence your purchasing choices?

Post-consumption

10. What quantity of food waste does your business produce and how is it disposed? What quantity of other food-related waste does your business produce and how is it disposed (volume, frequency of pickup)?

Challenges

11. What do you see as the major constraints or challenges to your business in terms of food service? (What step(s) in the supply system presents greatest challenges? Challenges could be costs of delivery/transportation, processing, inefficiencies in distribution, storage issues, purchasing particular products, etc.)
12. What changes or interruptions in the supply system would harm your business? (Looking to identify vulnerabilities.)
13. What changes in the food supply system could provide opportunities for increased efficiency in the system? (For example, increased access, more direct supply chain, food affordability, infrastructure...) What, if any, changes would be necessary to accommodate an increase in demand?

Questions for Distributors/Suppliers

Supply

1. Are you solely a distributor, a food wholesaler, or both? Do you do any processing of food?
2. Who are your customers? What is the breakdown of your customers in food retail, food service, schools, other public/nonprofit institutions? Where are your customers located (Neighborhood, borough)?
3. What quantities of fresh produce, meat/dairy, and manufactured goods do you purchase, and with what frequency? (Identify quantities as well as breakdown of foods.)

4. From where/whom do you purchase your fresh produce, meat/dairy, manufactured goods? (Here, try to identify any additional middlemen in the supply system, and the geographical origin of foods if possible).
5. What are your main reasons for using that source/sources? Does where you get your food from change depending on season. If so, how?
6. How does the breakdown of sales by commodity type (fresh produce, meat/dairy, manufactured goods) vary depending on the customer?

Distribution + Transformation

7. How is food delivered to your establishment? How do you deliver food to customers? What are the most highly travelled routes?
8. What is the lead time for getting food from your suppliers? What is the lead time for getting food to your customers?
9. How does distribution process differ depending on type and location of the customer, if at all (including purchasing/contract process, processing, and delivery)?
10. How is food stored at your establishment?

Post-Consumption

11. What quantity of food waste does your business produce and how is it disposed? What quantity of other food-related waste does your business produce and how is it disposed? (volume, frequency of pickup)?

Challenges

12. What do you see as the major constraints or challenges to your business in terms of food distribution? (What steps in the supply system present greatest challenges? Challenges could be costs of delivery, processing, inefficiencies in distribution, storage issues, purchasing particular products).
13. What changes or interruptions in the supply system would harm your business? (Looking to identify vulnerabilities.)
14. What changes in the food supply system could provide opportunities for increased efficiency in the system? (For example, increased access, more direct supply chain, food affordability, infrastructure.) What, if any, changes would be necessary to accommodate an increase in demand?

Interview Protocol and Advice

1. Contact interviewee to arrange interview. In-person interviews are suggested if possible; particularly for restaurant and store owners (i.e. anyone without a desk job).
2. Introduce project: "I'm a Columbia University grad student working on a project with the NYC Mayor's Office of Long-term Planning and Sustainability to analyze the food supply system for NYC. As part of this analysis we are conducting interviews of different players in NYC food supply with the goal of understanding trends and complexities in the system."
3. Let the interviewee know what sort of quantitative information you will be asking for so that if they have records of the information, they can be prepared.
4. Ask for any quantitative information as a follow-up to qualitative (how/why) information.
5. Other information: the study is an analysis only. There is no policy agenda behind it. The aim of the study is to provide the Mayor's Office with a base of information on the food supply system for NYC.
6. Confidentiality: We can provide confidentiality in the report if desired by describing case as "top chain supermarket" or "small single location restaurant," etc. Obviously any data or statistics that we find through publicly available information (such as names of supermarkets with highest market shares, gross sales, etc.) may be included in the report.
7. Try to get quotations where possible, or enough detail to paraphrase.
8. Ask if there is anyone else you should contact to get more information and remember to ask if you can follow up with your interviewee if you have additional questions.

APPENDIX 3: ADDITIONAL CASE STUDY DATA

FOOD RETAIL

Supply

One large chain store got up to 90 percent of processed food from White Rose Food, while others used a combination of White Rose, Krasdale, ShopRite, and Wakefern products to offer customers a range of non-brand name products that are often less expensive. The bodega owners interviewed were all familiar with Jetro Cash & Carry, a popular wholesale food retail supplier for bodegas, but only one used it to stock over 50 percent of his store. Other bodega owners relied on trips to Jetro for occasional purchases, but Jetro products represented less than 15% of most stores' merchandise. Jin's Superette and Smile Deli rely on long-standing relationships with independent suppliers and middlemen.

Large supermarket chains, bodegas, specialty food stores, and small independent grocers purchase produce from the Hunts Point Terminal Produce Market through independent middlemen with whom they have long-standing business relationships. "They know what quality we're looking for, so we can rely on them [to get produce we need] based on our orders every day," a store manager said.ⁱ It seems that the quality of produce selected lies in the hands of the middlemen who purchase from Hunts Point Terminal Produce Market and deliver to these endpoints.

In addition to Hunts Point Terminal Produce Market, the independent grocer and one of the two large chains use Porky's Products and Westside for meat supply, often ordering on a daily basis. Porky's was a regular supplier to the distribution center owned and operated by the other large chain store, but produce came from across the country from non-Hunts Point suppliers, and less than 25% from Hunts Point Terminal Produce Market.

For conventional retail, key distributors included companies such as White Rose Food, Krasdale, Porky Products, and the Hunts Point Terminal Produce Market. Some of the companies supplying organic retailers are United Natural Foods International (UNFI), Baldor, Porky Products, and Tree of Life.

Most often a retailer chooses to use a specific distributor based on a combination of price, quality, and relationships. All food retailers use a combination of distributors, such that they do not rely on a single distributor to supply their products.

The supply of food to retailers depends more on the focus of the store (organic versus conventional) than on the size of the store (for example a bodega versus a large chain supermarket). The product mix at a particular store is driven by customer demand. “People are still afraid of the price [of organic and local food], but some people are interested in seeing more at the store,” a chain store manager stated.ⁱⁱ

Food retail entities most directly connected to the production of food are the vendors at the Greenmarkets. Most Greenmarket vendors rely on sales at the Greenmarkets as their sole source of income.

Transformation/Processing and Delivery

Produce is sold by the unit or arrives in unit-bundles. In some instances, food retailers may briefly wash produce to remove excess soil, but minimal processing, if any, happens for most produce arriving on site. Meat products undergo the most processing at the store including cutting, packaging, labeling, and preparing meat for cooking and ready-to-eat sale (via sandwiches, dinner platters, and as a part of other prepared dishes). Bodegas with deli counters administered the same processing for meat products as both large organic and conventional supermarket chains, albeit on a smaller scale. Due to space constraints in the Park Slope Food Co-op and other small retailers like some bodegas, meat processing is not an option, thus, meat enters the facility prepackaged. Dietary constraints for Kosher and organic meat dictates these items are processed and prepacked before inventory in most locations. Dairy and processed goods arrive ready to be sold.

Post-consumption

Food waste in the food retail industry, similar to the manufacturing sector, indicates inefficiency.ⁱⁱⁱ Food product disposal equates to a loss in profits.

Although the quantity of food waste differs among the main food retailers interviewed (large chains appear to have the most waste per week), the volume of waste for all establishments was suggested to be minimal. The bodegas, specifically, emphasized their understanding of the local client base’s buying patterns, having all been in operation for at least 15 years. “I know what we will need way in advance, even the next seasons,” the manager of Tejada Grocery said.^{iv}

In addition to the loss of profit resulting from food waste, many organic food retailers are cognizant of the negative role waste plays in the environment. Thus, a noticeable trend in the organic food retail business is zero-to-low food waste.

There are several ways those interviewed try to keep food out of landfills: 1) reuse in other aspects of the food retail business, 2) donations to local food banks, or 3) composting. Food retailers, especially those with in-house kitchens, use bruised produce or products nearing expiration to prepare their premade food options. This is true of Whole Foods Market and Westside Market's business operations.

Most natural food retailers in Manhattan donate daily to City Harvest or the Food Bank for New York City. Food retailers bag the donated goods and City Harvest and Food Bank trucks will pick up the donations daily. Back to the Land and the Park Slope Food Co-op donate their unused food products to Chips, a local food bank in Brooklyn.^v

Finally, an option for some food retailers is composting unusable food waste. Whole Foods Market and the Park Slope Food Co-op both compost a portion of their food waste. Whole Foods is able to aggregate all food waste into a single stream of compost. Action Recycling is responsible for picking up the compost and processing it. The Park Slope Food Co-op takes a more local approach by donating food scraps to local community gardens. Garden of Union in Park Slope takes the majority of the Co-op's food waste, but the Garden also limit scraps to produce waste and thus the Co-op does not compost meat or dairy waste.

Some food retailers who are interested in composting are unable due to capacity constraints. Retailers, like Back to the Land, are operating at full capacity and do not have space for a composting endeavor between their saleable items and inventory.

Challenges, Obstacles, and Vulnerabilities

The ability of all stores to respond to supply interruptions is an example of the resilience of the supply side of the industry. The complex, interconnected web of food suppliers and distributors available to retailers appears to minimize the supply challenges felt at the retail level. The challenges facing the food system at the larger supermarket level are often linked to increasing costs of operations, not vulnerabilities within the actual food system tied to suppliers.^{vi} With a projected

increase in demand as population rises, most locations seemed confident they would be able to continue to supply desired goods at a reliable rate.

Issues with transportation and parking were most often mentioned as the biggest opportunity for improvement in the food supply system. Access to regional food is constrained by lack of vehicle access by farmers and small- and medium-sized retailers. Thus, in many instances there exists no viable means to transport food to New York City from surrounding farming regions. In recognition of this need, distributors specializing in regional food, including Regional Access and Angelo's distribution, were founded. While these organizations were founded on a sustainable business model, parking in the City has posed threats to the business. Parking tickets abound in the food distribution business. They have been so prevalent in Regional Access's business that soon the operation may begin to pass on this cost to their customers (the food retailers).^{vii} This cost could then become prohibitive to retailers using Regional Access as a distributor, thus further reducing access to regional food.

In the same vein, parking also poses obstacles to food retailers. Lack of access to parking for customers inhibits some natural food retailers. Dave Long, manager of Back to the Land, notes, "We have lost customers to stores that have developed, like Fairway in Red Hook, which has a convenient parking lot."^{viii} And while Mr. Long understands a parking lot in the heart of Park Slope is unrealistic, he would like to see a decrease in the issuance of "predatory parking tickets" on the block where Back to the Land is located. He notes, "This is a well-known predatory block for parking tickets, and it deters customers from shopping here."^{ix}

One common trend in the food retail sector was the lack of knowledge about where food arriving off the delivery trucks had been originally produced. Retailers lacked insights to the origin of any of their foodstuffs. While retailers could name the distributor the food was purchased from, little data was available as to how and where the distributor acquired the food.

FOOD SERVICE

Of the approximately 23,500 restaurants in New York City, 40 percent are located in Manhattan, about 23 percent lie in both Brooklyn and Queens, 10 percent are in the Bronx, and 4 percent are in Staten Island. The majority are small

establishments, with 65 percent having fewer than 50 seats and only 10 percent having more than 100 seats.¹ As can be expected, within this group there is an extremely wide diversity of restaurants in terms of cuisine and service type. New York City's restaurants represent 85 types of cuisine, although it should be noted that well over half of restaurants serve food in the top ten cuisine categories: in descending order, American, Chinese, pizza, Latin, Italian, cafes (coffee and tea), other, Caribbean, and Mexican.² The majority of restaurants—about 55 percent—are what New Yorkers likely think of as restaurants: eat-in, take-out, fast food, and bars and pubs.³ However, the rest of the food service industry is divided into 25 different categories, such as cafeterias, employee dining halls, attractions, and stadium concessions.

The case studies were chosen to reflect this diversity found within the food service industry.

Supply

The supply chain for restaurants in New York City varies widely depending on the type of restaurant and whether it is independent or part of a larger chain. The national chain interviewed, McDonalds, has its own warehouses and delivery trucks, as well as an automated system for tracking inventory. The store manager or buyer submits an order based on the computer system, and all of the food, including meat and dairy, produce, and processed goods, comes from the same place. The store manager interviewed could locate the warehouse only as specifically as “somewhere in New Jersey,” an indication of the degree to which the system is automated at this chain.^x

Independent or small chain restaurants that are quality-focused, as opposed to price-focused, appear to rely on a common set of wholesalers and distributors, depending largely on their location. The owner of a quality-focused Vietnamese restaurant indicated that most of the upscale restaurants in Manhattan all use the same main distributors, regardless of the cuisine. For example, she knew of a steakhouse that uses the same distributors as she did, and the hamburger restaurant interviewed for this report also had a distributor in common. However, because this restaurant sells some specialty menu items, the owner also relies on a smaller distributor and Chinatown grocers to get specific goods that are

¹Ten percent of restaurants did not respond to this question or did not know the answer.

²Approximately 15 percent of restaurants had no answer to the question of cuisine type or reported that it was not applicable. These answers were not included in the analysis but do make up a sizeable percentage of restaurants.

³Almost 30 percent of restaurants reported “other” or “unknown” to the question of service type.

not carried by the main distributors. According to this owner, restaurants in Chinatown purchase almost all of their food from suppliers in Chinatown.^{xi} Some of the major wholesalers and distributors mentioned are Dairyland, Baldor, Da Bragga, Pat LaFreida Meats, and Lucky's Tomatoes.

Independent restaurants that are more concerned with price will purchase from large wholesalers or distributors, where they can purchase most of their food at one time.^{xii} Two price-focused restaurants interviewed in the Bronx and one in Staten Island all get the majority of their food from Restaurant Depot, which has several branches in New York and New Jersey. Restaurant owners send their employees to Restaurant Depot to pick up the food, thereby reducing costs. Two diners in the Bronx get 70–100 percent of their food from Restaurant Depot, and the owner of one said he estimates 75–80 percent of restaurant owners do the same thing.^{xiii} The diner in Manhattan purchases its food exclusively from Sysco, while the Mexican restaurant in Brooklyn purchases most of its food, except for its meat, from Jetro, which is located nearby.^{xiv}

The corporate caterer interviewed, Restaurant Associates, is owned by a national food service company called Compass Group. Restaurant Associates' cafeterias purchase food almost exclusively from another company within Compass Group, called FoodBuy. This food supplier has relationships with producers and negotiates the best price available, and then provides a list of food that the caterer may purchase.^{xv}

Some independent restaurants purchase food based primarily on quality, rather than solely on price, using distributors and wholesalers with whom they have a long-standing relationship. They may try to buy local produce when the season allows, but even the hamburger restaurant we spoke to, which stated that they try to be environmentally friendly, will buy the best produce available, regardless of where it comes from. Only some specialized high-end restaurants, such as Union Square Cafe, will get a large percentage of their food from local sources.^{xvi}

Only some independent restaurants know or care where their food comes from. Sometimes a restaurant will choose a distributor or supplier based on reputation, so the restaurant can trust that the supplier makes sound purchasing decisions.

The catering company had an initiative to provide more organic food, but had to scale back this program because of cost-saving measures at the host company.

They still purchase only cage-free eggs (a designation that is not controlled by the USDA) and sustainably caught or raised fish.^{xvii}

The hamburger restaurant uses Pat LaFrieda Meats for their burgers. This meat wholesaler is recognized as one of the best quality meat wholesalers in the industry. This particular restaurant purchases “natural” beef, which according to our source means that it is antibiotic- and hormone-free and humanely raised (this definition is not officially recognized by the USDA).^{xviii}

Transformation/Processing and Delivery

All of the food purchased at McDonald’s comes preprocessed; even the lettuce and onions are prechopped.^{xix} On the other hand, most of the food purchased by independent restaurants is prepared from unprocessed ingredients, regardless of which distributor is used.

Since most restaurants use a regular third-party distributor, the food they buy is ready to be delivered or picked up soon after it is ordered. For example, the hamburger restaurant has a long-standing relationship with Pat LaFrieda, so when the purchaser places an order the meat supplier knows exactly what specifications this restaurant requires. Delivery can be made the same day as long as the order is placed by 3pm.^{xx}

Post-consumption

All restaurants claim to keep their waste to a minimum, because they can predict with relative certainty what demand will be on any given day. Some restaurants estimate their food waste to be about 10 percent. Produce spoils most often, especially lettuce, cucumbers, and bean sprouts.^{xxi}

Most restaurants have their waste picked up daily. Only two of the restaurants studied compost waste that is produced during preparation of the food (none compost post-consumer waste).^{xxii} The caterer has an anaerobic digester, one of only a handful in New York City, which transforms almost all of the food waste produced during preparation into liquid that is then disposed of into the sewer system.^{xxiii} The Vietnamese restaurant gives its used vegetable oil to biodiesel vehicles.^{xxiv}

Challenges, Obstacles, and Vulnerabilities

The food supply chain to restaurants appears to work without many disruptions.

The major constraints are seasons and weather, which primarily affect the price of food—and, in some cases, the quality of the food—but not the ability of restaurants to procure the foods they want. Sometimes a restaurant will decide not to purchase a particular food, such as strawberries, if they become too expensive out of season.^{xxv} Additionally, many restaurants mentioned the frost that affected crops in Florida in December of 2009; one restaurant manager noted that the price of a case of tomatoes has more than doubled in recent weeks because of the frost.^{xxvi} Local weather, such as the February 2010 snowstorms, impacted the ability of some of the independent restaurants to obtain the food they ordered, although the disruption did not last long. McDonald’s had no difficulty receiving deliveries during extreme weather events.^{xxvii}

The owner of the Vietnamese restaurant noted that the larger distributors work very efficiently—serving several customers in the same area with one truck, for example—while some of the small distributors seem to be less efficient. For example, they would make a delivery to one restaurant in the morning and make a separate delivery to a neighboring restaurant in the afternoon. They did not combine the deliveries because the two restaurants had different representatives at the supplier who did not coordinate with each other.^{xxviii}

Most restaurant owners and managers could not identify vulnerabilities in the food system; most restaurants studied have been in the business long enough to work within the system efficiently and, especially for the quality-focused independent restaurants, to identify food trends that make their business more appealing to customers.

SCHOOLS AND UNIVERSITIES

Supply

As the largest system of public schools in the country, the New York City public school system educates 1.1 million students from grades K-12 in over 1,600 schools across five boroughs each year.^{xxix} Over this time, cafeteria staff members serve a total of 36 million breakfasts and 119 million lunches to students, educators, and school staff.^{xxx} But the New York City educational system reaches beyond the walls of public K-12 institutions. The system also includes over 125 schools belonging to the Independent School Admission Association of Greater New York.^{xxxi} These privately operated schools provide lunch and snacks for an average total of 500

students per school each year. New York City also has a wealth of opportunities for those seeking higher education, including the CUNY system, comprising 23 institutions and serving 480,000 students annually,^{xxxii} as well as numerous not-for-profit educational institutions: Columbia University, serving a campus of 25,000 students;^{xxxiii} New York University, which serves a campus student body of 40,000 students;^{xxxiv} and over 20 other higher education institutions.^{xxxv}

Within this breadth of educational institutions we have isolated three main categories, and chosen a case study from each category. These three categories are: (1) public/charter K-12 schools, (2) independent/private K-12 schools, and (3) institutions of higher education.

SchoolFood is the organization responsible for ensuring that 1,200 New York City public schools get the food their students need. The organization does not distribute food directly to schools; rather, it relies on four major distributors: Driscoll's, located in New Jersey, which delivers to Queens and the Bronx; Teri Nichols, located in Brooklyn, which distributes to Manhattan and parts of Brooklyn; Maramont, which delivers to parts of Brooklyn; and Chef Choice, also located in Brooklyn, which delivers to Staten Island. SchoolFood first provides a menu of basic items. School cafeteria managers then place orders for these basic items, and can vary the ultimate recipe based on student preference. Paul Uffer, Manager of Food Technology at SchoolFood, relayed that "a manager could order a chicken patty, then turn it in Chicken Parmigiana, Chicken Teriyaki, or Caribbean Chicken, based on the populations; this is not so much a matter of ethnicity, but of student preference." SchoolFood then sends these orders to the four distributors, which serve as purchasing agents, obtaining the food from various suppliers. The four distributors also serve other organizations and retailers in addition to schools.

Schools on average place orders about once per week, but the frequency can range to three to four times per week. Additionally, SchoolFood places daily orders for items such as bread, which comes from three local distributors, and milk, which comes from the only milk processor in NYC, located in Queens.^{xxxvi}

Another element of SchoolFood is the SchoolFood Plus initiative, started about eight years ago. Initially, the program intended to synthesize learning in the classroom with the dining experience by teaching students about 12 plants common to New York State; the students would arrive in the cafeteria for lunch to find that these items were incorporated into their menus in new and innovative

ways. Though the educational component is not offered in every school, these new recipes have been incorporated into the general SchoolFood menu rotation, and are offered three to four times per month to all cafeteria managers.^{xxxvii}

The Dalton School dining services are run by Flik Independent, a branch of Compass Group North America. This branch supplies food to over 100 independent educational institutions across the country.^{xxxviii} Walter Lyczkowski, the manager for Dalton Dining Services, is also an employee of Flik International. Walter must use the vendors who have agreements with Flik, and orders goods through purchasing agents approved by the company. The largest supplier used by Flik for the Dalton School is the Performance Food Group, located in Elizabeth, NJ, where Walter procures about 85 percent of his foods and paper products.^{xxxix}

Dalton uses other food suppliers and distributors as well. Several of these vendors are local, as Dalton students, parents, and other stakeholders have expressed a strong preference for local, organic, more healthful foods since Walter first joined Dalton 11 years ago. Thus, many offerings vary with season, including produce. Local offerings include produce from Rhode Island, upstate New York, and New Jersey, as well as dairy from the Tuscan distributor in Jamaica, Queens. As each student pays for lunch and snacks as part of his or her tuition, each student eats the food provided by Dalton; there are no other food suppliers.^{xl}

Similarly to Dalton, Columbia University Dining Services purchases the majority of their food from one large distributor: Sysco. However, Columbia University also places a heavy emphasis on using local vendors. It essentially has a different vendor for each type of food product: apples from Red Jacket Orchards in Geneva, NY; coffee from the Brooklyn Roasting Company in Williamsburg; Gino's Bakery, Rockland Bakery, and Chris' Cookies for baked goods; J. Kings for local produce; and a cooperative in Syracuse, NY, for dairy products.^{xli} This list just scratches the surface of the variety of suppliers that provide food to the Columbia community. The University even produces its own salsa and strawberry jam; both products are grown in Hamden and South Glastonbury and canned in New Haven.^{xlii} In total, the University spends about 4-4.5 million dollars per year on food purchasing. In fact, the University purchases so many products from New York State that it has been certified *Pride of New York*.^{xliii} The emphasis on local foods is driven primarily by the desire of the University to encourage and stimulate the economic development of the surrounding neighborhood. However, price is clearly a factor in the decision-making process. Victoria Dunn, Director of Dining for Columbia

University Dining Services, pointed out that though there are apple orchards closer to campus than Red Jacket, that particular farm offered the best price for apples.^{xliv}

Transformation/Processing and Delivery

Food at all three of the schools we studied arrives at the schools via truck. The Essex Street Academy cafeteria managers place orders on a weekly basis and receive shipments every Monday morning.^{xlv} The other two institutions place orders of some kind on a daily basis, both via phone and online. Staff members take daily inventories to assess which foods are in need of purchasing and replacing. Walter, the Dalton Dining Hall Manager, places orders for more perishable goods, including milk, breads, and some produce on a daily basis; other foods are ordered twice per week.^{xlvi} Vicki, the Columbia Dining Hall Director, also assesses inventory daily and communicates with her distributors just as frequently.^{xlvii}

Food arrives at all three locations both already processed and in need of processing. When we visited the Essex Street Academy, the staff was busy preparing turkey and cheese wraps for the expected lunchtime onslaught of 600 students. These consisted of a white flour tortilla, American cheese, and sliced, preprocessed turkey, then wrapped in plastic. Breakfasts, however, arrive fully processed; one breakfast offered included a Rice Krispies cereal pack and skim milk. Others include baked goods, such as bagels and muffins, as well as juice (Ian MacDonald, Dean of students at Essex Street Academy, noted that “the kids fight over the juice - it’s very popular”).

The three chefs and 15 staff members in the Dalton kitchens prepare a wide array of foods for student lunches. Many foods, such as flavored waters, come pre-processed, but most are cooked on the premises.^{xlviii} Meats are more difficult to cook as no fire grill is allowed on premises, but instead they “char grill” the meats.

Food also arrives on Columbia’s campus both previously processed and in need of processing. Café 212, for example, located in Alfred Lerner Hall, prepares its own sushi and bubble tea daily, as well as serves premixed frozen yogurt Pinkberry-style, with a variety of toppings to choose from. Vicki’s kitchen staff members prepare 15,000 lunches per week for the students that circulate in John Jay Hall, Columbia College’s only fully operational dining hall.^{xlix}

Post-consumption

As the Dalton students are required to eat the lunch provided by the school, there is very little waste to discard. Walter said it was too little waste to donate, but would not say how it was disposed of. The cafeteria manager at Essex Street Academy could not gauge student numbers as well, but predicted that about 600-700 students, half the student body, ate in the cafeteria on a regular basis. The manager expressed that he ordered the foods that the kids liked the most, but also made sure to order fish, though unpopular, as “the kids, they need their fish.” By ordering popular items more frequently, Essex Street is able to both keep their student body happy and avoid excess waste.

Columbia has attempted to handle the waste issue in two ways. First, the main dining hall has eliminated the use of trays. Vicki has found that this prevents the students from taking more than they can consume, limiting the amount of food later disposed of. Second, Vicki donates leftover food to City Harvest, as well as several local churches.ⁱ

SchoolFood itself does not produce any waste as no food is delivered directly to the organization. Additionally, since the distributors only purchase the foods ordered by the cafeteria managers, there is little waste. However, since the distributors also service other clients, they may have waste from these sources.ⁱⁱ

Challenges, Obstacles, and Vulnerabilities

When asked, all three institutions named two main challenges: storage and transportation. All three facilities had a severe dearth of storage space. Essex Street kept its food lockers in the main cafeteria - each locker was labeled with a different day of the week, containing that day’s food. Both Dalton and Columbia needed to take inventory daily and order on a daily basis because they needed to keep their inventories as small as possible - there was no space to store more than a day’s worth of food.

Additionally, transportation was a major issue. Walter described the delivery process at Dalton as a “nightmare.” Since the main building is located on a small side street in Manhattan, and trucks are often delivering during rush hour (between 6 and 8am), the trucks must quickly park in the front of the building, unload as quickly as possible, and immediately depart. There is no room for parking, as the school buses must unload students at precisely the same location. Columbia faces a similar transportation challenge; though the trucks can eventually park

in garages, they must navigate Manhattan traffic to reach their final destination.

Paul, of SchoolFood, cited school storage and safety as his two primary concerns. Since foods are primarily delivered between the hours of 7:30am and 2pm, students are also in the building during the deliveries. Delivery persons must wheel their hand trucks through the busy hallways, avoiding the students along the way. Furthermore, school cafeterias and storage spaces might be located in places difficult to get to with cumbersome packages. Storage is also a major concern, and necessitates the frequent ordering of foods; Paul noted that orders used to be placed month to month. Now this is no longer possible.^{lii}

PUBLIC AND NONPROFIT INSTITUTIONS

Supply

The Food Bank of New York City (FBNYC) sources four categories of food: fresh produce, fresh fish, fresh meat, and processed, packaged foods (including dairy). Processed, packaged foods are obtained via donations from individuals as well as a national network of food manufacturers, wholesalers, and retailers.

Fresh produce is donated by “the produce industry, including the Hunts Point Terminal Produce Co-op, government agencies, and Feeding America. [Their] Fresh Produce Program distributes approximately nine million pounds of fresh fruits and vegetables to [their] network of food assistance programs throughout the city every year.”^{liii} In addition to these sources, FBNYC has a direct relationship with a farm in Orange County, NY, and is working to expand its relationships to other farms and farmers.

Fresh fish is sourced from the Hunts Point Co-op Market every day and fresh meat and poultry are obtained via a relationship with Pathmark grocery store and smaller local distributors. More than 300,000 pounds of fresh fish, meat, and poultry are distributed by FBNYC every year.

FBNYC also receives a variety of food products from government agencies, both city and state, with which they have annual, renewable contracts.

Homes for the Homeless (HFH) provides food in two of its shelter kitchens, the Saratoga kitchen and the Prospect kitchen. All of HFH’s food is provided by

Ambassador Food Services located in Long Island City, Queens. HFH does not provide organics or local food. All of the food is purchased from Ambassador based on yearly renewable contracts. Ambassador provides the food, cooks it, and provides clean-up service afterwards. HFH does not receive food donations.

In 2008, City Harvest redistributed over 27 million pounds of rescued food, which was collected from myriad segments of the food industry including caterers, bakeries, healthcare facilities, production companies, restaurants, farms, grocers, retail, corporations, coffee bars, hotels, manufacturers, schools, wholesalers, and food drives. The organization's activities rely solely upon the generosity of food donations and the financial support of over 40,000 donors, and therefore, their capacity to feed New York City's hungry is inexorably related to the economic stability of the country and region. Like FBNYC, City Harvest collects a large amount of fresh fruits and vegetables from the Hunts Point Terminal Produce Market in the Bronx. New York State farmers contributed over one million pounds of fresh produce to City Harvest citywide programs, e.g., HarvestWorks, Produce Corners, and Mobile Markets.

Food supply to New York City's public hospitals differs significantly from the food aid organizations like FBNYC and City Harvest in that hospital food is purchased. In 2003, the New York City Health and Hospital Corporation (HHC), the largest municipal healthcare system in the United States, identified major threats and inefficiencies in its food service operations. The HHC simultaneously faced aging infrastructure and equipment, lack of standardization, inefficiencies due to decentralized dietary operations, and increasing labor and food costs.^{liv} As a result, the HHC decided to outsource the corporation's dietary operations, and in 2005, HHC entered into a 10-year contract with Sodexo, a large multinational food service and facilities management corporation. Prior to the agreement, HHC was producing approximately seven million patient and resident meals annually in a network of 17 separate kitchens. The consultant implemented a cook-chill system that emphasized standardization, quality control, and reporting. Between 2003 and 2007, the initiative increased patient satisfaction ratings and decreased annual corporate-wide food service costs.

Transformation/Processing and Delivery

Food comes to FBNYC's 90,000 square foot warehouse in the Bronx via tractor-trailer six days a week. There are no deliveries on Sunday. The food is sorted, labeled, stored, and prepared for distribution. Volunteers break down the huge

cases of food delivered by tractor-trailer into 500 pound or less sorted shipments suitable for delivery to their network of local food assistance programs and their Community Kitchen & Food Pantry in West Harlem. On a typical day, eight to ten tractor-trailers full of food shipments leave FBNYC and deliver to smaller food assistance entities. In this way, FBNYC serves as a nonprofit food distributor in addition to a direct supplier of food to the hungry. FBNYC dispatches over 50 million pounds of food every year throughout the five boroughs. Overall, FBNYC's distribution network provides over 300,000 meals a day. To date, they have collected and distributed over 823 million pounds of food.

HFH does not engage in any processing or distribution of food; everything is handled directly by Ambassador Food Services.

City Harvest conducts daily collection from hundreds of food donors each day. A fleet of trucks and cargo bikes are employed to both pick up and deliver rescued food from donor to recipient. A Feeding America grant provided City Harvest with a logistical truck routing and tracking system that helps minimize the traveled distance between donor and recipient. Overall, City Harvest provides meals for approximately 260,000 New Yorkers per week. To date, the organization has collected and distributed over 200 million pounds of rescued food.

HHC has large food contracts with Sodexo and U.S. Foodservice. Patient and resident meals are produced in a state-of-the-art Cook-Chill Plant (CCP) located at Kings County Hospital in Brooklyn. In total, HHC food operations produce approximately 17,000 meals per day.^{iv}

Post-consumption

Food waste at FBNYC and City Harvest is minimal as food is distributed almost immediately after it is received. Any prepared food that is not eaten at the Community Kitchen is frozen with the assistance of local restaurants and saved to make new meals. Scraps and other suitable waste are donated to compost programs around the city.

HFH and HHC did not provide details on what happens to their food waste post-consumption.

Challenges, Obstacles, and Vulnerabilities

The key challenge facing FBNYC and City Harvest is the recession. The recession has

impacted these organizations in multiple ways. Food donations have decreased as families, restaurants, and other suppliers have had to make do with less and cut costs in any way possible. Yet the demand for food from FBNYC and City Harvest has increased as people have lost jobs and income and need help.

During the recent economic crisis, City Harvest began narrowing its focus on sourcing more nutritious food from contributing donor agencies. Their efforts aim to prevent New York's hungry from relying on cheap unhealthy food in face of economic adversity. Approximately 90 percent of the 1998 poundage was nutrient-dense. In addition, more than 60 percent of the food they rescued in 1998 was fresh produce.^{lvi}

HUNTS POINT DISTRIBUTION CENTER

The Hunts Point Distribution Center is comprised of three independently managed markets, the Hunts Point Cooperative Market, Hunts Point Terminal Produce Market, and New Fulton Fish Market, as well as many private distributors and vendors. The New York City Economic Development Corporation (EDC) is the property manager and landlord of the 329 acres of Hunts Point that make up the food distribution center. Over 115 firms operate out of the distribution center and over 10,000 individuals are employed there.^{lvii} The EDC is responsible for negotiating leases, enforcing and collecting rent, as well as for the long-term development of the site and its infrastructure.^{lviii} Within each of the three markets, private companies rent space and operate from within the larger market structure. Alternately, some private companies⁴ choose to rent space within the distribution center, separate from the three major markets. EDC is trying to diversify the business at Hunts Point by collaborating with local community groups to implement the Hunts Point Vision Plan. One focus is expanding capacity for food processing and manufacturing at the distribution center, which is a major economic boon to Hunts Point and the Bronx as a whole. All but 30 acres of the Distribution Center are occupied, and these 30 acres are vacant due to brownfield issues that EDC is currently working to resolve.^{lix}

The Hunts Point Cooperative Market was originally built in 1972 and is the largest meat market in the world. The market currently consists of 52 companies located

⁴ These companies are Anheuser-Busch, Baldor Specialty Foods, Inc., Bazzini Nuts, Inc., Citarella, Krasdale Foods Distribution Center, R. Best Produce and Sultana Distribution Services, Inc.

in seven buildings on 60 acres of land at the Distribution Center, and generates approximately \$2 billion in revenue annually.^{lx} The Terminal Produce Market was established in 1967 with 600,000 square feet of facilities. Today, it is located on 105 acres and consists of 48 firms. It is the highest volume produce market in the United States, with an estimated \$2.3 billion in annual revenue, selling approximately 3.3 billion pounds of produce.^{lxi} The New Fulton Fish market relocated to Hunts Point in November of 2005, but was historically located in lower Manhattan near the Brooklyn Bridge since 1807. The New Fulton Fish market encompasses 33 acres and consists of 31 companies^{lxii} that sell 125,000 tons of seafood annually, generating approximately \$1 billion in annual revenues.^{lxiii}

Supply

Food arrives to the Distribution Center mainly via truck, but the Terminal Produce Market and some of the companies operating out of the Distribution Center, including Baldor, receive deliveries via train and ship. According to Baldor, train and ship are used for products that are heavier, and would require more trucks for delivery to comply with weight regulations, such as citrus, potatoes, or onions. Ship is also used for products that have a longer shelf-life.^{lxiv} The Hunts Point Truck Survey conducted in 2003 required truck drivers making deliveries at the Hunts Point Distribution Center to identify their point of origin. According to the information collected, drivers at the Cooperative Market and the Terminal Produce Market indicated that 42.9 percent of the drivers had trips originating within New York City, 13 percent came from other areas in New York State, and 13 percent came from New Jersey. Regionally, four percent came from the mid-west, 8.4 percent from the far-west, 9.3 percent from southern states, and 9.3 percent indicated that they came from “other regions.”^{lxv} For deliveries to the Fish Market, a total of 21 trucks drivers were surveyed: two indicated they came from New York City, three from New Jersey, eight from New England, four from Florida, one from Long Island, and three from Maryland.^{lxvi} While this data does not indicate the point of origin of the food products being delivered, it is interesting to note that the EDC has found that more than 50 percent of the vendors at the Terminal Produce Market carry New York State produce.^{lxvii} The New Fulton Fish Market receives 60 percent of its fresh fish “wild-caught from the East Coast, between Maine and Florida.”^{lxviii} The remaining supply comes from both farms and fisheries in and outside of the United States.

Vista Food Exchange, Inc., mainly purchases its meat from out of state: the poultry comes from Ohio, Maryland, Delaware, and beef and dry fish from Canada.

They receive daily deliveries (and sometimes multiple loads depending on the demand that specific day) of poultry including items such as wings, legs, thighs, cutlets, parts, and whole birds, and deliveries of frozen turkey parts, fish, and beef approximately once or twice a week.^{lxxix} Monte's Seafood Emporium also receives daily shipments of fish, on average 25 truckloads. They receive deliveries of fresh and frozen fish from around New York State, all over the United States, as well as from international locations including South America, China, Mexico, Africa, and New Zealand.^{lxxx}

Baldor, a company operating outside the three main markets but within the distribution center, is primarily a produce wholesale distributor, comprising 95 percent of their business. The other five percent includes dry food, such as chocolate and caviar, which Baldor started carrying in 2005. Approximately 10 percent of Baldor's produce and products are organic, and the percentage is predicted to grow based on consumer demand. Baldor indicated that their products are received from all around the United States, as well as from abroad, including Guatemala, France, China, Mexico, the Dominican Republic, and Holland.^{lxxxi}

Transformation/Processing and Delivery

The Cooperative Market and Terminal Produce Market do not carry out any food transformation or processing. Of the private companies operating at the Distribution Center, Bazzini Nuts is one of the few which engages in value-added processing (coating nuts with chocolate). In terms of required treatment to products before consumer sale, this process either goes on prior to arrival at Hunts Point or at the endpoint. "Break bulk activity" is the closest activity resembling a value-added process at the Terminal Produce Market, and this involves breaking down large palette deliveries into smaller amounts.^{lxxxii} Vista Food Exchange, Inc., based within the Cooperative Market, is an international business specializing in distributing meat products. At Vista Food Exchange, Inc., no transformation of meat is done. They do not conduct any value-added processing to the meat products, and packing of the meat is not even done onsite; it goes out as it comes in.^{lxxxiv}

The New Fulton Fish Market engages in more transformation and processing, in addition to vending, than the other Hunts Point markets. Delivered fish may be filleted at the market, which can be considered processing. However, these practices are carried out to varying degrees, and some vendors do not carry out any processing and sell fish to customers in the same containers in which they are

received. Approximately 15,000 pounds of fish are filleted each day and 35,000 pounds are not processed.^{lxxv} Monte's Seafood Emporium's onsite processing includes filleting and cleaning the fish.^{lxxvi} The Baldor facility conducts the processing of produce onsite, including the washing, peeling, skinning, cutting, and packaging of fruits and vegetables in state of the art facilities. Baldor also provides packaging for different companies onsite.^{lxxvii}

Storage and Distribution

Food at the distribution center is stored onsite to varying degrees based on available space. Storage seems to be an issue at the Terminal Produce Market more than at the Cooperative Market or New Fulton Fish Market. The meat at Vista Food Exchange, Inc., and the fish at Monte's Seafood Emporium is stored in freezers and coolers onsite.^{lxxviii} As a result of limited space, only 50 percent of the product volume can be stored within the facilities at the Terminal Produce Market. The other 50 percent is stored in diesel powered trucks on the property, known as "flex storage." These storage trucks run on idle 24 hours, 7 days a week.^{lxxix} On a daily basis, there are 600 to 1,000 (peak) trucks used for this purpose. While the other markets also rely on flex storage, it is not to the degree the Terminal Produce Market does.^{lxxx} Food storage at Baldor, however, is not an issue; there are numerous rooms, including refrigerated, freezer, and ripening rooms, which are located throughout the facility.^{lxxxi}

The Distribution Center's customers include supermarkets, convenience stores, restaurants, and hotels, but the clientele for each market is slightly varied. The Terminal Produce Market primarily serves independent and ethnic grocers around the city, which do not require HACCP safety standards.⁵ Supermarkets generally vertically integrate with suppliers for extended contracts and do not purchase from the Terminal Produce Market unless they have shortages that require immediate restocking.^{lxxxii} The Cooperative Market and the New Fulton Fish Market have a similar customer base, "large chain store supermarkets, most of the region's top restaurants, hotels, and country clubs, as well as independent butcher shops." However, the New Fulton Fish Market also has a strong ethnic market base; one wholesaler noted that about 20 percent of the buyers are Chinese, and about 30 to 40 percent are Korean.^{lxxxiii}

⁵ Health Analysis and Critical Control Points (HACCP) is a system of ensuring food safety with regard to biological, chemical, and physical hazards along the supply chain (from point of origin to consumption).

The customers of Vista Food Exchange, Inc., include wholesalers and large-chain supermarkets, but no restaurants. Customers⁶ include, but are not limited to, vendors at the 14th Street market (but not many vendors are there anymore), and are located in Brooklyn, Long island, and Connecticut.^{lxxxiv} Customers of Monte's Seafood Emporium include supermarkets, restaurants, wholesalers, as well as the general public. The customers are located in all five boroughs, as well as in other states including California, New Jersey, Florida, and Louisiana.^{lxxxv} Approximately 80 percent of Baldor's customers are in the food service industry (restaurants, country clubs, nursing homes, cafeterias), and 20 percent in the food retail industry (including FreshDirect and Dean & DeLuca). About 92 percent of their customers are located in within a 100-mile radius of their facility. Baldor also donates certain percentages of their produce to City Harvest, a food rescue organization based in New York City.^{lxxxvi}

There are three main methods equally used to distribute food to consumers from the distribution center. Some endpoints pick up their orders themselves. At both Vista Food Exchange, Inc., and Monte's Seafood Emporium, customers come to pick up the products themselves.^{lxxxvii} If the vendor is a wholesaler, these companies will distribute the order to the endpoint themselves. Each of the three markets own their own trucks or lease them for distributional purposes that vendors can choose to use. "Jobbers," or middlemen, may also be used for distributional purposes. In this case, the jobber will make purchases and then distribute them on behalf of the endpoint.^{lxxxviii} At Baldor, most of the products are delivered directly to the customer; on average, about 160 refrigerated trucks are sent out a day for deliveries. According to Baldor's records, an average of four million delivery miles is logged annually. Only a very small fraction of its customers use jobbers or pick up deliveries themselves.^{lxxxix}

Post-consumption

Recent waste estimates find an average total of 111 tons of waste generated per day from the New Fulton Fish Market and Terminal Produce Markets, the latter representing 83 percent of this total. More than half of the material is food waste, while approximately 25 percent is cardboard.^{xc}

⁶ Vista Food Exchange, Inc., was not willing to disclose any customer names.

The Terminal Produce Market takes part in the NYC WasteLe\$\$ Business Project, which ultimately aims to help companies reduce the volume of their solid waste, increase energy and water efficiency and reduce waste-related costs. Enlisting the help of the Terminal Produce Market's current waste collector, Circle Rubbish, the Terminal Produce Market has been separating their waste into organic, recyclable, and normal waste. These composting activities have reportedly diverted approximately 840 tons of food waste per month.^{xci}

As mentioned earlier, the vendors at the New Fulton Fish Market practice different degrees of processing before product sale, which results in different waste generation levels. One vendor indicated that more waste is generated from the unprocessed fish than the processed fish, even though there is twice the volume of unprocessed fish. According to vendors at the New Fulton Fish Market, processed fish is 40 to 60 percent of its original weight while the remainder is waste. Accordingly, the total waste generation at the New Fulton Fish Market is estimated to be 3.8 percent of the total annual tons of product sold.^{xcii} Monte's Seafood Emporium employs a private company to collect its fish waste, which is later processed into cat or dog food.^{xciii} Baldor disposes its food waste by composting, while cardboard and plastic are collected and picked up on a regular basis by a private company for recycling.^{xciv}

Challenges, Obstacles, and Vulnerabilities

The major challenges currently faced by the Distribution Center are largely concentrated in the Terminal Produce Market. The Market's deteriorating infrastructure and limited storage capacity is impacting business. At the Cooperative Market and New Fulton Fish Market, individual vendors had difficulty identifying perceived constraints or challenges to their businesses.

"Insufficient storage capacity, transportation circulation problems, lack of food safety protections, and deficient site infrastructure" are the major issues at the Terminal Produce Market.^{xcv} As discussed earlier, storage capacity is a huge issue; the reliance on flex storage is unsustainable. Inbound rail and truck delivery conflicts and traffic congestion are major issues creating significant delays for suppliers and forcing them to do business elsewhere. The Terminal Produce Market infrastructure dates back to 1967, and facilities were meant to have stations to accommodate both rail and truck unloading. Today, however, this creates a constant shuffling back and forth between these two delivery means, wasting

time and money pulling a boxcar back to allow a truck delivery, then pushing the boxcar out again.^{xcvi} Trucks are the predominate means by which goods are delivered to Hunts Point compounded by obstacles which make it difficult for suppliers to maneuver between roadways. On a daily basis, 15,000 trucks come in and out of the distribution center serving 115 businesses (including vendors at the three markets). Aside from trucks, the CSX Railroad line, which serves most of the East Coast, runs adjacent to the Hunts Point Distribution Center. The Terminal Produce Market is the only one of the three major markets within the Distribution Center that uses rail delivery via the CSX Railroad line, receiving approximately 3,000 boxcars annually.^{xcvii} Additionally, Baldor is a private distributor that is also adjacent to the railroad line and receives products by rail delivery.

The Terminal Produce Market is currently threatening to relocate to New Jersey unless renovation demands are met. EDC is currently working with the Terminal Produce Market to renegotiate its lease to address these issues by creating more storage space and bettering cold chain compliance, creating separate areas where trucks and boxcars unload, and working to reduce internal traffic congestion by looking for opportunities to decrease the number of trucks coming in and out of the market, as well as looking into options to increase deliveries via rail and water.^{xcviii} EDC is currently looking into the feasibility of creating a fishing pier near the New Fulton Fish Market so that fishermen can pull up their boats up and drop off delivery this way.^{xcix} Addressing these issues would spur increased demand for market space among New York State producers.^c Renovation of Terminal Produce Market will have to be a public-private partnership, including contributions from the Market itself. In the event that the Terminal Produce Market decides not to renew its lease at Hunts Point, the larger companies within the market would likely relocate to their individual offsite facilities and the smaller vendors would simply close.^{ci}

At the Cooperative Market and New Fulton Fish Market, vendors could not identify specific challenges their businesses faced. According to the warehouse manager at Vista Food Exchange, Inc., there are no pertinent challenges or issues as the company is well established with its suppliers. Vista indicated that it also has its own power source, so even city blackouts don't affect business. When there are issues with one supplier, Vista has a list of other suppliers it calls on. Examples of potential issues faced include: a supplier may not be accurate in weighing their chickens (their actual weight is different than what they put on the label); a supplier may produce chickens that are too heavy (people do not want to

one whole four-pound chicken); or a supplier may not pack their fresh meat with enough ice.^{cii}

According to Baldor, its largest challenge is dealing with parking tickets accumulated by their 70 trucks delivering within New York City. Regulations were changed with the introduction of the new traffic lane, the lane in which the truck would double park while delivering food products to its customers. Baldor indicated that they spend approximately \$180,000 on these parking tickets annually.^{ciii}

Additionally, environmental contamination issues on the unused 30 acres of land within the Distribution Center and the recycling of organic waste promise to be challenges in the future.^{civ}

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