Master's Programme in Innovation and Global Sustainable Development

Pandemic Pathways for Food System Sustainability

A thematic case study on NYC food system actor expectations for sustainable transition dynamics during the COVID-19 pandemic

by

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Abstract

The COVID-19 pandemic revealed the fragility of the global food system and its existing inadequacies in achieving food security, providing jobs, and ensuring environmental sustainability on various regimes around the world. Through a qualitative thematic-textual analysis, this thesis uses a case study of New York City to identify themes of actor expectations, either explicit or implicit, on how to address food system challenges revealed by the COVID-19 pandemic that may tip current agro-industrial food systems into an era of transformation. Data is derived from a collection of articles dated between March 17, 2020, and January 17, 2021, from New York University, which captures the landscape of food in NYC during the COVID-19 pandemic (NYU, 2021). The findings are as follows: (1) The impact of the pandemic on the city's food system distinguished the difference between short-term charitable support and the need for an integrated system for delivering nutritious food at all actor levels. (2) The most prominent unifying expectation among actors is that while specific charity-based pandemic responses have sustainable characteristics, they do not equate to a sustainable transition dynamic. (3) All actors are coming together to envision a system that, when a stressor like COVID-19 comes along, has a support system that can be integrated into it, rather than a system that simply takes on all the qualities of the emergency food system.

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Definitions

TERM	DEFINITION
Food System	The broader system that is defined by the activities, infrastructure, and people involved in feeding the global population (e.g., the growing, processing, distribution, consumption, and disposal of foods (Popkin, 2017)
Sustainable Food System	A system that delivers food security and nutrition for all in such a way that the economic, social and environmental bases to generate food security and nutrition for future generations are not compromised (FAO, 2018)
Agro-Industrial Food System	A system that is built for scale and efficiency, and while it often results in food that is less expensive for the consumer, it also creates "externalized" costs — paying for environmental cleanup or public health fallout— that must be absorbed by governments and taxpayers. (Foodprint, 2021)
Food Security	When all people at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. (Panagariya, 2002)
Wicked Problem	A constellation of linked problems embedded in the fabric of the communities in which they occur... wherein stakeholders may have conflicting interpretations of the problem and the science behind it, as well as different values, goals, and life experiences (Kreuter, De Rosa, Howze, & Baldwin, 2004)

1   Introduction

In October of 2020, a joint statement was released by the International Labor Organization, International Fund for Agricultural Development, the Food and Agriculture Organization, and the World Health Organization stating that the COVID-19 pandemic "has been affecting the entire food system and has laid bare its fragility" (WHO et al., 2020).

Currently, communities worldwide still face reduced access to healthy diets due to disruptions in domestic and international food supply chains stemming from COVID-19 trade restrictions and confinement measures. However, as the joint statement implies, "reduced access to healthy diets" is relative to already dysfunctional systems in many countries. The pandemic has illuminated the vast gaps in resiliency and sustainability impacting food systems around the world. While these gaps may have been present previously, awareness surrounding them was fragmented, or their resiliency had not been tested in a manner as far-reaching and complex as the COVID-19 pandemic. The fragmented awareness and lack of testing stem from the fact that historically, countries achieved productivity gains in the food sector at high environmental and health costs (World Economic Forum, 2020). In other words, an increase in the disease burden and nutrients lost along food supply chains—which constitutes both an environmental and economic inefficiency—is caused by the adoption of globalized and industrialized food production. Due to the paradoxical nature of current agro-industrial food paradigms, transforming a food system, even at a regional level, creates a litany of financial, cultural, and mindset challenges (World Economic Forum, 2020). A crisis like the COVID-19 pandemic presents a window of opportunity for food system actors (suppliers, distributors, retailers, consumers, and policymakers) in various regimes to align their expectations on how to tackle these challenges and tip their current systems into an era of transformation.

1.1   Research Problem

This thesis uses New York City (NYC) as a case study to investigate systemic failures in food systems revealed by the COVID-19 pandemic and the resultant shift in actor expectations. NYC presents an interesting case to investigate this dynamic as its food system is highly complex, interconnected, and characterized by traditional agro-industrial practices. The NYC food system serves over eight million residents, and more than 19 billion pounds of food are distributed annually throughout the system to approximately 42, 000 point of sale outlets, making it one of the largest regional food systems in the United States (NYC Economic Development Corporation & Mayor's Office of Recovery and Resiliency, 2016;

NYC Gov., 2021). While the system has withstood times of crisis before, such as the Great Recession in 2008 and Hurricane Sandy in 2012, these crises were geographically or socioeconomically confined and did not present the wide-scale disruption challenges of the COVID-19 pandemic.

Although various plans for a more sustainable and resilient food system were released to fortify the system after these previous crises, the pandemic revealed their limited effect (Bloomberg, 2007, Brannen & Exline, 2010, Cardoso, 2019, Stringer, 2010). Evidence of this is illustrated in a budget analysis conducted by the City University of New York (CUNY) Urban Food Policy Institute (2019). The financial years of 2019 and 2020 revealed that the massive budget for food-related activities and requests did not reach the places that needed it most. The report documents that previous resiliency and sustainability plans did not adequately address the system's issues. Better-off communities made more requests for food-related activities than those confronting a wide array of deeper issues (CUNY Urban Food Policy Institute, 2019). Further, similar patterns were found in poverty and food-insecurity-related budget requests. These findings imply that there is not enough of a participatory problem definition when it comes to the faults of the NYC food system. This lapse in problem definition was starkly highlighted when the COVID-19 pandemic hit and food insecurity numbers rose by nearly 38% citywide and 49% among children, compared to pre-COVID-19 figures, hitting particularly hard in communities of color (Food Insecurity, 2021). The numbers illustrate that the city's food system is nowhere near prepared enough to handle a threat like the COVID-19 pandemic. Additionally, there are existing policy inequities and systemic failures that must be addressed for NYC to succeed in its resiliency and sustainability plans. These existing policy inequities and systemic failures further serve as key considerations for food systems around the world to achieve a sustainable future.

Existing policy inequities and failures are likely due in part to a disconnect between agents of change (i.e., government funding and policy measures) and individual needs (i.e., food security and nutrition). This disconnect could be temporal, as in previous resiliency and sustainability plans for the food system moved too slowly in achieving their goals, or structural, as in there is a lack of succinct problem definition in the city's effort to build a more resilient, sustainable food system. Based on the budget analysis findings above, this study investigates the second of the disconnects (i.e., structural). As such, it asks the research question (RQ) of:

RQ: *How has the COVID-19 pandemic aligned food system actor expectations on transformation dynamics to a sustainable food system in NYC?*

1.2   Aim and Scope

While food system inefficiencies have been around for decades, research in agro-sustainability transitions, is fairly recent. The first paper considered an entry in the agro-sustainability transition field was published in 2003 (Wiskerke, 2003). Currently, there is a disconnect between the analysis of macro-level dynamics for sustainable transitions, such as government policy, and micro-level ones, such as food security and nutrition (El Bilali, 2019). This notion is reflected in the NYC budget allocations mentioned previously. That is, the NYC government is looking top-down at methods to increasing food access by pouring money into production or patches to reduce inefficiencies, thus ignoring the actual needs and pain points of areas suffering from food insecurity. In literature, too, there exist analyses of the broad dynamics needed to increase access to food and reduce waste or inefficiencies, but rarely are these connected to notions of the actual nutrition individuals will receive from these change dynamics and if the proposed changes will, in fact, increase food security. A sustainable food system model is a "system that delivers food security and nutrition for all in such a way that the economic, social and environmental bases to generate food security and nutrition for future generations are not compromised" (FAO, 2018). Therefore, this disconnect undermines the notion of a "sustainable" transition as it does not address the link between macro-level transition dynamics and individual nutritional or security needs at present or in the future.

This thesis addresses this epistemological gap by focusing on a case study of NYC's food system. By investigating the role of the COVID-19 crisis in generating awareness of what pathways NYC food system actors must take to achieve sustainable food security, this study contributes to existing literature in three main ways. First, it contributes to previous agro-sustainability transition research by linking the role of macro-level and micro-level dynamics in catalyzing transformation. Second, it links the effects of exogenous variables to actor and network discourses, thereby addressing gaps in current regime transition research. Third, it identifies the 'goal' of sustainable agro-food transitions by defining sustainable food systems and connecting findings with this definition to establish what the system is transitioning to and barriers in doing so. The implications of these contributions lie in policy actions for food systems that leverage the effects of landscape events on actor expectations into sustainable transition pathways.

The aim of this thesis is to identify themes of actor expectations, either explicit or implicit, on how to address food system challenges revealed by the COVID-19 pandemic that may tip the current food system into an era of transformation. The scope lies within the New York City food system and its network of actors, including suppliers, distributors, retailers, consumers, policymakers, and various other stakeholders. This aim is fulfilled through a qualitative thematic-textual analysis. Data is derived from a collection of articles from New York University, which captures the landscape of food in NYC during the COVID-19 pandemic (NYU, 2021). The timeframe of the articles analyzed begins on March 17, 2020 and ends on January 17, 2021. Through an analysis of the themes and messages delivered in the

"food insecurity" series of articles, this research identifies shared perceptions, revelations, and challenges that stand in the way of a more resilient and sustainable system.

1.3   Outline of the Thesis

This thesis is divided into six main sections. Section two gives an overview of the impact of COVID-19 on the global food system, precedence of food system crises, and the New York City Food System. Section three presents a review theoretical background and framework for this analysis as well as relevant literature in the food system and transition fields. Section four gives an overview of the data source for this study, along with the reasoning and descriptive statistics surrounding it. Section four also explains the methodology chosen for this study, the approach taken and the data cleaning process. Section five explores the findings found through qualitative analysis of the data and provides a short discussion. Finally, section six summarizes the findings, contributions and implications of this thesis, with notes on the limitations of this study and recommendations for future research.

2 Context—the COVID-19 Pandemic, Food System Crisis, and New York City

This section provides an overview of the context in which the thematic case study of NYC's food system is conducted. First, the impact of the COVID-19 pandemic on the global food system is discussed, along with the complexity of managing it. Next, a history of previous crises facing the global food system, as well as general themes in policy eras, responses, and outcomes, is presented. Lastly, an overview of the NYC food system is given, addressing descriptive statistics of the system, the model under which it operates, and issues with previous resiliency or sustainability plans and policy responses. The objective of this section is to situate the characteristics of the NYC food system, complete with its actors, supply-chain and policy history, and COVID-19 in the context of the global food system and past food system crises.

2.1 COVID-19 and The Global Food System

The seen impact of COVID-19 on the global food system reveals its vulnerabilities and conveys a need to build resilience at local and regional levels. Throughout the pandemic, institutions, organizations, and individuals have faced varying levels of food system disruption. Clapp and Moseley (2020) note three main impacts of COVID-19 on food systems that exacerbated issues within them. First, food supply chains were disrupted globally due to lockdowns and system workers falling ill. Second, the resultant global economic recession from COVID-19 closures and trade barriers decreased food access as well as impacted the livelihoods of those working in the food system. Last, price fluctuations and discrepancies in certain food commodities for certain regions were seen globally, creating uncertainty in the market. To boil these three findings down, managing the COVID-19 food system crisis at a global level presents a multitude of challenges and has the potential to derail long-term efforts for sustainability in food systems around the world. Differences in socioeconomic standing, community regions (i.e., urban, suburban, rural), and government support create complex and entangled challenges. Therefore, any global initiative to increase efficiency in response to the COVID-19 crisis will likely intensify these challenges as it overlooks regional and local complexities. Moreover, while some point to the COVID-19 crisis as a unique, once-in-a-century event (Economist, 2020), others are not as certain that the COVID-19 crisis is an outlier. Clapp and Moseley (2020, p. 1408) comment, "A host of other threats to food systems are waiting in the wings: the climate crisis, extreme weather events, conflict, economic nationalism, and rising trade protectionism, and the collapse of multilateralism." Thus, it seems imperative that food system actors and scholars view the COVID-19 crisis as a harbinger, and therefore an opportune turning point in adapting conventional, global industrial food system models to more sustainable decentralized ones.

2.2 Precedence of Food System Crisis

Throughout the past 70 years, the overall global policy response to food system crises has been centered around increasing efficiency. The main reasoning behind this is that increased food access can be achieved through gains in economic efficiency (Clapp & Moseley, 2020). In other words, by increasing production level, not only do prices stay low but agriculture income and commercial trade are also bolstered, which in turn would 'rebalance' the food system. This methodology in dealing with crises in food system forgoes any sort of consideration of supply chain disruptions, the loss of nutritional value in food produced in a large-scale industrial manner, and the incorporation of marginalized communities. Moreover, it can lead to dangerous dependencies and lock-ins that exacerbate the gaps in these considerations. An overview of food policy eras, crises, policy responses, and outcomes over the past 70 years can be seen in Table 1 (Adapted from Clapp & Moseley, 2020). As the table shows, this thread of 'efficiency-as-king' runs throughout, with a minimal effect in ushering in resiliency in the subsequent 'pivotal crisis'. Beck (1992) confirms this notion, conveying that with each successive crisis, actors in the global food system appear to double down on increased efficiency being the key to food system crises. This approach has left vast vulnerabilities in the global food system that the COVID-19 pandemic has been quick to reveal.

Table 1: Food policy eras, crises, policy responses and outcomes over the past 70 years

Food Policy Era:	Food Self-Sufficiency & the First Green Revolution (1950s-1970s)	Neoliberal Food Security (1980s-2006)	Neo-Productionism and the New Green Revolution (2007-2020)
Pivotal Crisis:	Food price crisis 1972-74 - Sharp rise in commodity prices, including food - Concerns about global food supply - Massive increase in hunger	Third World debt crisis and farm livelihood crisis late 1970s- early 1980s - Low and falling commodity prices - Concerns about oversupply - Growing precariousness of farmer livelihoods in rich and poor countries alike	Food price crisis 2007-08 - Sharp rise is commodity prices - Concerns about food supply - Increase in hunger
Policy Response:	- Government support for industrialization to increase production in rich and poor countries alike - Export push from industrialized countries - Encouragement of commercial imports to fill gaps in developing countries	- Structural adjustment loans in poor countries conditioned on reducing government support for agriculture and opening up to trade to encourage both more exports and imports - Growing pressure to liberalize agricultural trade through negotiation and adoption of the WTO Agreement on Agriculture	- Neo-productionism, this time as a private sector push - Heightened financialization of the agro-food sector and growing acquisition of land by private corporate and financial actors - Efforts to connect smallholders in developing countries to corporate controlled global supply chains
Outcome:	- Industrialized production on a global scale - Surplus production in industrialization countries flooding global markets - Growing dependence on food imports in some developing countries - Creation/emergence of Global South food exporters, e.g., Brazil, Thailand, Vietnam	- Growing dependence on food imports in developing countries - Increased specialization and competition for agricultural export markets - Opening up of agricultural trade on terms that served industrialized country interest - Consolidation of farms in industrialized countries - Growing power of agricultural trading firms	- Smallholder producers increasingly participating in highly specialized global supply chain production on contract with large corporations - Weakened land rights for most vulnerable food producers

Source: Adapted from Clapp & Moseley (2020)

2.3   New York City Food System

As stated previously, 19 million pounds of food are distributed annually in the NYC food system to over 42,000 point-of-sale outlets (NYC Economic Development Corporation & Mayor's Office of Recovery and Resiliency, 2016). The system serves approximately 8.4 million residents and 66.6 million tourists, as well as commuters, as of 2019 (DataCommons, 2021; Young, 2020). The city's restaurant industry also employs over 250,000 people (Moe, Parrott & Lathrop, 2019). Ten major government agencies, presented in Appendix A, are involved in distributing meals and overseeing policy. There are six major clusters of food distribution: Hunts Point, College Point, Long Island City, Maspeth, Greenpoint, and Sunset Park. Hunts Point is the largest, accepting and distributing more than 2.3 billion pounds of food into NYC, which is more than all five other distribution hubs combined (NYC Economic Development Corporation & Mayor's Office of Recovery and Resiliency, 2016). The city has over 1,000 soup kitchens, food pantries, and mobile pantries, as well as countless food non-profits aiming to decrease food insecurity levels (Find Food, 2021).

The distribution of food into and throughout the city follows a hub-and-spoke model, or one in which large stores of food come into hubs from a decentralized network of suppliers and flow back out through the hubs to a decentralized network of point-of-sale or consumption outlets. As distribution clusters are integral to the functioning of this model, the NYC food system's main vulnerability lies in damage or disruption to these sites. However, even if one site was damaged, it was presumed that the others could still run; thus, previous resiliency and sustainability efforts lay in fortifying the distribution clusters to maintain the strength of their diversification. For instance, after Hurricane Sandy in 2012, the city invested $350 million on top of a federal award of the same amount to increase the sea wall by eight feet and protect the surrounding area of Hunt's Point from future flooding (Cardoso, 2019). However, this action to decrease flood risk in vulnerable neighborhoods and distribution sites did not protect the city from a threat such as the COVID-19 pandemic, which affected all six sites, employees, and city residents.

The NYC food system has a $30-billion-USD budget for institutional meals. To put those numbers in perspective, the institutional food spending budget of NYC is second only to that of the United States Military (Brannen & Exline, 2010). NYC's food system is therefore unique because it seemingly has all the power to respond to food system challenges or bottlenecks, and yet food insecurity rates pre-COVID were 12 percent higher than national rates and 16 percent higher than the New York State rate (Food Bank For New York City, 2021). In other words, even when all six distribution sites were operating normally, the system was still not serving its people to the best of its ability. Moreover, research into previous resiliency or sustainability plans or efforts show little progress or follow-through, save for the increase of workers minimum wage to $15 in 2018 (Brannen & Exline, 2010; Moe, Parrott & Lathrop, 2019; OneNYC, 2015).

3   Related Literature

Section three of this thesis contains the theoretical background, framework, and previous related empirical analysis. The theoretical background defines sustainable food systems, food insecurity, as well as shared expectations and wicked problems for clarification of elements presented and analyzed in this thesis. The theoretical framework section provides detail on the Multi-Level Perspective Framework and the Sustainable Foresight Method, which are both leveraged in this study (Rip & Kemp 1998, Geels 2005, 2010). Finally, the previous related empirical analysis section presents related empirical literature, focusing mainly on sustainable and agro-food transition research. The objective of this section is to ground the textual thematic analysis conducted in this study in related theoretical content and frameworks.

3.1   Theoretical Background

> *"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"*
> *(Barron et al., 2010, p. 6)*

Several terms require expanded definition before the theoretical framework and previous empirical analysis sections are discussed. As the quote from Barron et al. (2010) conveys, the NYC food system is highly intertwined with various other societal, economic, and environmental paradigms. Thus, it affects and is affected by a host of other resources and mindsets. This section clearly defines sustainable food systems, food insecurity and shared expectations, and wicked problems in order to convey the 'goal' of sustainable improvements to the city's food system and why the analysis of expectations completed in this study is an appropriate step in informing this goal.

3.1.1   Sustainable Food Systems

A 'sustainable' food system is an umbrella term that currently takes on a number of different components in scholarly research. FAO (2018, p.1) most adequately encompasses all of these components in their definition of a sustainable food system as "a system that delivers food security and nutrition for all in such a way that economic, social, and environmental bases to generate food security and nutrition for future generations are not comprised." This definition stems from a report from the Food and Agriculture Organization of the United Nations, which includes useful heuristics for measuring and constructing a paradigm for determining the actors and dynamics involved in a sustainable food system. For the purposes of a robust definition, several of these inclusions are detailed here.

Figure 1 (FAO, 2018) below shows the five components of sustainable food systems (SFS in the figure), which add value as engines of growth: (1) Salary income (2) Return on Assets (3) Taxes (4) Consumer and (5) Socio-Cultural and Natural Environment. These five value-adding components support and enable other dimensions of a food system such as food security, nutrition, social support, wealth accrual, poverty levels, and food supply. They catalyze four main feedback loops, as shown below, that both impact these other dimensions and contribute to social, environmental, and economic sustainability. The investment loop is set into motion by reinvested profits and savings. Spending of increased worker income drives the multiplier loop by supporting economic welfare. Economic, social, and environmental impacts within the broader food systems and other systems drive the externality loop. Finally, the progress loop is set into motion by public expenditure on the socio-cultural and natural environments. These loops can produce positive and negative feedback. The more positive feedback produced in these four loops, the more sustainable the food system.

For the purposes of this study, two key insights about this paradigm are highlighted here. First, the "sink" of a sustainable food system, or the component into which all arrows flow, is nutrition. This is important to note as it indicates that sustainable food systems are not designed to extract value or profits like conventional agro-industrial models but rather to provide adequate nutrients to those they serve. Second, two points of catalytic support drive the feedback loops into action: taxes and wealth accrual. These two points of support must be directed at the system's socio-cultural and natural environment to catalyze the value feedback loops that embody the system's sustainability.

Figure 1: The Food System Development Paradigm
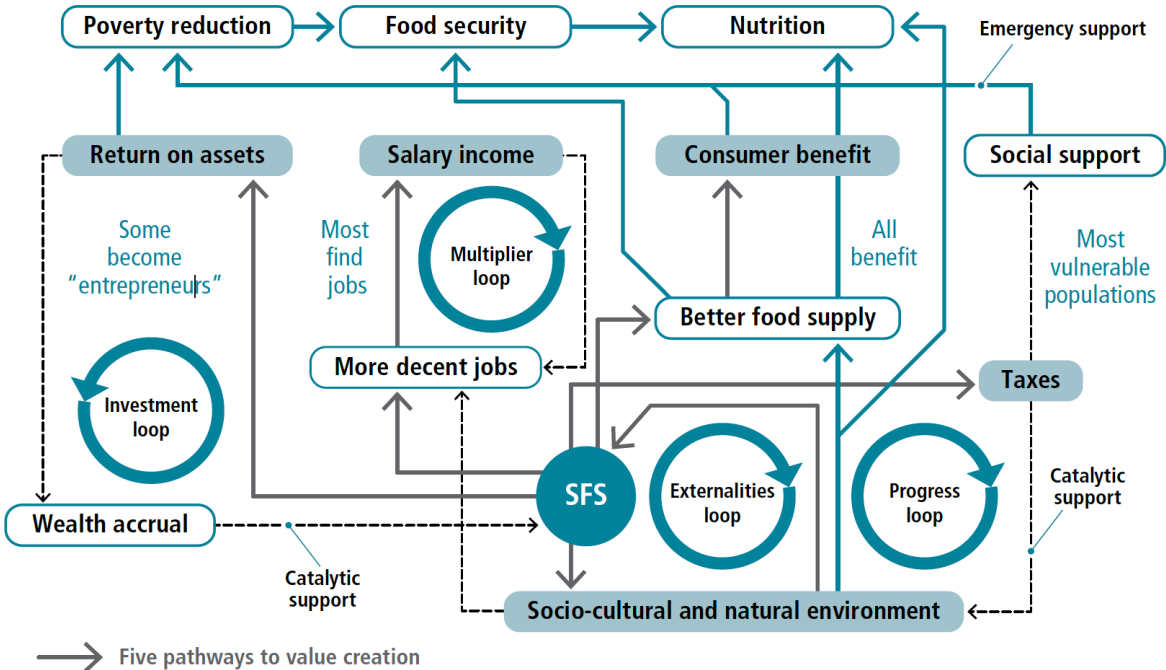
Source: FAO (2018)

3.1.2   Four Dimensions of Food Security

For this study, the food security dimension of sustainable food systems is of particular interest as the analysis is driven by perceptions of food insecurity throughout the COVID-19 pandemic in NYC. Here, *food security* is defined as existing "when all people at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (Panagariya, 2002). According to the Committee on World Food Security (CFS), the four main pillars of food security are availability, access, utilization, and stability (CFS, 2017). These pillars and their respective determinant factors are presented in Table 2. Availability refers to the availability of food supplies. As shown in the table, this covers everything from resource inputs and production outputs to import and export dynamics and government food aid. Access refers to the physical and economic access to food an individual, group, or society has. This access can be defined in terms of purchasing power, transportation options, market infrastructure, or food distribution in individual households. Utilization refers to how food is handled and consumed. The utilization of food can mean anything from food preparation and nutrition behavior to cultural traditions surrounding food. Lastly, stability refers to the stability of food supply and access. This includes determinant factors that generally fall under environmental, political, and economic spheres.

Table 2: Four Pillars of Food Security

Pillar	*Determinant Factors*
Availability	- Crop Production - Import Capacity - Efficient Water use - Food Stocks - Trade - Food Aid
Access	- Income - Purchasing Power - Transfer - Market Infrastructure - Food Distribution within households - Gender Issues
Utilization	- Food preparation and nutrition behavior - Cultural tradition - Knowledge, standards - Health status - Hygiene - Care opportunities - Diet Quality
Stability	- Weather variability - Price Fluctuation - Political Factors - Economics Factors

Source: Adapted from Charlton, 2016

3.1.3   Shared Expectations and Wicked Problems

Proposals to improve food system sustainability are often split between an emphasis on supply-side strategies and an emphasis on demand-side strategies, which creates a problem definition gap (Wicked Problems in Food System Solutions, 2018). As such, efforts to increase sustainability in food systems present what scholars call a 'wicked problem.' Wicked problems are "a constellation of linked problems embedded in the fabric of the communities in which they occur...wherein stakeholders may have conflicting interpretations of the problem and the science behind it, as well as different values, goals, and life experiences" (Kreuter, De Rosa, Howze, & Baldwin, 2004, p. 441). When wicked problems are combined with social complexity, fragmentation occurs (Conklin & Christensen, 2009). Fragmentation is a condition in which stakeholders in certain situations believe that their understanding of the problem is correct and separate from others (Conklin & Christensen, 2009). The cumulation of fragmentation can lead to apathy or inactivity when dealing with wicked problems (Weick, 1984). Therefore, a shared understanding of a given problem and consistent definition that includes buy-in from all stakeholders is integral to transformative discourses.

3.2   Theoretical Framework

Various frameworks are used to analyze transitions in the agro-food sector. These frameworks include, but are not limited to, the Multi-level Perspective (MLP) on socio-technical transitions, Strategic Niche Management (SNM), Transition Management (TM), Technological Innovation Systems (TIS), Techno-Economic Paradigm (TEP) shifts, and socio-metabolic transitions (SMT) (El Bilali, 2020; Lachman, 2013). As the subject of this study is the effects of a global pandemic on actor expectations in the NYC food system, the MLP is the most appropriate framework for analysis. The MLP provides a canvas on which a holistic view of micro, meso, and macro socioeconomic interactions can be analyzed. To account for the importance of social expectation dynamics, a further, more recent method, known as the Sustainable Foresight Method (Truffer, Voß & Konrad, 2008), is leveraged as well to ensure a robust analysis.

3.2.1   The Multi-Level Perspective Framework

The MLP is a framework that theorizes the dynamics of socio-technical transitions (Rip & Kemp 1998; Geels 2005, 2010). It defines three levels that interact to enable transition: (i) socio-technical landscapes (or macro-trends); (ii) socio-technical regimes (or dominant institution and practices); and (iii) niches (or places of innovative practices). A transition is said to occur when all three levels reinforce each other into an overall systemic transformation (Schot & Geels 2008; De Haan & Rotmans 2011). In the context of agro-food

systems, these levels have varying definitions. Generally, niches include agroecology, organic agriculture, permaculture, conservation agriculture, integrated farming, and alternative food networks (El Bilali, 2019). Regimes refer to current industrial, convention agro-food systems. Geels (2011) posits that regime elements can be tangible (e.g., laws, regulations, protocols, standards) or intangible (e.g., policy paradigms, shared visions and beliefs, social norms, cognitive routines). Finally, while the socio-technical landscape is widely excluded from agro-food system research when included, it considers international developments and trends (El Bilali, 2019).

Some have further defined these trends and developments as Globalization and agro-food market internationalization (Immink et al. 2013; Konefal, 2015; Belmin, Casabianca & Meynard, 2018); Population growth (Konefal, 2015); Global financial crisis (Slingerland & Schut, 2014); Changes in diets and lifestyles (Immink et al. 2013); (Neo)-liberalization (Hassink, Grin & Hulsink, 2018; Konefal, 2015); International treaties and conventions (Zwartkruis et al., 2020; Li et al., 2013); Increasing concerns about animal welfare and the environment (Immink et al. 2013; Hassink, Grin & Hulsink, 2018); Climate change (Lutz & Schachinger, 2013; Konefal, 2015). Immink et al. (2013) adequality summarize this list by defining the socio-technical landscape as ". . . cultural values, international rules in economics and trade, macro-political developments and new global standards are all part of landscape developments that can exert pressure on the current sector" (p. 153).

For the purposes of this study, the dynamic between socio-technical landscape trends and niche expectation alignment is considered. That is the effect of the COVID-19 pandemic on actor expectations for the future of the NYC food system. Thus, the MLP provides an adequate base paradigm as it considers a multi-actor and -process perspective rather than a single innovation or technology (Kemp, 1994; El Bilali, 2019; Geels, 2011). Moreover, it illustrates the interaction between landscape-level occurrences, such as a global pandemic, and micro-level ones, such as individual behavioral dynamics.

Challenges and Considerations of the Multi-level Perspective

In the context of agro-food system transition studies, the MLP is often combined with other, more socially leaning transition frameworks as it is inadequate by itself (El Bilali, 2019). Critiques have noted that factors such as participation, political and social relations, and agency require more definition in the framework (Hassink, Grin & Hulsink, 2018; Lawhon & Murphy, 2012). Moreover, MLP has been criticized generally for viewing the interaction between the three levels as bottom-up, or niche movements building up to destabilize and replace regimes which alters the landscape rather than top-down (Geels & Schot, 2007). In response to this criticism, Geels and Schot (2007) posited a typology of four pathways that extends the definition of macro-micro interaction within the framework. The first of these pathways is the transformation pathway, in which incumbents reorient incrementally by adjusting the regime's rules. The second is the technological substitution pathway, in which an innovation or technology leads to new firms overthrowing incumbents. Third, the reconfiguration pathway occurs when new alliances form between incumbent firms and

new entrants. Lastly, the de-alignment and re-alignment pathway is present when incumbent firms deteriorate due to landscape pressure, creating opportunities for new entrants. While these pathways provide more insight and expansion into the interactions between and among the niche, regime, and landscape levels, there is still a missing piece in the explanation of social dynamics. As such, this study employs the sustainable foresight method to ensure a robust theoretical framework.

3.2.2   Sustainable Foresight Method

The Sustainability Foresight Method (SFM) is a means of eliciting, aggregating, modulating, and contextualizing expectations held by different actors to incite sustainable transformation (Truffer, Voß & Konrad, 2008). It was created based on recent literature on social expectation dynamics and socio-technical system transformations. The SFM posits that "expectations may contribute to the emergence and shaping of socio-technical configurations by attracting interests and resources of producers, financial actors, policy actors, and also users" (Truffer, Voß & Konrad, 2008). The method was originally used for a participative scenario and strategy workshop surrounding sustainable transitions involving 120 actors in the German utility sector (Truffer, Voß & Konrad, 2008). SFM has three phases and five building steps. The phases are (1) exploration of expected transformation dynamics, (2) sustainability assessment, and (3) construction of transformation strategies. In the exploration of the expected transformation dynamics phase, an analysis is conducted of implicit and explicit future visions based on the perception of landscape, regime, or niche level development trends, and scenarios for potential future regimes are constructed. In the sustainability assessment, the scenarios are assessed against sustainability criteria to identify opportunities and challenges. Lastly, in the construction of the transformation strategies phase, potential development trajectories for future regimes are outlined (Truffer, Voß & Konrad, 2008). The five steps follow similar themes at more distinct levels. They are as follows: (1) Current regime dynamics and implicit visions; (2) Construction of explicit visions for future regime structures; (3) Evaluation according to sustainability criteria; (4) Outlining potential niche processes and critical innovation fields; and (5) Stating the implications for actors/ behavioral expectations.

The MLP and the SFM provide a unique means of understanding sustainable transitions in socio-technical regimes. In the context of the NYC food system and COVID-19, both frameworks complement each other in investigating the effect of landscape developments or crises on actor expectations.

3.3   Previous Empirical Literature

This section provides a focused overview of related transition and agro-food system transition research. A 2010 study from Columbia University on the city's food supply chain

found that "most stakeholders interviewed were unaware of the origins of their food beyond the immediate distributor" (Barron et al., 2010, p.4). This study is perhaps the closest to the investigation conducted in this thesis in terms of completing a holistic analysis of the NYC food system for gaps and windows of opportunity for increased resilience. Yet, Barron et al. (2010) focus mainly on the supply side of the food system from a techno-economic perspective, labeling it fairly resilient besides small issues with transportation challenges, storage issues, weather-related challenges, and economic challenges. This thesis analyzes the resilience of the New York City food system in light of a global pandemic through a socio-economic lens, therefore investigating pathways to sustainable system transformation rather than ways to close gaps in the resiliency of the current system. Thus, instead of focusing on similar studies conducting thematic analyses on food systems, this section provides an overview of transition research as it is more appropriate for situating the analysis conducted in this thesis.

3.3.1 Sustainable Transition Research

Transitions are increasingly understood in terms of systemic innovations directed toward more sustainable socio-technical systems (Smith et al., 2010). It is imperative to identify here the various definitions that scholars have for sustainable transitions. For instance, Grin et al. (2010, p.1) define a sustainable transition as a "radical transformation towards a sustainable society in response to a number of persistent problems confronting contemporary modern societies." On the other hand, Markard et al. (2012, p. 956) consider a sustainable transition a "long-term, multi-dimensional and fundamental transformation process through which established socio-technical systems shift to more sustainable modes of production and consumption." While other definitions of sustainable transition exist, these two present the main dichotomy between the perceptions of transition among scholars. This dichotomy is both temporal (i.e., 'radical' vs. 'long-term') and a matter of agency (i.e., transition in 'response to problems' vs. transition in response to a shift in demand for 'more sustainable modes of production and consumption'). While both seemingly have a reaction to problems as drivers of transition—with demand for sustainable production and consumption often rising due to increased awareness of climate crisis—Grin et al.'s (2010) definition conveys an immediate response from system actors to specific gaps in sustainable resilience. Grin et al. (2010, p.1) highlights that persistent problems "express themselves into crises, such as food, water, mobility and health crises, as well as energy and climate crises." As such, it can be inferred that the pathways for sustainable transitions lie in addressing or adapting to the root problems revealed in socio-technical systems during times of crisis.

The domain of transition research has been growing in recent years as scholars have become more interested in the dynamics that explain the influence of a change in incumbent regimes. Zolfagharian et al. (2019) conducted a review of transitions studies that outlined four main types of transition questions: 1) Questions that relate to explaining a whole or part of a transition ('Whole questions"), 2) Questions about particular transition policies and transition pathways ('Pathway') questions, 3) Questions that involve the role and influence of (networks of) actors ('Actor' questions) and 4) Questions that address the influence of

specific variables or factors underlying transition processes ('Variable') questions. The main research question of this study is classified as an intersection between 'Actor' and 'Variable' questions.

3.3.2   Agro-Food System Transition Research

Food Nutrition and Security

When considering agro-food system transition research, sectoral particularities must be accounted for. As mentioned previously, the field of agro-food system transition research is fairly new, and as such numerous research gaps are apparent. For instance, only 13.3 % and 21.7 % of papers on agro-food sustainability transitions address nutrition and food security, respectively, despite these being considered the main outcomes of sustainable agro-food systems (El Bilali, 2019). This thesis identifies this as a major oversight in the consideration of agro-food sustainability transitions. As noted previously, a sustainable food system is one that "delivers food security and nutrition for all in such a way that economic, social, and environmental bases to generate food security and nutrition for future generations are not comprised" (FAO, 2018, p.1). Analyses of transitions towards sustainable food systems should therefore seemingly be rooted in the areas of food security and nutrition. In his review of agro-food sustainable transition literature El Bilali (2019, p.1) even goes so far as to comment that there is a "need to move beyond silos by fostering cross-sectoral collaboration and the integration of the agro-food sustainability transitions and food security research fields."

Disruptive Events

Further, at the time of writing this thesis, only one paper has been identified that incorporates a transition framework, agro-food system, and a disruptive event. In the said paper, Davidson et al. (2015) discuss the effect of mad cow disease on the emergence of alternative beef production in Alberta, Canada, in 2003. The study notes that "disruptive events … can cross system boundaries, from the landscape to the regime, to the niche and back again" (Davidson et al. 2015, p. 368). The study further highlights that social experiences of crisis in niche movements must be compiled into a narrative that triggers a change in the structures defining the dominant regime for transition to occur (Davidson et al., 2015). In other words, disruptive events, or times of crisis, have the profound ability to reveal resiliency or sustainability flaws in macro, meso, and micro socio-economic level dynamics in agro-food systems. Yet, it is the harnessing of the diversity of perceptions and expectations among system actors in the midst of these disruptive events, or times of crises, that enables a challenging of the dominant agro-food system and thus catalyzes transformation.

4 Data and Method

4.1 Source Material

The NYC food system is complex and comprises a myriad of networks and actors, some of which operate outside of its traditional agro-industrial footprint—as such, reaching a common vision and thus mobilizing actors and networks in sustainable transition efforts, can be a difficult accomplishment. Qualitative data allows for the incorporation of tone and perception, which is integral to the scope of this study. Moreover, qualitative data supports a holistic picture of the food regime, which is crucial when discussing a transition into a more sustainable model. If part of the picture of the food system landscape is missing, such as societal bottlenecks or ambiguity between network expectations—challenges or inhibitors are likely also missing, and that undermines the whole notion of a sustainable transition.

This study uses secondary data in the form of articles gathered by New York University in their digital archive and collection of materials entitled Food and COVID-19 (NYU, 2021). The collection comprises articles, photos, testimonials, etc., beginning in the spring of 2020, which "captures the landscape of food" in NYC throughout the COVID-19 pandemic. The collection is categorized topically (food insecurity, restaurants, etc.), chronologically, and by "Front page news" and collections of various topical newsletters. This study uses only articles in the "Food Insecurity" collection. "Food insecurity" denotes articles with content surrounding the impact of COVID-19 on the availability and accessibility of food for a healthy, active life. This study analyzes the themes and messages delivered in the "food insecurity" collection of articles to determine if there are shared perceptions or revelations of the challenges facing the creation of a more resilient and sustainable system.

The secondary data chosen for this study is appropriate for this research for several reasons. One, most content that is needed for analysis of the research study has previously been produced through other outlets. Due to the nature of the pandemic, news coverage, forums, and reports regarding the impact it has had on the NYC food system have been prolific. Two, the information given in the secondary data was collected from numerous food system actors, institutions, and networks, thus providing a holistic view that would be extremely difficult to obtain with a one-person research team conducting surveys or interviews. Third, due to the dangers of infection and spreading, observational data or in-person analysis would also be difficult to conduct within the timeframe by which this study is bounded.

4.2   Data Manipulation

4.2.1   Data Cleaning

This thesis is the first of its kind, at present time and knowledge, to leverage the New York University collection of COVID-19 and food insecurity articles. To ensure relevancy to this analysis, the articles underwent a thorough cleaning process demonstrated in Figure 2. To narrate, each article's website link was placed into an Excel file and systematically tested for availability, resulting in 26 out of the original 153 articles being excluded due to faulty links or incompatible media formats (i.e., audio or video). The text and attribute data (i.e., author, date, publisher) of each remaining article was copied into a separate blank document to enable the removal of website advertisements or other extraneous material. Each article was then read through, and articles outside of the geographic scope, meaning that the article only spoke on a national or state level with no mention of how it related to NYC, were excluded. The remaining articles were then re-evaluated. Those containing only short-term call to action narratives (i.e., "Donate to the Food Banks Now," etc.), a lack of investigative reporting, or content that was verbatim of information found in other pieces were excluded. The remaining articles in the data collection after this process totaled 105.

Figure 2: Data Cleaning Flow Chart

DATA CLEANING FLOW CHART
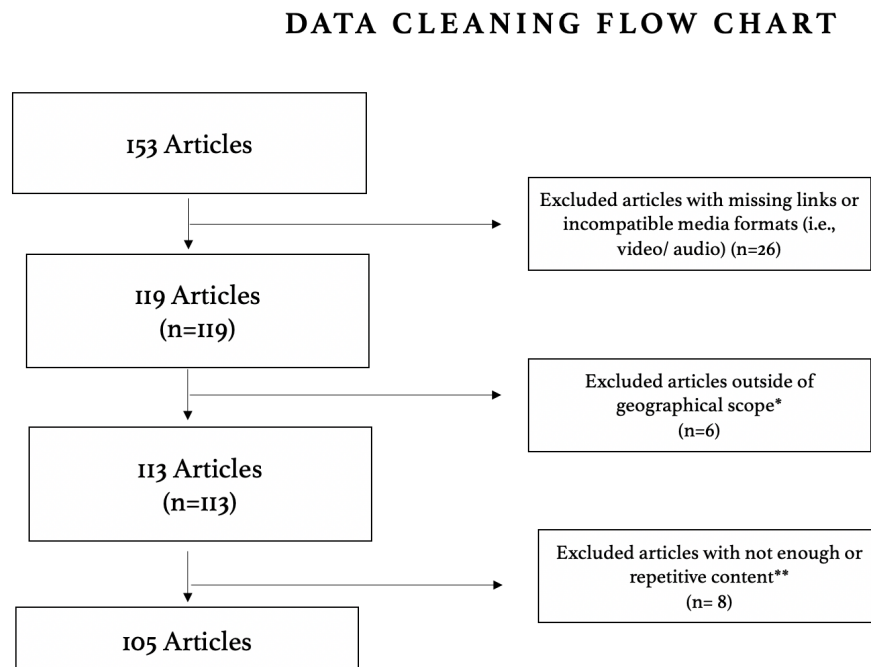
*Article only speaks on National or State level with no mention of how it related to New York City
**Article contained only short-term call to action narratives with a lack of investigative reporting or was verbatim of content found in another article

4.2.2   Descriptive Statistics

Two main descriptive statistics were generated from the remaining 105 articles subject to analysis for this thesis: date published and publisher source. These two statistics surrounding the data are important for several reasons. First, the frequency and consistency of articles over time provides evidence of their penetration into the general media, highlighting the importance and relevancy of the NYC food system, especially during the pandemic. Figure 3 illustrates the consistency of articles surrounding NYC, COVID-19, and food insecurity from March 2020 to January 2021. Second, statistics surrounding the frequency of publisher sources illustrate the breadth of the audience reached. There are 36 publisher sources represented in the data (see Figure 4). These sources range from local papers (e.g., Queens Daily Eagle, Brooklyn Based) and government websites (e.g., The Official Website of the City of New York, The Official Website of New York State) to internationally renowned news sources (e.g., Forbes, The New York Times) and everything in between. Finally, combined, these statistics provide evidence that the dataset is robust enough, in terms of voices and frequency, to convey general perceptions of issues, gaps, opportunities, and visions of the NYC food system that have been highlighted by COVID-19.

Figure 3: Number of Articles Covering NYC Food Insecurity and COVID-19 Over Time
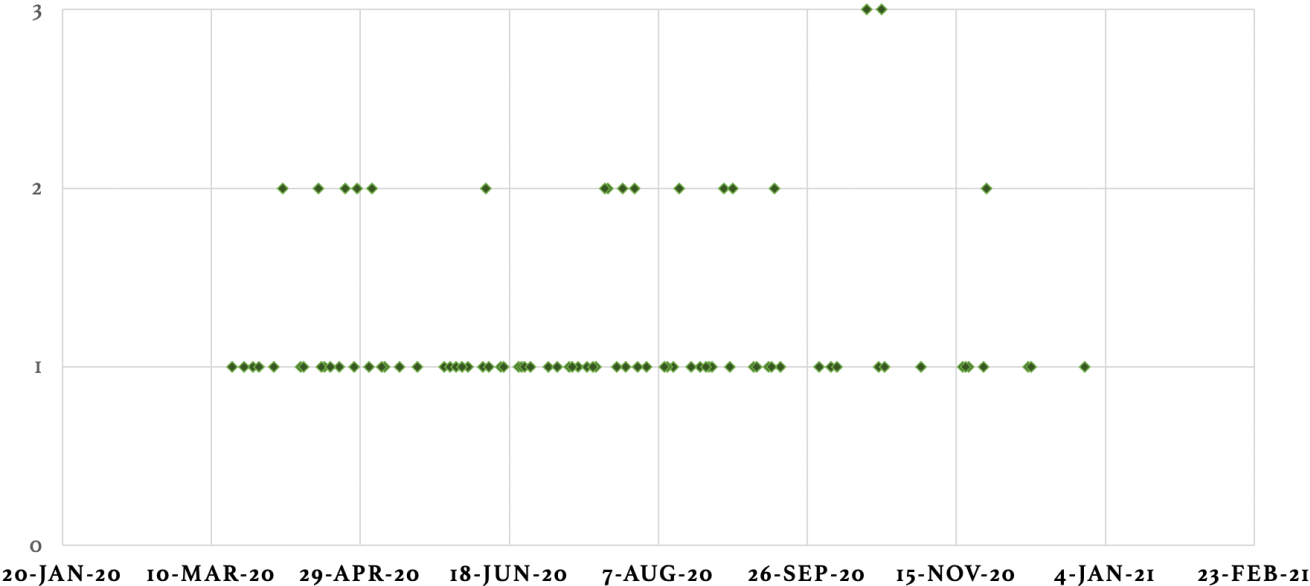
Figure 4: Articles Covering NYC Food Insecurity and COVID-19 Frequency by Publisher
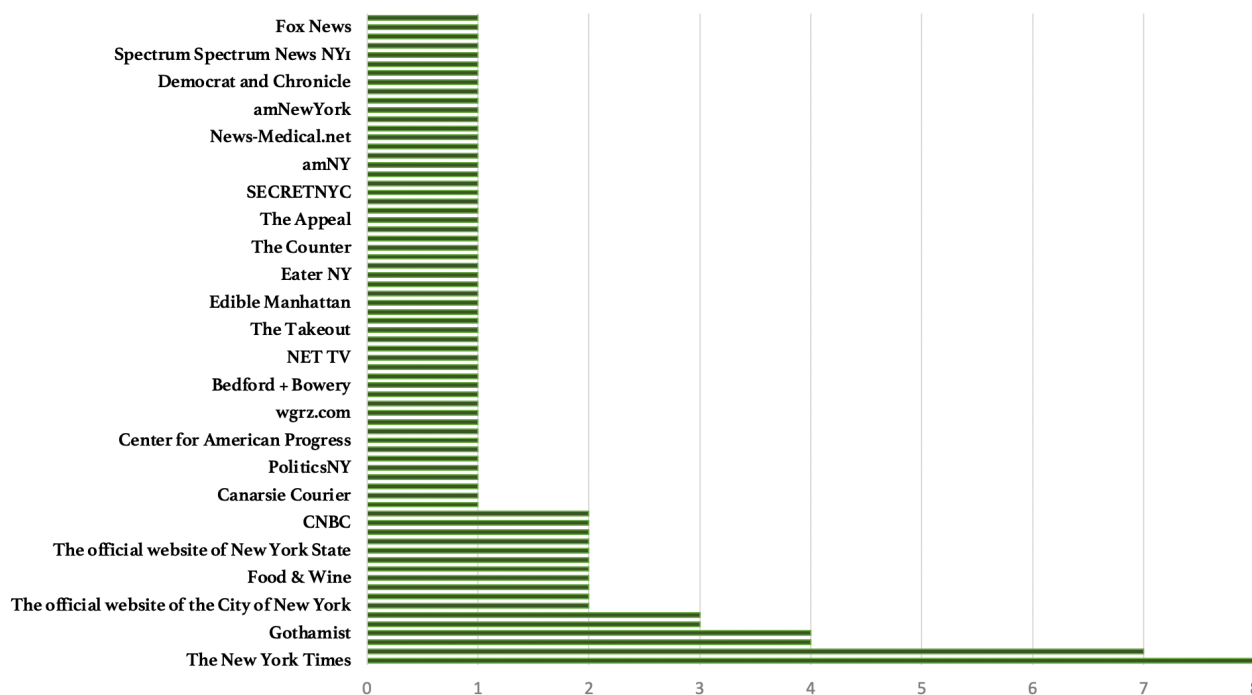
4.3   Methods

The main methodology for this study is a qualitative thematic textual analysis of a case study. Textual analysis is "a way for researchers to gather information about how other human beings make sense of the world" (McKee, 2003, p. 1). It is therefore useful in studies such as this one, which seek to gain an understanding of the social context and interpretations surrounding a specific matter. Methodologies surrounding textual analyses vary greatly in academic literature (McKee, 2003). This variance is paradoxically, one of the strengths and weaknesses of textual analysis. To explain further, there is no one methodology in textual analyses that explains "the truth" about a given social context. However, textual analysis provides a means of opening research questions, allowing new forms of thinking and knowledge, that might be excluded from more rigorous methodologies, to be incorporated (McKee, 2003). A *thematic* textual is a qualitative analytic method for "identifying, analysing, and reporting patterns (themes) within data. It minimally organizes and describes your data set in (rich) detail. However, frequently it goes further than this, and interprets various aspects of the research topic" (Braun & Clarke, 2006, p.79). Moreover, thematic analyses have the capability to deal with diverse and complex subjects through interpretation (Boyatzis 1998). As the data in this study comprises 105 news articles, a thematic textual analysis is seen here as appropriate means of parsing, analyzing and interpreting the robust contents of these articles in a manner that thoroughly investigates the research question. While methodologies might vary for thematic textual analyses, there

are generally four foundational steps that are agreed upon: (1) a summary of the text, (2) attention to context (3) a clear interpretation or judgement and (4) reasonable support for the conclusions drawn (WW Norton, 2011). Studies involving expectations and agro-food transitions have not used this methodology to date, and at present knowledge (El Bilali, 2019). Nor is it a popular methodology in transition studies (Lachman, 2013).

The specific methodology for this study is derived from the forementioned four steps and built out using the Sustainable foresight method. That is, articles are imported, read, attention to context is provided through an analysis of the current regime dynamics under COVID-19 and the exposures and responses highlighted by the pandemic. Interpretations and judgements are situation in typography seen in Table 3 (Truffer, Voß & Konrad, 2008) to allow for clarity. Finally, quotes and frequency statistics are provided to show reasonable support for conclusions. is used. Here, the analysis scope lies within the first phase and the first step of the Sustainable Foresight Method: Current regime dynamics and implicit visions (Truffer, Voß & Konrad, 2008). This scope is set as this study investigates the impact of landscape developments on shared expected transformation dynamics in conventional agro-food systems. The rest of the method is presented previously in this section to indicate the opportunity for sustainable transition that this dynamic may create if leveraged correctly. Table 3 presents an expectation topography from the method that is used to classify expectations and analyze their ability to be used a reference point, for different actor groups involved in the system transformation process.

Table 3: Topography of expectations related to potential system transformations

Whose expectations?*		INDIVIDUAL EXPECTATIONS	ACTOR GROUP EXPECTATIONS	COLLECTIVE EXPECTATIONS
What is expected?*	LANDSCAPE	Individual beliefs about long-term trends	Projections of future context conditions as shared within specific actor groups (e.g., the impacts of climate change as identified by climate experts)	Broad societal visions about the future (e.g., Science fictions and utopias)
	REGIME	Individual believes about ability of regimes to respond to external pressures	Expectations shared within specific actor groups (e.g., community-based decision making in future sector structures)	Broadly shared visions about future sector structures
	NICHE	Individual assessment of development potential for specific innovative technologies and products	Hopeful alternatives preferred by certain actor groups (e.g., Non-profits support for shorter more transparent supply chains)	Sectoral or national priorities in innovation policy to support "promising" technologies

Expectations are differentiated regarding the level of analysis and the scope of social support

Source: Adapted from Truffer, Voß & Konrad, 2008

The topography defines a range of individual versus collective expectations separated by the three levels defined in the MLP—landscape, regime, and niche. This topography serves as a

clarifying mechanism in the delineations between individual and collection expectations at each level. It can be read both vertically—as definitions of individual and collection expectations at each level—and horizontally—as the range that develops expectations from individual to collective at each level.

4.4 Approach

The articles were imported into the qualitative data analysis software NVivo. NVivo was created to help researchers process large volumes of qualitative data and find insights. An overview of the process is as follows:

1. Import the articles
2. Open and explore each article
3. Classify sources by publication date and source
4. Clear those with a duplicate nature or those lacking enough content
5. Code nodes for interesting themes present
6. Query nodes by running a Text Search query to examine theme frequency
7. Reflect on all query results gathered in the 'balance' node and review
8. Visualize parts of data through tables
9. Record insights

The first four steps of this approach were previously discussed in the Data Manipulation section of this thesis. Steps five through nine are explained in further detail here—along with the thematic framework and how it fits into the methodology noted above.

After the cleaning process was completed, the remaining 105 articles were carefully reviewed and annotated. Annotations contained interesting points made in the articles, such as changes in the food system dynamics as a result of COVID-19, most impacted areas, or innovations that arose during the pandemic to aid in the city's fight against food insecurity, among others. After the annotation process was complete, the annotations were reexamined, and the initial highlighted text was coded into relevant nodes or topics. A detailing of initial codes can be found in Appendix B. From here, the initial codes were categorized into broader themes, taking into account the topography in Table 3. This final codebook can be found in Appendix C. A text search query was run to determine theme frequency in the case that some evidence of the theme had been excluded in the initial coding stage. Data was then visualized through tables, which are presented in the following section, along with insights recorded throughout the process on the various themes derived.

5 Textual Analysis Findings and Discussion

In this section, the findings of the thematic textual analysis are presented, followed by a discussion of said results, as well as how they relate to the previously mentioned literature in section three of this thesis. Rather than simply zooming in on a specific sustainable transition dynamic or pathway revealed, this study also considers the implicit meanings behind gaps in the NYC food system revealed by COVID-19 and how they might convey dynamics towards a more sustainable food system in the city. While each of the 105 articles included in this study contains unique information and perceptions, several common themes are identified. These being the current COVID-19 regime dynamics of NYC's food system, responses and exposures in the NYC food system to COVID-19, and explicit & implicit vision expectations. As the research question posed in this study deals with actor expectations on transition dynamics, implicit and explicit vision expectations are connected to the landscape, regime, and niche expectation topography presented in Table 3. To adequately frame these themes, further insights into current regime dynamics and responses or exposures related to the COVID-19 pandemic in NYC are also incorporated into the analysis. Findings are summarized with key evidence that allows for a theme to be conveyed with brevity. The number of times a theme is present in the data can be found in coding phases presented in Appendix C.

5.1 The Current COVID-19 Regime Dynamics of NYC's Food System

5.1.1 Definitions of Food Insecurity

The first main theme identified regarding the current COVID-19 regime dynamics of NYC's food system is the narrow definitions of food insecurity or security found among system actors. Again, food security is defined in this thesis as existing "when all people at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (Panagariya, 2002). Table 4, seen below, showcases this definition and six other food insecurity definitions identified from the data. All definitions found in the data identify lack of money, either explicitly or implicitly, as the main reason behind food insecurity. Evidence of this is seen in the following: Letsch (2020), "families cannot afford," Davis (2020), "not having enough income to afford," Rosenberg (2020), "lack of money," Office of Governor Cuomo (2020), "encourage donations," Lupardo (2020), "lack of money," and Fraser (2020), "financial barriers." This identification of simple financial insecurity as the root cause of food insecurity is a dangerous narrative because it assigns implied fault on individuals, rather

than considering other impactful social, economic, and physical factors that may be a cause. Further, only two of the four pillars of food security were mentioned in the articles: access, 13 times, and utilization, four times (see Appendix C). It is important to note that not all aspects of the utilization pillar (see table 2) are not incorporated into the definitions despite being mentioned in the text. For instance, Letsch (2020) mentions a "healthy lifestyle," the Office of Governor Cuomo (2020) mentions "good, healthy food," and Lupardo (2020) mentions "nutritious food." While this language incorporates notions of the diet quality and health status aspects under the utilization pillar, it does not cover the food preparation and nutrition behavior, cultural tradition, knowledge and standards, hygiene, and care opportunities that Panagariya (2002) does through the language in their definition.

Table 4: Definitions of Food Security or Insecurity

Definition:	Source:
"When all people at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life"	*Panagariya, 2002*
"The Department of Agriculture defines food insecurity as 'lack of consistent access to enough food for an active, healthy lifestyle.' In other words, families cannot afford to put well-balanced meals on the table."	Lestch, 2020
"Food insecurity is defined as not having enough income to afford or access a healthful diet for an individual and their family and as Jerome Nathaniel, associate director of policy and government relations at City Harvest, says, it is also something that is 'involuntary and reoccurring.'"	Davis, 2020
"The Office of Disease Prevention and Health Promotion defines food insecurity as 'the disruption of food intake or eating patterns because of lack of money and other resources.'"	Rosenberg, 2020
".... ensuring that every person in every community has access to good, healthy food; fostering food insecurity awareness; and helping to encourage donations and volunteer support."	Office of Governor Cuomo, 2020
"The term 'food insecurity' signifies a household's limited access to adequate and nutritious food due to a lack of money and other resources."	Lupardo, 2020
"From a food security perspective, we have always known that a significant number of New Yorkers struggle to put food on the table due to a number of financial barriers as well as systems that do not adequately meet everyone's needs."	Fraser, 2020

5.1.2   Burden on the Emergency Food System

The number of NYC residents reporting food insecurity increased from 1.2 million in 2019 to 2.2 million by August of 2020, putting extra pressure on the city's emergency food system (Blau, 2020). One pantry in the Bronx that served 500 meals to families a week before the pandemic reported an increase in meals served to 4,000 a week (Strassmann, 2020). Another reported going from 200 to 6,500 meals served per week (Evelly, 2020). This

overwhelming increase in demand for NYC's emergency food system led to a slew of challenges and failures, including line waiting times of multiple hours, lack of volunteers, and even closures. Line waiting times were the most cited failure, with 20 references found in the data. Reports of waiting times from 3 hours and up to 6 hours were found (Farinacci, 2020; Kim, 2020; Lerner, 2020). These waits posed issues for NYC residents, including the opportunity cost of spending time in line versus searching for employment (Coe, 2020), difficulties in waiting due to health issues (Greene, 2020), and pantries running out of nutritious food (Martinez, 2020). One Queens resident commented, "I do not want to sound ungrateful—the truth is that sometimes the line forms as early as 5:00 in the morning and you end up going home with canned food high in sodium, and no milk or meat or anything healthy" (Martinez, 2020).

Emergency food organizations also faced problems due to a lack of volunteers (Donaghy 2020; Goldenberg, 2020; Joseph, 2020). One article notes, "many food pantries that are smaller are run by elderly folks, retirees" (Joseph, 2020). This obviously posed a major challenge in light of the stay-at-home orders from the city and state for risk groups, which included elderly people. Due to the immense burden, lack of infrastructure, and short preparation time, pantries, soup kitchens, and other food non-profits began to close their doors, unable to meet the growing demands of a hungry, pandemic-ridden city. In April, City Harvest, a food non-profit that works with community food programs in the city, reported that 96 out of 400 of its programs had closed due mainly to a lack of volunteers (Davis, 2020). By October of 2020, a city official reported that about 35% of the city's one thousand food pantries, soup kitchens, and mobile pantries had closed (Joseph, 2020). One article notes that these failures are because the "emergency food system {was} never designed to solve hunger" (Gomes, 2020).

5.1.3   Differences in Impact

The COVID-19 pandemic hit the NYC food system in a manner, unlike any crisis before it. A main key difference of the COVID-19 pandemic from other crises that affected NYC—such as the terrorist attack on 9/11, Hurricane Sandy in 2012, or the Great Recession in 2008—is that its impact was not confined to a specific area or socioeconomic group. Racine Droz, Director of Donor Relations and Supply Chain Management for an NYC food nonprofit, states in an interview, "Unlike other disasters that happened that are usually consolidated in one area, COVID-19 is not that way. It's a global epidemic, so it's impacted all of the five boroughs," (Tomassetti, 2020). Thus, the entirety of the city faced hardships stemming from the pandemic. Another article notes, too, that large food distribution points the government may have set up in the past to combat crisis-driven food insecurity were not an option due to social-distancing measures (Goldenberg, 2020). The pandemic also disrupted the city's food supply chain and caused unemployment for more than one million city residents (Evelly, 2020). However, while all five boroughs of the city experienced the impact of the pandemic, it was felt very differently across them.

Two main categories of differential impact are noted from the data: geographic and demographic. Of the five boroughs of NYC, the Bronx was identified as those most impacted by the pandemic, respectively, in terms of food insecurity. Evidence of this was found through a word frequency text query in the most vulnerable groups (borough) classification category. The Bronx was mentioned 27 times in the query. The Bronx is among NYC's (and America's) most densely populated and impoverished areas (Essa, 2020). Residents of the Bronx often live in "food deserts," or areas that have limited access to affordable and nutritious foods (Britannica, 2021; Mitchell, 2020). The COVID-19 pandemic, therefore, disproportionally impacted the Bronx in terms of food insecurity compared to the other boroughs. This finding blends into the demographic classification analysis. The most vulnerable demographic groups identified were communities of color, older individuals, and children (Lupardo, 2020). A survey done by the CUNY Graduate School of Public Health and Health Policy found that "Latinx and multi-racial and other {marginalized} households are almost twice as likely to report that their food availability was reduced a lot more than white households" (Parra, 2020). The digital divide exacerbated issues with elderly people trying to access food who did not have internet access or did not know how to use digital systems set up by pantries (Vick, 2020). One article reported 1 in 10 parents said financial insecurity during the pandemic resulted in their children skipping or reducing meals (Leonard, 2020). In summary, those groups and areas vulnerable to food insecurity before the pandemic grew more vulnerable, and the city could not rely on previous crisis response methods to mitigate the effects of the pandemic on the city's food system.

5.2 Responses and Exposures in the NYC Food System to COVID-19

5.2.1 Exposures

Throughout the reviewed articles, there was the repeated assertion that the COVID-19 pandemic was merely the hand that pulled the veil back on the existing failures of NYC's food system. These perceptions contained frustration and mistrust of the food system both at a regional level (i.e., the NYC food system) and a national level (i.e., America's food system). Crystal Wolfe, founder and president of Catering for the Homeless, Inc., "believes that, to an extent, the repercussions of the coronavirus outbreak {NYC is} witnessing are due to the existing failures within NYC's—and the nation's—system" (Acevedo, 2020). Dr. Jahi Chappell, former executive director of the national advocacy organization, Food First, expands on this thought, stating, "the roots of our current crisis lie in both the 'barely-there social safety net' and the larger food system in which big agriculture and retail companies have too much power," (Lerner, 2020). Ian Rosenblum, the Executive Director of the Education Trust-New York, commented on the exposure of food security inequities within the education system too, noting, "The pandemic has worsened the existing inequities in our education system and broader society, including staggering food insecurity for children and families" (Lankes, 2020). These perceptions of an already-broken food system, pre-COVID-19, highlight the fragility of food security in NYC in normal times. Moreover, they convey

that the industrialized agro-food system in both the United States and NYC relies on centralized distribution models that focus on production economies of scale, rather than models more like the sustainable food system presented in section 2.1.1 in which circular feedback loops create value through more decent jobs, return on assets, appropriate distribution of taxes, a better food supply, and a more just socio-culture and natural environment.

5.2.2   Government Responses

Several themes regarding government responses were found through analysis that illustrate systemic failures in their handling of crisis within the NYC food system at a city, state, and federal level. It is important to note that this analysis is not directly stating that the data shows government response efforts, particularly at a city level, did not aid people in need or make progress in increasing access to healthy food for New Yorkers. Rather, the analysis conveys the unsustainable characteristics and misalignments that were found among NYC food system actors that are indicative of a broken system. For instance, an article published in July of 2020 stated that since the beginning of the pandemic, the city had delivered more than 83 million free meals and expanded programs to help New Yorkers, particularly those in low-income communities, access healthier options (Eama, 2020; Office of the Mayor, 2020). The mayor's office and city government's main response to the food crisis caused by COVID-19 was pouring millions of dollars in aid into the emergency food system. In April, the GetFoodNYC plan was launched by the government. It included $170 million in funding, the opening of over 400 food hubs where hungry New Yorkers could get free food and hiring 11,000 out-of-work taxi and for-hire vehicle drivers for help with delivery (Bergin & Chang, 2020; WABC, 2020).

However, while the mammoth undertaking of these efforts should not be discounted, there were major faults found by city food system actors within them. For instance, one article stated concerns around the effectiveness of the GetFoodNYC program including, "meals that aren't nutritionally appropriate for older people, especially those who are getting most of their nutrients from delivered food, missed deliveries because the program has had incorrect addresses, food quality, and the cultural appropriateness of the meals" (WABC, 2020). Moreover, four major emergency food organizations were excluded from the $25 million of the $170 million in funding slated for emergency food organizations (Bocanegra, 2020). In a letter to the city council speaker, these four organizations state, "Not only are we concerned to not be included in the initial distribution of these much-needed resources, but also for the lack of transparency in the process" (Bocanegra, 2020). City and state officials released pleas for more funding to the federal government (Mayor Bill de Blasio's Office, 2020, Martinez, 2020, Mckay, 2020). State Office of Temporary and Disability Assistance Commissioner Michael Hein commented at a legislative hearing, "We are in one of the most, if not the most, financially challenging times in our state. The ability for us to move forward and fund many of these programs... will be contingent upon additional funding flowing from the federal government" (Mckay, 2020).

5.3 Explicit & Implicit Vision Expectations

Out of the COVID-19-induced chaos that ensued in the NYC food system, themes of restructuring and realigning visions among the food system actors were found. These so-called explicit and implicit-vision expectations are classified below according to the sustainable foresight methodology. To reiterate, this is done to conceptualize the dynamics of expectations across the three levels—landscape, regime, and niche—derived from the multi-perspective framework theory in order to discern whether or not these expectations may pave the way for a transition to a more sustainable food system in NYC.

5.3.1 Landscape

Landscape theme classifications comprise three main expectation categories in the topography, yet only one was present in the data: The individual expectation level, which is defined as "individual beliefs about long-term trends classifications" (Truffer, Voß & Konrad, 2008). Portions of articles classified into this theme category are highly implicit and deal mainly with a shift in respect around the importance of food, nutrition, and food system workers. For instance, one article comments that "some pantry visitors have discovered a love of cooking or have been excited by new ingredients that they would have never bought on their own" (Stewart & Heisler, 2020). Another article, recapping a study done by CUNY Hunter College in NYC, reported that a poll showed 50% of New Yorkers "actually reported eating healthier, probably through cooking at home" (Platkin, Freudenberg & Koch, 2020). The same article further states, "Food workers, long one of the most poorly paid workforce sectors, earned new respect as essential workers, who enabled New Yorkers to feed their families" (Platkin, Freudenberg & Koch, 2020). These quotes, combined with other accounts of shifting respect around food and food system actors (Noveck & Franklin, 2020; Kiernan & Katz, 2020), convey an implied trend of reconnection and appreciation around food. These accounts are classified in the landscape expectation level as they embody an overarching trend of change in the way individuals interact and perceive their own relationship with food and the food system, rather than more sector or specific technology-focused accounts.

5.3.2 Regime

The three levels of the regime are similar in classification to the landscape level, with a narrower focus on sector beliefs and expectations. The individual level is defined as "individual beliefs about the ability of regimes to respond to external pressures" (Truffer, Voß & Konrad, 2008). Accounts found in the data that match this level's definition deal

primarily with themes regarding individual grievances surrounding city government response to the COVID-19 induced food crisis. One resident in Bedford Stuyvesant, a historically African- American neighborhood in Brooklyn, New York, commented, "I also felt confident that the government response would not be adequate, compassionate or proactive" (Lestch, 2020). Another account by a Queens borough resident stated, "the city chose to contract with a military ration company out in Illinois when they could have easily worked with the thousands of small businesses that have been struggling to stay afloat during the pandemic" (Eama, 2020). Both accounts convey a tone of distrust and exasperation at the government's role in hindering the NYC food system's regime in responding to the COVID-19 induced food crisis.

Actor group expectations at the regime level are "Expectations shared within specific actor groups" (Truffer, Voß & Konrad, 2008). Data classified in this level present actor group expectations of interagency collaboration, learning from and filling the gaps in the food system uncovered by COVID-19, and developing sustainable practices and health protocols. Interestingly, these sentiments came from non-profit (Bocanegra, 2020; Rosenberg, 2020), mutual aid (Evelly & Javorsky, 2020; Fraser, 2020), and policymaker groups (Evelly & Javorsky, 2020; Mckay, 2020). One article comment, "The Queens Mutual Aid Network and other groups, say they would like to see the city partnering more directly with local restaurants, markets, and food vendors, both as a way to make more palatable and culturally-competent meals and to support small businesses that are struggling to stay open" (Evelly & Javorsky, 2020). Nicholas Freudenberg, director of the CUNY Urban Food Policy Institute, stated, "I think the hope for us in food policy and food justice is that this epidemic will help us to create a system that will address some of the deeper causes of food insecurity in our society" (Dervishi, 2020). Rethink an NYC food non-profit, echoed these expectations of collaboration as well and aims to "build a coalition of restaurants willing to... adhere to... sustainable practices and health protocols" (Digiorgio, 2020).

These actor-group expectations are translated to the collective level as well. Collective expectations at the regime level are "broadly shared visions about future sector structure" (Truffer, Voß & Konrad, 2008). One non-profit group leader comments, "I do not translate the future in terms of growth unless measured by community ownership in the decision-making process and permanent community structures created to respond to our communities needs now and for future disasters" (Fraser, 2020). This conveys a vision of a food sector that eliminates unneeded waste, shorter supply chains, and increased transparency. Twenty-one other articles contained thematic visions of a more collective and community-based food sector in NYC. A breakdown of these articles can be found in Appendix D. Kelvin Taitt, a Brooklyn-based community organizer notes, "some of the electeds are right now down in the trenches with us, but from a government perspective, there are a lot of blanket systems that they expect to work around the country and just don't... and what we realized is that we were able to get together and create community systems that worked for us" (Davis, 2020). These community-based models enable local groups to tailor their services to meet the specific needs of their neighborhoods and address gaps others might not notice (Davis, 2020). Moreover, they enable interagency collaboration that mimics

the intertwined nature of the food system with economic development, public health, social justice, and environmental resilience (Barron et al., 2010).

5.3.3 Niche

The niche levels focus more on specific innovations or technologies that system actors are focused on. Individual expectations at the niche level are defined as "individual assessment of development potential for specific innovative technologies and products" (Truffer, Voß & Konrad, 2008). Innovations unveiled in the NYC food sector during the COVID-19 crisis did not necessarily comprise new technology or models; rather, they presented new combinations and/or the importance of alternative food production methods. For instance, Karen Washington, founder of Garden of Happiness, founded her community garden in 1988 in the Bronx. Therefore, while the garden is not necessarily 'new,' "the pandemic [has exposed] the larger needs that led her to building the garden in the first place" (Wharton, 2020). As such, the community garden model holds potential for innovative repurposing in a community-based system. Another article notes that "the unequal food distribution {during COVID-19} in New York has led some food activists to start urban farms that cater to individual communities" (Reader, 2020). Another major community-based model innovation that emerged in many NYC neighborhoods during the pandemic was free-food fridges. While only five articles mentioned community urban farms or gardens, and often apart from the main subject of the article, the free-food fridge movement was the main subject and presented in the title of eight articles in the collection (see Appendix E). Thadeaus Umpster, who is widely credited as the founder of the free-food fridge movement in NYC during the pandemic, states that the fridges are an attempt to "build a different type of relationship with people, a relationship between equals and not a handout from a higher authority or privileged person," (Rosa & Keith, 2020). Moreover, Umpster's Instagram account credits nonprofit organizations, anarchist networks, and an aquaponics farm for donations to the fridges, conveying the notion that the fridges act as a sort of middle-man innovation to connect system actors in a way that the government is currently not doing. (Shure & Dean, 2020).

Actor group expectations at the niche level are "hopeful alternatives preferred by certain actor groups" (Truffer, Voß & Konrad, 2008). Data classified into this category at the niche level contains implied alternatives for food supply-chain models that are derived through analysis of new partnerships or innovative models that have worked for certain food system actor groups during the pandemic. Themes surrounding new partnerships showed many organizations teaming up with restaurants to keep workers employed and leverage the talents of renowned chefs to aid in fundraising efforts (Cohen, 2020; Platkin, Freudenberg & Koch, 2020; Farinacci, 2020; Sugerman, 2020). Such partnerships present a hopeful alternative for how the food system could run during a crisis in the future as they forge a blueprint for adaptability among actors that maintains the flow of value within the food system throughout periods of crisis. These movements have shown how simply relying on government funding or donations to support the emergency food system during a time of

crisis not only exacerbates unemployment rates it also puts more pressure on the volunteers of the emergency food system, who are typically older and less trained individuals (Joseph, 2020). By partnering with restaurant workers, emergency food organizations can use government funding or other donations to support employment rates and provide less interruptible aid to residents. Moreover, these partnerships imply support for another alternative to the current complex agro-industrial model: shortened food supply chains with increased transparency and traceability among them. Explicit evidence of this is illustrated by reports of food pantries partnering with community gardens and their use of technology that increases transparency into inventory and availability between themselves, suppliers, and consumers (Appel, 2020).

Collective expectations at the niche level are defined as "sectoral or national priorities in innovation policy to support 'promising' technologies" (Truffer, Voß & Konrad, 2008). Data classifications here centered around policy change recommendations made by food system actors. These classifications hold both explicit and implicit sectoral priorities to support innovative models or technologies that would aid NYC in a transition to a sustainable food system. Two main themes were identified in terms of policy recommendations: Decentralized distribution or community-focused policies and student and family support-focused policies. Table 5 breaks down the implicit and explicit textual evidence found in the data in support of decentralized distribution or community-focused policies.

Table 5: Implicit and Explicit Evidence of Support for Decentralized Distribution or Community-Focused Policies

Implicit	Explicit
"It could take the form of the passage of a comprehensive economic stimulus bill that provides resources to strengthen local food value chains between urban and rural small-mid scale sustainable farmers/ producers, and fisherfolk, workers in the field to restaurants, and consumers" (Fraser, 2020)	"We must begin to reconceptualize a community food distribution system that is decentralized, where there are resources to create and implement community-based micro hubs, both for food and health, and where decision-making, ownership and distribution is community driven." (Fraser, 2020)
"The city should expand economic stimulus support, focusing on small, independent food businesses owned by women, people of color and immigrants." (Platkin, Freudenberg & Koch, 2020)	"Implement effective outreach and communication strategies to communities in need of food resources in regards to City agencies- and community-based organizations and programs available" (Gallanter, 2020)
"Strengthen food policies so that they designate clear authority and provide adequate funding and staff who have a thorough understanding of the programs' population and meal requirements, which will better position the City to meet New Yorkers' diverse food needs." (Gallanter, 2020)	

The main value driver behind these recommendations, as conveyed by the table, is rooted in strengthening economic resilience in the NYC food system through increased transparency of community needs. This increased transparency will enable government policies to focus on funding efforts in the food system that reduce financial insecurity, improve food nutrition throughout the supply chain, and close disparity gaps among New Yorkers most vulnerable to food insecurity. The next main theme is student and family-supported policies. Table 6 below displays textual evidence categorized into implicit and explicit recommendations.

Table 6: Implicit and Explicit Evidence of Support for Student and Family-Supported Policies

Implicit	Explicit
"Emergency, school and other institutional food programs can provide healthier, less highly processed food, helping to close income and racial gaps in diet quality" (Platkin, Freudenberg & Koch, 2020)	"The coalition is urging local, state and federal policymakers to hone in on these specific areas of family support as the impact of the coronavirus outbreak continues to be felt among low-income communities: Financial Assistance; Food security; Access to health professionals; Support for parents and families; Greater investment in early childhood programming; Access to web-based information and resources" (Leonard, 2020).
"Ensuring that children have consistent access to nutritious meals, supporting the local economy by expanding SNAP eligibility to all families with a child that is eligible for free or reduced-price school meals" (Fraser, 2020). "However, Wolfe believes there's a particular element that's missing in order to reduce the hunger crisis in NYC: The food excess from schools" (Acevedo, 2020).	"Parents could fill out virtual "Blue Cards" and work with schools to identify food-related needs. The schools could then communicate these needs to the Department of Health, which would work with local distribution centers to ensure that food is delivered to hungry students. By creating a system of collaboration between families, schools, and government agencies, we can make sure all of our children receive three meals a day, including on weekends. Right now, none of this is being done" (Bowman, 2020).

The table illustrates the large role the NYC school system plays in the distribution of food to children and families. Moreover, it conveys a need for policies focused on increased interagency collaboration with the school system to more effectively leverage this large role. Other, less frequent but still important policy priorities found in the data include improved food system worker conditions (Platkin, Freudenberg & Koch, 2020), support for a healthy volunteer workforce (Gallanter, 2020), and support for a city-wide food pantry inventory database (Dervishi, 2020). Additionally, Jerome Nathaniel, the Director of Policy and Government Relations at NYC food non-profit City Harvest, made an important point regarding policy change recommendations: "It is very easy to fall into the trap of constantly brainstorming possibilities, but we need to remind ourselves that some of the more imminent improvements in our food system rest in policies that have already been laid

before us" (Fraser, 2020). In other words, throughout the COVID-19 pandemic, the city, state, and federal government have enacted several policy measures, including the USDA's Farmers to Families Food Box Program (USDA, 2021); the Families First Coronavirus Response Act (Lowey, 2020); and the CARE Act (U.S. Treasury Department, 2021), that have measures within them capable of improving the NYC food system over the long-term. However, all of these policies are set to expire as the threat of the pandemic decreases (Davis, 2020; Fraser, 2020). Thus, it would behoove policymakers who are interested in supporting a sustainable food system in NYC to use these programs as a springboard when crafting future legislation.

5.4   Barriers to Visions and Innovations

Several articles noted accounts of barriers to these visions and innovations as well. The main themes identified as barriers to sustainable pathway visions are the racism present throughout the city and national food system, the lack of time and resources many New Yorkers have to shop and cook their food, and the lack of accountability and consistency in community-based efforts. Qiana Mickie, an employee at Just Food, a non-profit that works to develop community-driven solutions to inequities within the New York regional food system, poignantly summarizes the systemic racism within the system:

"The purposeful inequities within our food system have long been apparent from the theft of land from Indigenous peoples, to our nation's economies built on slavery, to the current struggles of labor and fight for dignity of farm and restaurant workers. Even with telltale signs of the degradation of soil, significantly low number of farmers of color—in particular, Black farmers and high national food insecurity—there remains barriers to developing and implementing equitable food/farm policy that supports regenerative agriculture practices, addresses land theft, stolen generational wealth or authentically engages the most impacted in our society." (Fraser, 2020)

This statement conveys the breadth of work that is left to be done policy-wise in ameliorating racial disparities and restoring dignity to farm and restaurant workers. If such issues are not addressed, decentralized, or community-focused, the policies are likely to not be effective.

Next, as vaccines are rolled out throughout the city, many residents will have to return to their jobs, meaning they'll have less time to stand in food lines, shop, cook, and store their food (Gomes, 2020). Moreover, the first people who return to their full-time jobs or gain new employment are likely to overlap with those both volunteering and using the emergency food system, i.e., taxi drivers, restaurant workers, and others. (Dervishi, 2020). As such, the previously mentioned landscape-level trends surrounding the cooking trends are likely to be stifled, and individuals will return to quick and easy takeout meals with low nutritional value that will fuel the conventional agro-industrial food models. Lastly, though many accounts in the data support decentralized or community-based pathways to achieve a sustainable food system, others have pointed out challenges in achieving this as the

pandemic dies down. One article includes a paraphrased quote from an associate professor of social work at CUNY Hunter College that reads, "he's not confident that bonds forged in gentrifying neighborhoods will be long-lasting, but people are at their best in moments of disaster" (Lawrence, 2020). Another article comments on the sustainability of community-based food innovations, such as free-food fridges, stating:

"Emergency food efforts that spring up overnight are not sustainable, as many of the so-called mutual aid efforts behind them use the rhetoric of community solidarity but show little accountability to the community. True mutual aid is a consistent presence in communities, not only during times of emergency, and involves reciprocity. The very nature of these efforts—one group giving, another group taking—make true mutual aid impossible." (Gomes, 2020)

The article further notes that these charitable innovations and projects distract from "long-term, community-based sovereignty and food justice work that is already taking place (Gomes, 2020). Moreover, innovations such as community gardens and fridges are dependent on weather conditions, and their supply fluctuates greatly with natural and capital resources, which indicates they should not be heavily relied on.

5.5 Discussion

The overall impact of COVID-19 on NYC's food system created a complex web of issues that both catalyzed a search for solutions by food system actors and highlighted the extent of unsustainability in the current agro-industrial model. Findings were categorized in three main areas: The current COVID-19 regime dynamics of NYC's food system, responses and exposures in the NYC food system to COVID-19, and explicit & implicit vision expectations. The current COVID-19 regime dynamics of NYC's food system illustrate the narrow view of the drivers of food insecurity held by system actors. That is, that food insecurity is mainly caused by financial insecurity at an individual level. This narrow definition silos food security issues into the access pillar, thereby ignoring faults and drivers in the other three pillars of availability, utilization, and stability. The consequences of this oversight are illustrated by the immense burden that fell on the emergency food system and differences in impact felt when the COVID-19 pandemic hit NYC. The failures and issues faced by emergency food organizations in NYC show that the emergency food system was never meant to play such a large role in solving the problems of the actual system. Moreover, reliance on the emergency food system actually hinders the healing and functioning of the actual system.

As shown by the data, COVID-19 was a massive and complex crisis to deal with in itself, and the city, state, and federal governments initially responded in a manner set by precedence (i.e., throwing money into mass economy-of-scale solutions focused on efficiency). However, while this reaction may have been sufficient to deal with past crises, the COVID-19 pandemic was unique in that it affected all socio-economic levels and was not

consolidated in one area. Therefore, the pandemic revealed in stark detail the dysfunction of the food system, particularly in terms of achieving food security for the most vulnerable NYC residents. In fact, many accounts of these most vulnerable groups and areas (being black, brown, and multi-racial communities, the elderly, children, and, geographically, the Bronx) highlighted that the food industry in NYC has 'Darwin-ed' itself into being food deserts, with fast-food chains and dollar stores being the more prolific—and popular—option for many residents. This is indicative of the weak social safety net the agro-industrial food model provides for residents that results in lower-socioeconomic groups being marginalized from access to healthy, nutritious food. This marginalization is exacerbated by the fact that achieving increased food security not only means integrating supply chains with community gardens or urban farms to provide healthier options; it also means people must have the resources to store and cook their food and the time to do it.

A summary of the explicit & implicit NYC food actor expectations for the future of the NYC food system is illustrated in table seven below. Overall, expectations revealed at the actor group and collective level show that the majority of actors were united on envisioning a system with more community-based decision making and interagency collaboration. This expectation provides a potential pathway to a more sustainable food system in NYC as it decentralizes food system decision-making and ensures that funding allocations are being used efficiently and in ways that create more value in the long term. However, individual expectations at all three levels revealed challenges in the implementation of this vision.

Table 7: Topography of NYC food actor expectations related to potential system transformations

<table>
<tr><td colspan="2">**Whose expectations?***</td><td>**INDIVIDUAL EXPECTATIONS**</td><td>**ACTOR GROUP EXPECTATIONS**</td><td>**COLLECTIVE EXPECTATIONS**</td></tr>
<tr><td rowspan="3">**What is expected?***</td><td>**LANDSCAPE**</td><td>Trends surrounding appreciation of food, cooking and the role food workers play</td><td>X</td><td>X</td></tr>
<tr><td>**REGIME**</td><td>Tone of distrust and exasperation from food system actors at the government's ability to provide equitable aid, respond to regime pressures, and implement policies that include other food system actors' input</td><td>Expectations of interagency collaboration, learning from and filling the gaps in the food system uncovered by COVID-19 and developing sustainable practices and health protocols</td><td>Non-profit, mutual-aid groups, and policy makers share a vision of a food system characterized by community ownership in policy or funding decision-making processes and interagency collaboration to reduce waste, shorten the supply chain and increase transparency</td></tr>
<tr><td>**NICHE**</td><td>Community gardens, urban farms and free-food fridges all mentioned as possible middle-man innovations to achieve a more sustainable food system, yet with skepticism surrounding their charity-based model, and dependence on certain resources/ weather conditions</td><td>Food pantries partnering with community gardens & their use of technology that increases transparency into inventory and availability between themselves, suppliers, and consumers</td><td>Decentralized Distribution or Community- Focused Policies and Student and Family-Supported Policies are both identified as sectoral policy priorities</td></tr>
</table>

Expectations are differentiated regarding the level of analysis and the scope of social support

Source: Adapted from Truffer, Voß & Konrad, 2008

First, as previously mentioned, individual landscape-level trends surrounding the cooking trends are likely to be stifled as the effects of the pandemic fade, and individuals will return to quick and easy takeout meals with low nutritional value that will fuel the conventional agro-industrial food models. Next, there is still a distrust of the government's ability to provide equitable aid, respond to regime pressure, and implement policies that include other food system actor's input, as shown in the regime individual expectations category. Lastly, while some innovations, such as free food fridges, emerged during the pandemic as an example of solutions to this issue, the data included a tone of skepticism from some as to whether they will be sustainable post-COVID-19 due to their charity-based model. The main issue of charity-based models is that they often undermine achieving food sovereignty in communities by removing agency. The issues that NYC faced during the pandemic, such as lower volunteer numbers, long line waits, and closures of emergency food organizations (i.e., non-profits, mutual aid groups, soup kitchen, and pantries), prove that the charity-based system models are not able to single-handedly fill the gaps of a broken food system.

By connecting these findings back to FAO's (2018) definition of a sustainable food system, and Food System Development Paradigm (see section 3.1.1), insights into systemic bottlenecks in the transition of the NYC food system from its conventional agro-industrial model to a sustainable can be derived. Firstly, the progress loop currently has a defective cog preventing its motion. This cog is the misallocation of public expenditure on the socio-cultural and natural environments. Evidence of its existence is given by the inequitable distribution of a nutritious food supply, misaligned government expenditure, and production-focused strategies. Next, the externalities loop is also inhibited by conventional state, national, and global agro-industrial systems, as well as various other systems within the city that provide inputs and resources for the NYC food sector. While the multiplier feedback loop was positively stimulated by the $15 minimum wage policy measure in 2018 (Moe, Parrott & Lathrop, 2019), this loop is isolated from other value-adding components, and thus, its repercussions did little when the pandemic-caused economic downturn came, and the food industry suffered closures. The findings provide little explicit insight into the functioning of the investment loop, yet due to the fact investment of wealth accrual from entrepreneurs in socio-culture and natural environment are not touched upon in the data, it can be assumed that this loop is not running optimally for the redistribution of value. In sum, the catalytic support the NYC food system needs from the government and wealth accrual sources to embark on a sustainable transition is lacking. This is exacerbating challenges within the system, particularly when it comes to responding to a crisis as evidenced by the heavy reliance on the emergency support system throughout the COVID-19 crisis.

6 Conclusion

6.1 Research Objectives

Through a qualitative textual data analysis of 105 topical news articles, this thesis investigated how the COVID-19 pandemic has aligned food system actor expectations on transformation dynamics needed to achieve a sustainable food system in NYC. It, therefore, posed the research question:

RQ: *How has the COVID-19 pandemic aligned food system actor expectations on transformation dynamics to a sustainable food system in NYC?*

This question is answered here:

The COVID-19 pandemic impacted NYC's food system, unlike any other crisis before it. It stressed the system and exposed flaws. However, it also opened up conversations and increased news coverage on the complexity of the food system and the extent to which it underserves the city's residents. The impact of the pandemic on the city's food system distilled the difference between short-term charitable support and the need for an integrated system for the delivery of nutritious food at actor levels. In other words, the restructuring of the system during the pandemic has all the earmarks of an attempt to integrate a temporary response into long-term structural support. The largest unifying expectation among actors is that while these responses have sustainable characteristics, they do not equate to a sustainable transition dynamic. Evidence of this is illustrated in the dysfunction of positive feedback loops previously mentioned that results from relying on emergency support tactics. All these actors coming together envision a system that, when faced with a stressor like COVID-19, has a support system that can be integrated into it rather than a system that simply takes on all the qualities of the emergency food system. While the government, food system workers, volunteers, and NYC residents may each retain discrepancies in their expectations of pathways to a more sustainable and equitable food system, all of these actors agree, either implicitly or explicitly, that there are systemic problems that must be addressed if the NYC food system is to become a sustainable, long-term enterprise. Fortunately, there are accounts from all sides of willingness to participate in more transparent, collaborative, and relationship-building conversations of what these pathways might look like.

6.2 Contributions

This thesis contributes to existing literature in several ways. First, it addresses the epistemology gap in agro-food transition research between macro-level transition dynamics

and individual nutritional or food security needs. In doing such, it fulfills El Bilali's (2019, p.1) identified need to "move beyond silos by fostering cross-sectoral collaboration and the integration of the agro-food sustainability transitions and food security research fields." Second, it contributes to existing knowledge in transition research by linking the effects of exogenous variables, such as crisis, to "beliefs, expectations, cognitions and characteristics" of actor and network discourses (Zolfagharian et al., 2019, p. 6). This linkage illustrates the power of harnessing the diversity of perception and expectations during a disruptive event and leveraging them into transition narratives. Lastly, this study identifies the 'goal' of sustainable agro-food transitions by defining sustainable food systems and connecting key information found in the data to this definition to conceptualize what the system is transitioning to and bottlenecks in this process.

6.3   Implications

As stated in the discussion, the data showed that while NYC food system actors at all MLP levels—niche, regime, and landscape—did not necessarily present the same perceptions of what pathways to take, they all agree that there are pressing systemic issues in the food system that need to be addressed for the long-term. This finding presents several practical implications for future policy measures focused on creating a sustainable food system. First, food-system policy must be a collaborative, iterative, and adaptive process focused on incorporating community needs and voices at all levels. Second, policies must marry the keepers of cultural heritage or affiliation with food (i.e., restaurant workers, chefs, or others who may provide recipes that are nutritious and align with the food culture of residents), with modern capabilities for accessing, preparing and storing ingredients. Lastly, there must be a connection dynamic between grassroots efforts to achieve food security and government policy so that innovations presented as solutions to downstream food security and nutrition needs are also nurtured from policy above to ensure value creation within the system.

These implications echo issues with positive progress, externality, multiplier, and investment feedback loops discussed previously. In short, to accelerate a sustainable food system transition, policymakers and those with wealth accrual should direct funding to support the socio-cultural and natural environment of the city. This could come in the form of developing model positive feedback loops that over time become self-sustaining and translate value to the rest of the system. It could also be constructing a multi-stakeholder vision and strategy for allocating funding that incorporates the voices to marginalized communities in a non-hierarchical manner. It could even be constructing policy with incentives or penalties for large agro-food organizations that dominate the current system to create more equitable relationships, sharing agency with other smaller actors in the food system.

6.4 Limitations and Future Research

As this study analyzed a specific case, it contains certain limitations that must be taken into account. First, due to the dangers of infection and spreading the COVID-19 virus, the study contains only secondary data. This was considered a necessary evil as observational data, or in-person analysis would also be difficult to conduct in the timeframe that this study is bounded. Moreover, NYC food system actors represent such a robust and diverse set of individuals and groups that conducting virtual interviews that yielding a holistic picture of food system expectations would have required more time or resources that were allocated for this study. Second, the collection of articles used for textual analysis were not an exhaustive list of those covering food insecurity and COVID-19 in NYC. However, the number of articles and perspectives within them is considered robust enough to provide a representative sample of viewpoints for the analysis. Lastly, there were no large themes of collective and actor group expectations identified at a landscape level. These are highly speculative expectations that comprise thoughts on the future "impacts of climate change and "science fictions and utopias," respectively (Truffer, Voß & Konrad, 2008). As the NYC food system was already in a time of crisis and attempting to fill the gaps of a largely dysfunctional system, expectations in these categories were not considered crucial in answering the research question and thus were not supplemented with other data.

Future research building on the findings of this study could focus on three main areas. First, it could focus on the next steps of the sustainable foresight method. That is, the construction of explicit collective visions for future regime structures; evaluation according to sustainability criteria; outlining potential niche processes and critical innovation fields; and stating the implications for actors/ behavioral expectations (Truffer, Voß & Konrad, 2008). Second, other cases in which the Food Development Paradigm (FAO's 2018) was or could be leveraged to transition a conventional agro-industrial food system to a sustainable one. Third, a quantitative study could also be conducted that investigates what qualities a sustainable "middle-man-innovation" would need to marry the keepers of cultural heritage or affiliation with food (i.e., restaurant workers, chefs, or others who may provide recipes that are nutritious and align with the food culture of residents), with modern capabilities for accessing, preparing, and storing ingredients. In the context of continued research in NYC, this could be a study on how NYC residents, particularly the most vulnerable groups, buy, store, and consume food would be beneficial to support research into innovation that caters to this group while also carrying sustainable characteristics. Finally, further research could be conducted into food system policy changes after COVID-19.

This thesis illustrates the power of crisis events in revealing systemic regime faults and opening opportunities for actors to collaborate and communicate expectations while enhancing programs for future use. It is a pivotal opportunity to achieve sustainable systems, particularly in food models, as their complexity hinders transition by nature. Policymakers, community leaders, and grassroots champions can choose to capitalize on and leverage this opportunity for the long-term benefit of society.

References

Barron, M., Goldblatt, B., Ho, C., Hudson, R., Kaplan, D., Keberle, E., Naumoff, C., Perlmutter, C., Suttile, Z., Thorsteinson, C., Deborah Tsien, Wild, L. & Wilson, M. (2010). Understanding New York City's Food Supply | Columbia SIPA, Available Online: https://www.sipa.columbia.edu/academics/capstone-projects/understanding-new-york-city%E2%80%99s-food-supply-0 [Accessed 20 May 2021].

Belmin, R., Casabianca, F. & Meynard, J.-M. (2018). Contribution of Transition Theory to the Study of Geographical Indications, *Environmental Innovation and Societal Transitions*, vol. 27, pp.32–47.

Bloomberg, M. R. (2007). PlaNYC, The City of New York, Available Online: http://www.nyc.gov/html/planyc/downloads/pdf/publications/full_report_2007.pdf [Accessed 2 March 2021].

Brannen, S. & Exline, H. (2010). Food Works: A Vision to Improve NYC's Food System, p.90.

Braun, V. & Clarke, V. (2006). Using Thematic Analysis in Psychology, *Qualitative Research in Psychology*, vol. 3, no. 2, pp.77–101.

Britannica. (2021). Food Desert | Britannica, Available Online: https://www.britannica.com/topic/food-desert [Accessed 12 May 2021].

Cardoso, J. (2019). Seven Years After Sandy, Slow Moves Toward Resiliency in High-Risk Nabes, *City Limits*, Available Online: https://citylimits.org/2019/07/01/sandy-resiliency-retrofits-nyc/ [Accessed 2 March 2021].

CFS, C. on W. F. S. (2017). Global Strategic Framework for Food Security and Nutrition (GSF), Available Online: http://www.fao.org/3/MR173EN/mr173en.pdf [Accessed 14 April 2021].

Charlton, K. (2016). Food Security, Food Systems and Food Sovereignty in the 21st Century: A New Paradigm Required to Meet Sustainable Development Goals, *Nutrition & Dietetics*, vol. 73, pp.3–12.

Clapp, J. & Moseley, W. G. (2020). This Food Crisis Is Different: COVID-19 and the Fragility of the Neoliberal Food Security Order, *The Journal of Peasant Studies*, vol. 47, no. 7, pp.1393–1417.

Conklin, J. & Christensen, K. (2009). Building Shared Understanding of Wicked Problems | Harvard Business Publishing Education, p.4.

CUNY Urban Food Policy Institute. (2019). Food and the New York City Budget: A Review and Analysis of Municipal Budget Allocations in Fiscal Years 2019 and 2020, CUNY Urban Food Policy Institute, Available Online: https://www.cunyurbanfoodpolicy.org/news/2019/10/29/food-and-the-new-york-city-budget-a-review-and-analysis-of-municipal-budget-allocations-in-fiscal-years-2019-and-2020 [Accessed 2 March 2021].

DataCommons. (2021). New York City - Place Explorer - Data Commons, Available Online: https://datacommons.org/place/geoId/3651000?utm_medium=explore&mprop=count&popt=Person&hl=en [Accessed 22 May 2021].

Davidson, D. J., Jones, K. E. & Parkins, J. R. (2015). Food Safety Risks, Disruptive Events and Alternative Beef Production: A Case Study of Agricultural Transition in Alberta | SpringerLink, no. 33, pp.359–371.

El Bilali, H. (2019). Research on Agro-Food Sustainability Transitions: Where Are Food Security and Nutrition?, *Food Security*, vol. 11, no. 3, pp.559–577.

El Bilali, H. (2020). Transition Heuristic Frameworks in Research on Agro-Food Sustainability Transitions, *Environment, Development and Sustainability*, vol. 22, no. 3, pp.1693–1728.

FAO. (2018). Sustainable Food Systems: Concept and Framework, Food and Agriculture Organization of the Untied Nations, p.8, Available Online: http://www.fao.org/3/ca2079en/CA2079EN.pdf [Accessed 5 May 2021].

Find Food. (2021). *Food Bank For New York City*, Available Online: https://www.foodbanknyc.org/get-help/ [Accessed 22 May 2021].

Food and Covid-19 NYC – Digital Archive and Collection. (n.d.). , Available Online: https://wp.nyu.edu/foodandcovid19/ [Accessed 23 February 2021].

Food Bank For New York City. (2021). View Our Research & Financials, *Research, Reports and Financials*, Available Online: https://www.foodbanknyc.org/research-reports/ [Accessed 2 May 2021].

Food Insecurity. (2021). *City Harvest*, Available Online: https://www.cityharvest.org/food-insecurity/ [Accessed 2 March 2021].

Foodprint. (2021). Our Industrial Food System and Its Negative Impacts, *FoodPrint*, Available Online: https://foodprint.org/the-total-footprint-of-our-food-system/issues/the-industrial-food-system/ [Accessed 23 May 2021].

Front Page – Food and Covid-19 NYC. (n.d.). , Available Online: https://wp.nyu.edu/foodandcovid19/links-and-resources/storyline-links-and-resources/ [Accessed 23 February 2021].

Full Text PDF. (n.d.). , Available Online: https://www.researchgate.net/profile/Karen-Charlton/publication/292948468_Food_security_food_systems_and_food_sovereignty_in_the_21st_century_A_new_paradigm_required_to_meet_Sustainable_Development_Goals/links/56c9080b08ae96cdd06bc028/Food-security-food-systems-and-food-sovereignty-in-the-21st-century-A-new-paradigm-required-to-meet-Sustainable-Development-Goals.pdf [Accessed 15 April 2021].

Geels, D. I. F. W. (2005). The Dynamics of Transitions in Socio-Technical Systems: A Multi-Level Analysis of the Transition Pathway from Horse-Drawn Carriages to Automobiles (1860–1930), *Technology Analysis & Strategic Management*, vol. 17, no. 4, pp.445–476.

Geels, F. W. (2010). Ontologies, Socio-Technical Transitions (to Sustainability), and the Multi-Level Perspective, *Research Policy*, vol. 39, no. 4, pp.495–510.

Geels, F. W. (2011). The Multi-Level Perspective on Sustainability Transitions: Responses to Seven Criticisms, *Environmental Innovation and Societal Transitions*, vol. 1, no. 1, pp.24–40.

Geels, F. W. & Schot, J. (2007). Typology of Sociotechnical Transition Pathways, *Research Policy*, vol. 36, no. 3, pp.399–417.

Grin, J., Rotmans, J. & Schot, J. (2010). Transitions to Sustainable Development: New Directions in the Study of Long Term Transformative Change, Routledge.

Hassink, J., Grin, J. & Hulsink, W. (2018). Enriching the Multi-Level Perspective by Better Understanding Agency and Challenges Associated with Interactions across System Boundaries. The Case of Care Farming in the Netherlands: Multifunctional Agriculture Meets Health Care, *Journal of Rural Studies*, vol. 57, pp.186–196.

Immink, V. M., Reinders, M. J., Tulder, R. J. M. & Trijp, J. C. M. van. (2013). The Livestock Sector and Its Stakeholders in the Search to Meet the Animal Welfare Requirements of Society, 2, *Journal on Chain and Network Science*, vol. 13, no. 2, pp.151–160.

Konefal, J. (2015). Governing Sustainability Transitions: Multi-Stakeholder Initiatives and Regime Change in United States Agriculture, 1, *Sustainability*, vol. 7, no. 1, pp.612–633.

Kreuter, M. W., De Rosa, C., Howze, E. H. & Baldwin, G. T. (2004). Understanding Wicked Problems: A Key to Advancing Environmental Health Promotion, *Health Education & Behavior*, vol. 31, no. 4, pp.441–454.

Lachman, D. A. (2013). A Survey and Review of Approaches to Study Transitions, *Energy Policy*, vol. 58, no. C, pp.269–276.

Lawhon, M. & Murphy, J. T. (2012). Socio-Technical Regimes and Sustainability Transitions: Insights from Political Ecology, *Progress in Human Geography*, vol. 36, no. 3, pp.354–378.

Li, J., Jiggins, J., Bueren, E. T. L. V. & Leeuwis, C. (2013). TOWARDS A REGIME CHANGE IN THE ORGANIZATION OF THE SEED SUPPLY SYSTEM IN CHINA, *Experimental Agriculture*, vol. 49, no. 1, pp.114–133.

Lowey, N. M. (2020). Text - H.R.6201 - 116th Congress (2019-2020): Families First Coronavirus Response Act [legislation], Available Online: https://www.congress.gov/bill/116th-congress/house-bill/6201/text [Accessed 12 May 2021].

Lutz, J. & Schachinger, J. (2013). Do Local Food Networks Foster Socio-Ecological Transitions towards Food Sovereignty? Learning from Real Place Experiences, 11, *Sustainability*, vol. 5, no. 11, pp.4778–4796.

McKee, A. (2003). Textual Analysis: A Beginner's Guide, SAGE.

Moe, L., Parrott, J. & Lathrop, Y. (2019). New York City's $15 Minimum Wage and Restaurant Employment and Earnings, New York City: The New School, Center for New York City Affairs and National Employment Law Project, Available Online: https://s27147.pcdn.co/wp-content/uploads/New-York-City-15-Minimum-Wage-Restaurant-Employment-Earnings.pdf.

NYC Economic Development Corporation & Mayor's Office of Recovery and Resiliency. (2016). 2016 New York City Food Distribution & Resiliency Study Results, Available Online: https://www1.nyc.gov/assets/foodpolicy/downloads/pdf/2016_food_supply_resiliency_study_results.pdf [Accessed 20 May 2021].

NYC Gov. (2021). Planning-Population-NYC Population Facts - DCP, Available Online: https://www1.nyc.gov/site/planning/planning-level/nyc-population/population-facts.page [Accessed 20 May 2021].

NYU. (2021). Food Insecurity – Food and Covid-19 NYC, Available Online: https://wp.nyu.edu/foodandcovid19/links-and-resources/food-insecurity/ [Accessed 20 May 2021].

OneNYC. (2015). #OneNYC: The Plan for a Strong and Just City, *#OneNYC*, Available Online: https://onenyc.cityofnewyork.us [Accessed 6 January 2021].

Panagariya, A. (2002). Trade and Food Security: Conceptualizing the Linkages., Conference on Trade, Agricultural Development, and Food Security: The Impact of Recent Economic and Trade Policy Reform, Food and Agricultural Organization, Rome, July 2002.

Popkin, B. M. (2017). Relationship between Shifts in Food System Dynamics and Acceleration of the Global Nutrition Transition, *Nutrition Reviews*, vol. 75, no. 2, pp.73–82.

Schot, J. W. & Geels, F. W. (2008). Strategic Niche Management and Sustainable Innovation Journeys : Theory, Findings, Research Agenda, and Policy, *Technology Analysis and Strategic Management*, vol. 20, no. 5, pp.537–554.

Slingerland, M. & Schut, M. (2014). Jatropha Developments in Mozambique: Analysis of Structural Conditions Influencing Niche-Regime Interactions, 11, *Sustainability*, vol. 6, no. 11, pp.7541–7563.

Smith, A., Voß, J.-P. & Grin, J. (2010). Innovation Studies and Sustainability Transitions: The Allure of the Multi-Level Perspective and Its Challenges, *Research Policy*, vol. 39, no. 4, pp.435–448.

Stringer, S. (2010). FOODNYC: A Blueprint for a Sustainable Food System, New York City, Available Online: https://hungeractionnys.org/wp/wp-content/uploads/2012/06/FoodNYC_stringer.pdf [Accessed 2 May 2021].

Truffer, B., Voß, J.-P. & Konrad, K. (2008). Mapping Expectations for System Transformations: Lessons from Sustainability Foresight in German Utility Sectors, *Technological Forecasting and Social Change*, vol. 75, no. 9, pp.1360–1372.

U.S. Treasury Department. (2021). About the CARES Act and the Consolidated Appropriations Act | U.S. Department of the Treasury, Available Online: https://home.treasury.gov/policy-issues/coronavirus/about-the-cares-act [Accessed 12 May 2021].

USDA. (2021). USDA Farmers to Families Food Box | Agricultural Marketing Service, Available Online: https://www.ams.usda.gov/selling-food-to-usda/farmers-to-families-food-box [Accessed 12 May 2021].

Weick, K. E. (1984). Small Wins: Redefining the Scale of Social Problems, *American Psychologist*, vol. 39, no. 1, pp.40–49.

WHO, ILO, IFAD & FAO. (2020). Impact of COVID-19 on People's Livelihoods, Their Health and Our Food Systems, Available Online: https://www.who.int/news/item/13-10-2020-impact-of-covid-19-on-people's-livelihoods-their-health-and-our-food-systems [Accessed 25 February 2021].

Wicked Problems in Food System Solutions. (2018). in *Socio-Envrionmental Synthesis Center (SESYNC)*, 5 April 2018, Available Online: https://www.sesync.org/project/propose-a-workshop/wicked-problems-in-food-system-solutions [Accessed 25 February 2021].

Wiskerke, H. (2003). On Promising Niches and Constraining Sociotechnical Regimes: The Case of Dutch Wheat and Bread, *Environment and Planning A*, vol. 35, pp.429–448.

World Economic Forum. (2020). Incentivizing Food Systems Transformation, p.32, Available Online: https://www.weforum.org/reports/incentivizing-food-systems-transformation/ [Accessed 25 February 2021].

WW Norton. (2011). W-6a Key Elements of a Textual Analysis - Little Seagull Desktop, Available Online: https://wwnorton.com/college/english/write/lsh/full/w-6a.html [Accessed 14 June 2021].

Young, L. (2020). Tourism in New York City May Take until 2024 to Recover, New Report Says, *New York Business Journal*, [e-journal], Available Online: https://www.bizjournals.com/newyork/news/2020/11/17/nyc-tourism-report-2024-return.html [Accessed 22 May 2021].

Zolfagharian, M., Walrave, B., Raven, R. & Romme, A. G. L. (2019). Studying Transitions: Past, Present, and Future, *Research Policy*, vol. 48, no. 9, p.103788.

Zwartkruis, J. V., Berg, H., Hof, A. F. & Kok, M. T. J. (2020). Agricultural Nature Conservation in the Netherlands: Three Lenses on Transition Pathways, *Technological Forecasting and Social Change*, vol. 151, article no. 119235.

Data Sources

Acevedo, A. (2020). 'When You Ignore Problems, the Problems Get Worse': Queens Activist Calls on DOE to Help Feed Homeless with Excess Food from Schools | AmNewYork, Available Online: https://www.amny.com/coronavirus/when-you-ignore-problems-the-problems-get-worse-queens-activist-calls-on-doe-to-help-feed-homeless-with-excess-food-from-schools/ [Accessed 21 April 2021].

Acharya, P. (2020). COVID-19 Has Plunged More People of Color into Food Insecurity, *The Counter*, Available Online: https://thecounter.org/covid-19-people-of-color-food-insecurity/ [Accessed 21 April 2021].

Adams, B. (2020). Black, Hispanic Households Struggling with Food Insecurity during Pandemic, *TheGrio*, Available Online: https://thegrio.com/2020/07/07/black-hispanic-households-food-insecurity/ [Accessed 21 April 2021].

Aponte, C. I. (2020). Half of NYC's Immigrants Are Unemployed Because of the Pandemic, Report Finds, *THE CITY*, Available Online: https://www.thecity.nyc/2020/6/21/21298436/half-of-nyc-immigrants-unemployed-because-of-pandemic [Accessed 20 April 2021].

Appel, D. (2020). Food Pantries Increasing Their Impact Through Innovation, *NYC Food Policy Center (Hunter College)*, Available Online: https://www.nycfoodpolicy.org/food-pantries-increasing-their-impact-through-innovation/ [Accessed 20 April 2021].

Babür, O. (2020). Feeding the Elderly in New York City's Chinatown, *Food & Wine*, Available Online: https://www.foodandwine.com/fwpro/heart-of-dinner-chinatown-feeding-elderly-food-insecurity [Accessed 21 April 2021].

Bergin, B. & Chang, S. (2020). Stuck At Home, Some Elderly NYers Are Struggling To Get Food During Coronavirus PAUSE, *Gothamist*, Available Online: https://gothamist.com/food/stuck-home-some-elderly-nyers-are-struggling-get-food-during-coronavirus-pause [Accessed 20 April 2021].

Blau, R. (2020). Fate of Grab-and-Go Meals Dished Out at Schools Unclear as Return of Classes Nears, *THE CITY*, Available Online: https://www.thecity.nyc/2020/8/23/21398171/nyc-grab-and-go-meals-schools-food-insecurity [Accessed 21 April 2021].

Bliss, L. & Capps, K. (2020). Why Coronavirus Is a Food Security Crisis, Too, *Bloomberg.Com*, Available Online: https://www.bloomberg.com/graphics/2020-coronavirus-dash/ [Accessed 20 April 2021].

Bocanegra, M. (2020). Food Pantries, Soup Kitchens Say They Haven't Seen $25M in City Aid, *Politico PRO*, Available Online: https://politi.co/2L8zwu6 [Accessed 20 April 2021].

Bookman, S. (2020). Coronavirus News: NYC Food Banks Struggle to Stay Stocked amid COVID-19 Crisis, *ABC7 New York*, Available Online: https://abc7ny.com/6066195/ [Accessed 20 April 2021].

Bowman, J. (2020). We Can't Let Our Children Go Hungry, *The Appeal*, Available Online: https://theappeal.org/we-cant-let-our-children-go-hungry/ [Accessed 21 April 2021].

Brand, D. (2020). Ridgewood Justice Organization Provides Food and Info for the Community, *Queens Daily Eagle*, Available Online: https://queenseagle.com/all/ridgewood-justice-organization-provides-food-and-info-for-community [Accessed 21 April 2021].

Carter, M. (2020). Tackling Food Insecurity One Community Fridge at a Time, *Edible Manhattan*, Available Online: https://www.ediblemanhattan.com/foodshed-2/community-fridges-spring-up-in-new-york/ [Accessed 21 April 2021].

CBS Local. (2020). Coronavirus Update: 1 In 8 New Yorkers Struggles With Food Insecurity, Available Online: https://newyork.cbslocal.com/2020/03/26/coronavirus-update-1-in-8-new-yorkers-struggles-with-food-insecurity/ [Accessed 21 April 2021].

CCC New York. (2020). Economic Hardship From COVID-19 Facing NYC's Working Parents and Youth, *CCC New York*, Available Online: https://cccnewyork.org/economic-hardship-from-covid-19-facing-nycs-working-parents-and-youth/ [Accessed 20 April 2021].

Chang, S. (2020). Food Insecurity In NYC Rises Precipitously With No Federal Help In Sight, *Gothamist*, Available Online: https://gothamist.com/news/food-insecurity-nyc-rises-precipitously-no-federal-help-sight [Accessed 20 April 2021].

Christ, K. (2020). We Must Not Ignore the Toll of COVID-19 on the Bronx, *The Fordham Ram*, Available Online: https://fordhamram.com/76318/opinion/we-must-not-ignore-the-toll-of-covid-19-on-the-bronx/ [Accessed 20 April 2021].

Coe, A. (2020). Opinion | Free Produce, With a Side of Shaming, *The New York Times*, 25 June, Available Online: https://www.nytimes.com/2020/06/25/opinion/snap-food-pantry-aid.html [Accessed 20 April 2021].

Cohen, J. (2020). Citymeals Continues Donating Food to Bronx Seniors and Others in Need during COVID-19 – Bronx Times, Available Online: https://www.bxtimes.com/citymeals-continues-donating-food-to-bronx-seniors-and-others-in-need-during-covid-19/ [Accessed 20 April 2021].

Cook, L. (2020). De Blasio Ties Federal Stimulus Aid to NYC Free Meals Program, *PIX11*, Available Online: https://pix11.com/news/coronavirus/de-blasio-ties-federal-stimulus-aid-to-nyc-free-meals-program/ [Accessed 20 April 2021].

Culliton, K. (2020). Bronx Restaurant Kitchen Survives To Feed Its Hungriest Neighbors, Available Online: https://www.ny1.com/nyc/all-boroughs/news/2020/07/20/la-morada-nyc-coronavirus-hunger [Accessed 21 April 2021].

CUNY Graduate School of Public Health & Policy, H. (2020). As Food Insecurity Continues to Plague New Yorkers, Impact on Children Is Worrisome, Available Online: https://medicalxpress.com/news/2020-06-food-insecurity-plague-yorkers-impact.html [Accessed 20 April 2021].

Davis, T. S. (2020). As COVID-19 Cases Rise in New York, so Does Food Insecurity, *Prism*, Available Online: https://prismreports.org/2020/11/25/as-covid-cases-rise-in-new-york-so-does-food-insecurity/ [Accessed 21 April 2021].

DeCiccio, E. (2020). Food Pantries Dry up as Unemployment Skyrockets [Text.Article], *Fox News*, Available Online: https://www.foxnews.com/media/food-pantries-feel-the-growing-burden-as-unemployment-skyrockets [Accessed 20 April 2021].

Dervishi, K. (2020). Moving into the next Phase of Addressing New York City's Hunger Crisis [Text], *NYN*, Available Online: https://nynmedia.com/content/moving-next-phase-addressing-new-york-citys-hunger-crisis [Accessed 20 April 2021].

Digiorgio, F. (2020). Brooklyn Nonprofit Rethinks Food Waste to Feed New Yorkers During COVID-19, *Food Tank*, Available Online: https://foodtank.com/news/2020/06/brooklyn-nonprofit-rethinks-food-waste-to-feed-new-yorkers-during-covid-19/ [Accessed 20 April 2021].

Donaghy, S. C. (2020). Greenwood Soup Kitchen Closes; Volunteer Tests Positive for COVID-19, *Index-Journal*, Available Online: http://www.indexjournal.com/news/covid-19/greenwood-soup-kitchen-closes-volunteer-tests-positive-for-covid-19/article_b2d0f658-f358-57c5-9b1b-31ae573aa7d1.html [Accessed 20 April 2021].

Dunn, E. G. (2020). These Unsung Heroes of Public School Kitchens Have Fed Millions, *The New York Times*, 15 September, Available Online: https://www.nytimes.com/2020/09/15/nyregion/coronavirus-nyc-schools-cafeterias.html [Accessed 21 April 2021].

Dzhanova, Y. (2020). Food Banks Are Closing and Losing Their Workforce Because of the Coronavirus, *CNBC*, Available Online: https://www.cnbc.com/2020/04/28/coronavirus-food-banks-are-closing-and-losing-their-workforce.html [Accessed 20 April 2021].

Eama, A. (2020). Especially Hard-Hit by Coronavirus, City's Bangladeshi Community Sees Failure of Government to Help Vulnerable New Yorkers, *Gotham Gazette*, Available Online:

https://www.gothamgazette.com/city/9609-bangladeshi-community-hard-hit-coronavirus-government-failure-vulnerable-new-yorkers [Accessed 21 April 2021].

Easthope, J. (2020). New York City's Undocumented Population Faces Exposure to COVID-19 and Food Insecurity, *NET TV*, Available Online: https://netny.tv/episodes/currents/new-york-citys-undocumented-population-faces-exposure-to-covid-19-and-food-insecurity/ [Accessed 10 April 2021].

Essa, A. (2020). Coronavirus in the Bronx: Why the Poor Never Stood a Chance, *Middle East Eye*, Available Online: http://www.middleeasteye.net/big-story/coronavirus-the-bronx-epicentre-united-states [Accessed 20 April 2021].

Evelly, J. (2020). Six Months Into Pandemic, NYC's Hunger Crisis Is 'Getting Even Worse,' Advocates Say, *City Limits*, Available Online: https://citylimits.org/2020/09/13/six-months-into-pandemic-nycs-hunger-crisis-is-getting-even-worse-advocates-say/ [Accessed 21 April 2021].

Evelly, J. & Javorsky, N. (2020). City's Efforts to Meet Food Crisis Evolve; Questions About Long Term, *City Limits*, Available Online: https://citylimits.org/2020/05/18/citys-efforts-to-meet-food-crisis-evolve-questions-about-long-term/ [Accessed 20 April 2021].

Farinacci, A. (2020a). Brooklyn Eatery Becomes a Food Bank for Hard-Hit Industry, Available Online: https://www.ny1.com/nyc/all-boroughs/news/2020/04/02/brooklyn-eatery-becomes-a-food-bank-for-their-own-industry-hit-hard-by-coronavirus [Accessed 20 April 2021].

Farinacci, A. (2020b). Food Insecurity Worsens During Coronavirus, Available Online: https://www.ny1.com/nyc/all-boroughs/coronavirus-blog/2020/04/17/food-insecurity-during-coronavirus [Accessed 21 April 2021].

Farinacci, A. (2020c). NYC Food Pantries Struggle to Stay Stocked Amid Coronavirus Crisis, Available Online: https://www.ny1noticias.com/nyc/noticias/coronavirus-blog/2020/04/21/more-ny-residents-rely-on-food-pantries [Accessed 20 April 2021].

Farinacci, A. (2020d). Free Meals at City Schools a Lifeline for Struggling Families, Available Online: https://www.ny1.com/nyc/all-boroughs/coronavirus-blog/2020/04/24/finding-food-during-coronavirus [Accessed 20 April 2021].

Farinacci, A. (2020e). Brooklyn Food Pantry Sees Seven-Fold Increase in Demand, Available Online: https://www.ny1.com/nyc/all-boroughs/coronavirus-blog/2020/06/11/brooklyn-food-pantry-sees-seven-fold-increase-in-demand [Accessed 20 April 2021].

File, N. (2020). Covid-19 and Racial Justice Movements Show It's Time for Black Food Sovereignty in Brooklyn, *Bedford + Bowery*, Available Online: https://bedfordandbowery.com/2020/07/covid-19-and-racial-justice-movements-show-its-time-for-black-food-sovereignty-in-brooklyn/ [Accessed 21 April 2021].

FoodBank, N. (2020). Food Bank Calls for Community Support During Coronavirus Public Health Crisis, *Food Bank For New York City*, Available Online: https://www.foodbanknyc.org/covid-19-food-bank-for-new-york-city-response-2/ [Accessed 20 April 2021].

Fraser, K. T. (2020). Interview: How Are Frontline Food Nonprofits in NYC Changing Their Models in the COVID-19 Era and What They Have 'Learned' about the Gaps in Our System?, *CUNY Urban Food Policy Institute*, Available Online: https://www.cunyurbanfoodpolicy.org/news/2020/3/24/interview-how-are-frontline-food-nonprofits-in-nyc-changing-their-models-in-the-covid-19-era-and-what-they-have-learned-about-the-gaps-in-our-system [Accessed 21 April 2021].

Gainer, A. (2020). Food Banks In Growing Need Of Donations As New Families Experience Food Insecurity During Pandemic, Available Online: https://newyork.cbslocal.com/2020/10/23/food-bank-donations-pandemic/ [Accessed 21 April 2021].

Gallanter, M. (2020). The Impact of the COVID-19 Pandemic on SNAP Administration and More, *NYC Food Policy Center (Hunter College)*, Available Online:

https://www.nycfoodpolicy.org/oversight-the-impact-of-the-covid-19-pandemic-on-snap-administration-food-pantries-and-soup-kitchens/ [Accessed 21 April 2021].

Gannon, D. (2020). 'No End in Sight': How NYC Is Dealing with the Growing Hunger Crisis, *6sqft*, Available Online: https://www.6sqft.com/coronavirus-hunger-crisis-new-york/ [Accessed 20 April 2021].

Garcia, K. (2020). NYC Grab-and-Go Meals to Continue Operation through the Summer, Officials Say, *PIX11*, Available Online: https://pix11.com/news/coronavirus/nyc-grab-and-go-meals-to-continue-operation-through-the-summer-officials-say/ [Accessed 20 April 2021].

Goldenberg, S. (2020). Coronavirus Pushes New York City's Food Pantries to 'Nothing Short of a Crisis', *Politico PRO*, Available Online: https://politi.co/2U9hfSJ [Accessed 20 April 2021].

Gomes, R. (2020). Op-Ed: Why Those Community Fridges Won't Solve Hunger, *Civil Eats*, Available Online: https://civileats.com/2020/07/30/op-ed-why-those-community-fridges-wont-solve-hunger/ [Accessed 21 April 2021].

Gould, J. (2020). NYC Soup Kitchens Are Now Serving Grad Students, Actors and Musicians, *NY Post*, Available Online: https://nypost.com/2020/04/19/food-banks-feeding-more-people-amid-coronavirus-unemployment-crisis/ [Accessed 20 April 2021].

Greene, C. R. M., Morgan Chittum, Leonard. (2020). NYers Hard Hit by COVID-19 Pandemic Rely on Food Pantries to Live, *Nydailynews.Com*, Available Online: https://www.nydailynews.com/new-york/ny-covid-hungry-people-food-panties-20201005-2w7zvnmw7ralpbovntf2r37rzm-story.html [Accessed 20 April 2021].

Haken, J. (2020). Opinion: NYC Faces a Hunger and Homelessness Crisis. Here's How to Help., *City Limits*, Available Online: https://citylimits.org/2020/11/17/opinion-nyc-faces-a-hunger-and-homelessness-crisis-heres-how-to-help/ [Accessed 21 April 2021].

He, G. (2020). NYC Restaurant Workers Pushed to Food Pantries and Homelessness While Jobs Remain Scarce, *Eater NY*, Available Online: https://ny.eater.com/2020/8/14/21366085/nyc-restaurant-workers-jobless-meals-food-pantry-hunger [Accessed 20 April 2021].

Henderson, E. (2020). Addressing Food Insecurity in School Children during COVID-19 Pandemic, *News-Medical.Net*, Available Online: https://www.news-medical.net/news/20200901/Addressing-food-insecurity-in-school-children-during-COVID-19-pandemic.aspx [Accessed 21 April 2021].

Hicks, N., Marsh, J. & Calder, R. (2020). How NYC's Emergency Food Program Is 'Starving People', *New York Post*, Available Online: https://nypost.com/2020/04/28/how-nycs-emergency-food-program-is-starving-people/ [Accessed 20 April 2021].

Jones, S. (2020). Kids Are Going Hungry Because of the Coronavirus, *Intelligencer*, Available Online: https://nymag.com/intelligencer/2020/05/kids-are-going-hungry-because-of-the-coronavirus.html [Accessed 20 April 2021].

Joseph, G. (2020). A Third Of NYC Food Pantries Have Closed, Swelling Bread Lines During Coronavirus Lockdown, *Gothamist*, Available Online: https://gothamist.com/food/third-nyc-food-pantries-have-closed-swelling-bread-lines-during-coronavirus-lockdown [Accessed 20 April 2021].

Kiernan, P. & Katz, C. (2020). New Yorker of the Week: Shatia Burks, Available Online: https://www.ny1.com/nyc/all-boroughs/nyer-of-the-week/2020/12/25/new-yorker-of-the-week--shatia-burks [Accessed 21 April 2021].

Kim, Y. (2020). Opinion | To Be Hungry in the Middle of the Pandemic, *The New York Times*, 4 July, Available Online: https://www.nytimes.com/2020/07/04/opinion/coronavirus-food-banks-hunger.html [Accessed 21 April 2021].

Lankes, T. (2020). Poll: Half of NYC Parents Have Skipped/Reduced Meals for Their Family, and 62% Are Concerned about Their Child's Access to Food This Fall, *The Education Trust - New York*, Available Online: https://newyork.edtrust.org/press-release/poll-half-of-nyc-parents-have-skipped-reduced-meals-for-their-family-and-62-are-concerned-about-their-childs-access-to-food-this-fall/ [Accessed 21 April 2021].

Lawrence, E. (2020). 'Love And Solidarity': Amid Coronavirus, Mutual Aid Groups Resurge In New York City, *NPR.Org*, Available Online: https://www.npr.org/sections/health-shots/2020/07/26/895115149/love-and-solidarity-amid-coronavirus-mutual-aid-groups-resurge-in-new-york-city [Accessed 21 April 2021].

Leaden, C. (2020). A Fridge Full Of Free Food Appeared In Brooklyn For New Yorkers In Need - Secretnyc, Available Online: https://secretnyc.co/a-fridge-full-of-free-food-appeared-in-brooklyn-for-any-new-yorkers-in-need/ [Accessed 21 April 2021].

Leonard, M. (2020). Missing Meals: Coronavirus Has 1 in 3 Parents of Infants and Preschoolers Skipping Food, *Democrat and Chronicle*, Available Online: https://www.democratandchronicle.com/story/news/2020/04/30/coronavirus-sees-parents-kids-forgoing-meals-due-financial-stress/3059261001/ [Accessed 20 April 2021].

Leonhardt, M. (2020a). Covid-19 Pandemic Is the First Time 40% of Americans Have Experienced Food Insecurity, *CNBC*, Available Online: https://www.cnbc.com/2020/11/19/covid-pandemic-first-time-many-americans-experienced-food-insecurity.html [Accessed 20 April 2021].

Leonhardt, M. (2020b). The U.S. Is Facing 'unprecedented' Levels of Child Hunger—and It Could Get Worse This Winter, *CNBC*, Available Online: https://www.cnbc.com/2020/12/11/millions-of-kids-are-going-hungry-and-it-could-get-worse-this-winter.html [Accessed 21 April 2021].

Lerner, S. (2020). "We Need Protein" — Coronavirus Pandemic Deepens New York's Hunger Crisis, *The Intercept*, Available Online: https://theintercept.com/2020/06/16/coronavirus-hunger-crisis-nyc/ [Accessed 20 April 2021].

Lestch, C. (2020). Amid Pandemic Hunger Crisis, Entrepreneurial Women Work to Combat Food Insecurity, *The Story Exchange*, Available Online: https://thestoryexchange.org/entrepreneurial-women-combat-food-insecurity/ [Accessed 21 April 2021].

Long, A. C. (2020). Sunset Park Food Pantry Hangs on by a Thread While Serving More People, Available Online: https://politicsny.com/2020/07/01/sunset-park-food-pantry-hangs-on-by-a-thread-while-serving-more-people/ [Accessed 20 April 2021].

Lupardo, D. (2020). Letter to Governor Cuomo Regarding Food Insecurity, *Donna Lupardo*, Available Online: https://donnalupardo.com/letter-to-gov-food-insecurity/ [Accessed 20 April 2021].

Margolies, J. & Strauss, A. (2020). Hunger Is Worsening. Here Are 7 Ways New Yorkers Are Addressing It., *The New York Times*, 11 July, Available Online: https://www.nytimes.com/2020/07/11/nyregion/coronavirus-hunger-relief-nyc.html [Accessed 21 April 2021].

Martinez, E. (2020). Hunger 'Skyrocketing' in Latino Neighborhoods Hard-Hit by COVID, *City Limits*, Available Online: https://citylimits.org/2020/08/25/hunger-skyrocketing-in-latino-neighborhoods-hard-hit-by-covid/ [Accessed 21 April 2021].

Maxwell, C. (2020). The Coronavirus Crisis Is Worsening Racial Inequality, *Center for American Progress*, Available Online: https://www.americanprogress.org/issues/race/news/2020/06/10/486095/coronavirus-crisis-worsening-racial-inequality/ [Accessed 21 April 2021].

Mayor Bill de Blasio's Office. (2020). Mayor Calls On Federal Government To Increase Funding For Food Assistance, Available Online: https://canarsiecourier.com/mayor-calls-on-federal-government-to-increase-funding-for-food-assistance-p5790-255.htm [Accessed 20 April 2021].

Mazzella, R. (2020). How Covid-19 Is Impacting Food Insecurity For Older Adults, *Forbes*, Available Online: https://www.forbes.com/sites/nextavenue/2020/05/31/how-covid-19-is-impacting-food-insecurity-for-older-adults/ [Accessed 20 April 2021].

Mckay, M. (2020). Food Insecurity Grows During COVID-19 Pandemic, Available Online: https://spectrumlocalnews.com/nys/central-ny/politics/2020/09/09/food-insecurity-grows-during-covid-19-pandemic- [Accessed 21 April 2021].

Mercado, A. (2020). Free Food Fridge in Bed-Stuy Inspires Community Fridges throughout the City, Available Online: https://brooklynbased.com/2020/06/02/free-food-fridge-bed-stuy-community-fridge-nyc/ [Accessed 21 April 2021].

Mitchell, A. (2020). Torres and Gibson Pledge $38K to Fight Food Insecurity in the South Bronx – Bronx Times, Available Online: https://www.bxtimes.com/torres-and-gibson-pledge-38k-to-fight-food-insecurity-in-nyc/ [Accessed 20 April 2021].

Moses, D. (2020). Supermarket-Style Food Pantry Opens in Upper East Side | AmNewYork, Available Online: https://www.amny.com/new-york/manhattan/neighborhoods/upper-east-side/supermarket-style-food-pantry-opens-in-upper-east-side/ [Accessed 20 April 2021].

New York State Office of Temporary and Disability Assistance. (2020). New York State Announces $880 Million in Temporary Food Assistance for New York's School Children, *New York State Office of Temporary and Disability Assistance*, Available Online: http://otda.ny.gov/news/2020/2020-05-12.asp [Accessed 20 April 2021].

News, U. C. (2020). New York State Announces More Than $100 Million In Additional Food Assistance for August, *Urban CNY*, Available Online: https://www.urbancny.com/new-york-state-announces-more-than-100-million-in-additional-food-assistance-for-august/ [Accessed 20 April 2021].

Nierenberg, A. & Pasick, A. (2020). Coronavirus Schools Briefing: Lunch Along With Learning, *The New York Times*, 4 September, Available Online: https://www.nytimes.com/2020/09/04/us/coronavirus-schools-briefing-lunch-along-with-learning.html [Accessed 21 April 2021].

Noveck, J. & Franklin, F. (2020). Brooklyn Eatery Serves Soul Food — and Food for the Soul, *Washington Post*, 20 July, Available Online: https://www.washingtonpost.com/health/brooklyn-eatery-serves-soul-food--and-food-for-the-soul/2020/07/20/e665daf6-ca85-11ea-99b0-8426e26d203b_story.html [Accessed 21 April 2021].

Novini, R. (2020). NYC Unveils $170M Plan to Help Feed Struggling New Yorkers During Pandemic, *NBC New York*, Available Online: https://www.nbcnewyork.com/news/coronavirus/nyc-unveils-170m-plan-to-help-feed-struggling-new-yorkers-during-pandemic/2375891/ [Accessed 20 April 2021].

NYC Health. (2020). Food Insecurity and COVID-19, Available Online: https://www1.nyc.gov/assets/doh/downloads/pdf/covid/covid-19-food-insecurity.pdf.

Office of Governer Cuomo. (2020a). Governor Cuomo Announces $1.5 Million for 'Feeding New York State' to Assist Food Insecure New Yorkers and State's Farmers, Available Online: https://www.governor.ny.gov/news/governor-cuomo-announces-15-million-feeding-new-york-state-assist-food-insecure-new-yorkers-and [Accessed 20 April 2021].

Office of Governer Cuomo. (2020b). Governor Cuomo Announces Actions to Expand Eligibility and Ease Access to Food Assistance for New Yorkers, Available Online: https://www.governor.ny.gov/news/governor-cuomo-announces-actions-expand-eligibility-and-ease-access-food-assistance-new-yorkers [Accessed 20 April 2021].

Office of the Mayor. (2020). Mayor de Blasio and Taskforce on Racial Inclusion and Equity Announce New Initiatives to Expand Acce, *The Official Website of the City of New York*, Available Online: http://www1.nyc.gov/office-of-the-mayor/news/592-20/mayor-de-blasio-taskforce-racial-inclusion-equity-new-initiatives-expand [Accessed 20 April 2021].

Op-Ed. (2020). Op-Ed: Hunger Remains a Problem for New Yorkers amid COVID-19 Pandemic – QNS.Com, Available Online: https://qns.com/2020/09/op-ed-hunger-remains-a-problem-for-new-yorkers-amid-covid-19-pandemic/ [Accessed 21 April 2021].

Parra, D. (2020). City's Food Pantries and Soup Kitchens Face Obstacles Meeting Soaring Need, *City Limits*, Available Online: https://citylimits.org/2020/04/03/citys-food-pantries-and-soup-kitchens-face-obstacles-meeting-soaring-need/ [Accessed 20 April 2021].

Platkin, C., Freudenberg, N. & Koch, P. (2020). Can NYC Use COVID to Fix Its Food Problems?, *Nydailynews.Com*, Available Online: https://www.nydailynews.com/opinion/ny-oped-can-

nyc-use-covid-to-fix-its-food-problems-20200930-mxchfhgxhvgm5jfdtcymnqga3y-story.html [Accessed 20 April 2021].

Rabson, D. (2020). With Weekly $600 Pandemic Assistance Gone, Many Out-Of-Work NYers Are "Back To Square One", *Gothamist*, Available Online: https://gothamist.com/news/with-weekly-600-pandemic-assistance-gone-many-out-of-work-nyers-are-back-to-square-one [Accessed 20 April 2021].

Ramos, A. (2020). New Report Shows More New Yorkers Are Struggling to Get Food on Table, *PIX11*, Available Online: https://pix11.com/news/local-news/new-report-shows-more-new-yorkers-are-struggling-to-get-food-on-table/ [Accessed 21 April 2021].

Reader, R. (2020). A Farm In NYC's Central Park Could Help Feed Food Insecure Residents, *AGRITECTURE*, Available Online: https://www.agritecture.com/blog/2020/8/10/a-farm-in-nycs-central-park-could-help-feed-food-insecure-residents [Accessed 21 April 2021].

Ríos, N. (2020). Q&A: NYC Food Aid During Coronavirus, *Documented*, Available Online: https://documentedny.com/2020/06/04/qa-nyc-food-services-during-coronavirus/ [Accessed 21 April 2021].

Rosa, A. & Keith, S. (2020). See That Fridge on the Sidewalk? It's Full of Free Food, *The New York Times*, 8 July, Available Online: https://www.nytimes.com/2020/07/08/nyregion/free-food-fridge-nyc.html [Accessed 21 April 2021].

Rosenberg, L. (2020). Food Insecurity in NYC Could Rise by 38 Percent Before 2021, Due to the Pandemic, *Green Matters*, Available Online: https://www.greenmatters.com/p/new-york-city-food-insecurity [Accessed 21 April 2021].

Salazar, J. (2020). Money for Groceries Coming to *ALL* NYC Families, *NY State Senate*, Available Online: https://www.nysenate.gov/newsroom/articles/2020/julia-salazar/money-groceries-coming-all-nyc-families [Accessed 20 April 2021].

Sanaycela, D. (2020). SNAP in the Era of COVID | Community Food Action, Available Online: https://newsettlement.org/food/2020/08/31/snap-in-the-era-of-covid/ [Accessed 20 April 2021].

Shure, M. & Dean, J. (2020). An Outdoor Fridge in Brooklyn Is Stocked with Food for Anyone Who Needs It, *The Takeout*, Available Online: https://thetakeout.com/fridge-in-nyc-full-of-free-produce-to-combat-food-insec-1842842447 [Accessed 21 April 2021].

Sole-Smith, V. (2020). 'I Know You'Re Angry With Me Right Now Because You're Hungry', *The New York Times*, 7 May, Available Online: https://www.nytimes.com/2020/05/07/parenting/food-insecurity-children.html [Accessed 20 April 2021].

Stewart, N. & Heisler, T. (2020). 1.5 Million New Yorkers Can't Afford Food. Pantries Are Their Lifeline., *The New York Times*, 20 October, Available Online: https://www.nytimes.com/interactive/2020/10/20/nyregion/nyc-food-banks.html [Accessed 20 April 2021].

Strassmann, M. (2020). New York Mother Relies on Food Bank to Feed Young Sons amid COVID-19 Pandemic, Available Online: https://www.cbsnews.com/news/new-york-city-mother-food-bank-coronavirus-pandemic/ [Accessed 21 April 2021].

Strong, A. (2020). How New York City Is Feeding Children on the Front Lines of a Pandemic, *Food & Wine*, Available Online: https://www.foodandwine.com/news/new-york-city-school-children-free-food-coronavirus [Accessed 20 April 2021].

Sugerman, M. (2020). Feed The Frontlines NYC Keeps Restaurants Going, Available Online: https://www.audacy.com/wcbs880/articles/news/feed-the-frontlines-nyc-keeps-restaurants-going [Accessed 20 April 2021].

Sukumaran, P. (2020). New York City's Fight Against Food Insecurity Amid COVID-19, *Salud America*, Available Online: https://salud-america.org/new-york-citys-fight-against-food-insecurity-amid-covid-19/ [Accessed 21 April 2021].

Taylor, J. (2021). Opinion: Older Adults Still Need Food and Support during the Pandemic. We Can Help, *Queens Daily Eagle*, Available Online:

https://queenseagle.com/all/2021/1/7/opinion-older-adults-still-need-food-and-support-during-the-pandemic-we-can-help [Accessed 21 April 2021].

The Hunter College NYC Food Policy Center, (2020). New York Food 20/20: Vision, Research, and Recommendations During COVID-19 and Beyond., New York City: The Laurie M. Tisch Center for Food, Education & Policy, and The CUNY Urban Food Policy Institute., p.36, Available Online: https://www.nycfoodpolicy.org/wp-content/uploads/2020/10/ny2020-finalv2.pdf [Accessed 2 May 2021].

Thorne. (2020). Food Banks on Long Island Report Nearly 50% Increase in Food Insecurity since Start of Pandemic - ABC7 New York, Available Online: https://abc7ny.com/food-banks-long-island-cares-harvest-supplemental-nutrition-assistance-program/7902186/ [Accessed 21 April 2021].

Tomassetti, B. (2020). Local Food Banks Having Trouble Meeting Need during COVID Pandemic [Text.Article], *FOX 5 NY*, Available Online: https://www.fox5ny.com/news/local-food-banks-having-trouble-meeting-need-during-covid-pandemic [Accessed 20 April 2021].

Vaughan, K. (2020). New York City Residents Are Filling Free Food Fridges for Those in Need | Martha Stewart, Available Online: https://www.marthastewart.com/7843010/new-york-city-free-food-fridge [Accessed 21 April 2021].

Vick, R. (2020). NYC Nearly Doubled Senior Meal Delivery during Queens' COVID Crisis, *Queens Daily Eagle*, Available Online: https://queenseagle.com/all/nyc-nearly-doubled-senior-meal-delivery-during-queens-covid-crisis [Accessed 21 April 2021].

WABC. (2020a). Manhattan Church Sees 2,264% Increase in Demand for Pantry Meals amid COVID Crisis, *ABC7 New York*, Available Online: https://abc7ny.com/6394012/ [Accessed 20 April 2021].

WABC. (2020b). Coronavirus News: COVID-19 Wreaking Havoc on Older Americans, Communities of Color, AARP Finds, *ABC7 New York*, Available Online: https://abc7ny.com/8225281/ [Accessed 21 April 2021].

Watkins, E. (2020). New York State Program to Provide $25 Million to Food Banks, *Wgrz.Com*, Available Online: https://www.wgrz.com/article/news/health/coronavirus/western-new-york-food-banks-will-receive-21-million-in-funding-from-the-state/71-13e8e5af-0f85-4b20-98b4-291eb7c6fdb1 [Accessed 20 April 2021].

Wharton, R. (2020). 'If All the Stores Close, We Need Food': Community Gardens Adapt to the Pandemic, *The New York Times*, 10 April, Available Online: https://www.nytimes.com/2020/04/10/dining/community-garden-coronavirus.html [Accessed 21 April 2021].

wny papers. (2020a). New York State Announces an Additional $100 Million in Food Assistance for SNAP Recipients, *Niagara Frontier Publications*, Available Online: https://www.wnypapers.com/news/article/current/2020/07/16/142375/new-york-state-announces-an-additional-100-million-in-food-assistance-for-snap-recipients [Accessed 20 April 2021].

wny papers. (2020b). NYS: More than $100 Million in Additional Food Assistance for September, *Niagara Frontier Publications*, Available Online: https://www.wnypapers.com/news/article/current/2020/09/14/143232/nys-more-than-100-million-in-additional-food-assistance-for-september [Accessed 20 April 2021].

Yee, S. & NYRR Staff. (2020). Volunteer Leader Steven Yee, Available Online: https://www.nyrr.org/Run/Photos-And-Stories/2020/Volunteer-Leader-Steven-Yee [Accessed 21 April 2021].

Appendix A: Ten Major NYC Food System Government Agencies

Table A-1: Ten Major Government Agencies Involved in Distributing Meals and Overseeing Policy

New York City Agency	Population(s) Served	Setting(s)	Major Sources of Public Funding	Number of Meals and Snacks Served, 2019
Department of Education (DOE)	Children and youth	Schools that participate in child nutrition programs and community locations like parks, pools, and libraries	National School Lunch Program (NSLP), School Breakfast Program (SBP), Child & Adult Care Feeding Program (CACFP), Summer Food Service Program (SFSP), state tax levy, City tax levy	165,276,871
Administration for Children's Services (ACS)	Children and youth	Childcare, Head Start, and Division of Youth and Family Justice centers	Child and Adult Care Feeding Program (CACFP)	19,435,231
Department of Homeless Services (DHS)	Individuals who are homeless	Homeless shelters	Community Development Block Grant (CDBG), Emergency Solutions Grants Program (ESG), state tax levy, City tax levy	14,032,210
Department for the Aging (DFTA)	Seniors	Homes and senior centers	Older Americans Act Senior Nutrition Program, City tax levy	11,032,839
Department of Correction (DOC)	Individuals who are incarcerated	Correctional and detention facilities	City tax levy	8,811,899
NYC Health and Hospitals Corporation (NYC H+H)	Patients	Public hospitals	Medicare, Medicaid	7,646,871
Department of Youth and Community Development (DYCD)	Children and youth	Schools and New York City Housing Authority (NYCHA) centers	Child and Adult Care Feeding Program (CACFP), Summer Food Service Program (SFSP)	1,958,143
Department of Health and Mental Hygiene (DOHMH)	Individuals enrolled in DOHMH's mental health, substance abuse, and developmental disability services	Supportive housing	Assorted federal funds, state tax levy, City tax levy	1,493,222
Human Resources Administration (HRA)	Individuals participating in the HIV/AIDS Services Administration (HASA) program	Supportive housing	Housing Opportunities for Persons with AIDS Program (HOPWA), City tax levy	566,151
Department of Parks & Recreation (DPR)	Children and youth	Parks	Child and Adult Care Feeding Program (CACFP), state tax levy, City tax levy	5,953

Source: The Hunter College NYC Food Policy Center, 2020   **230,259,390**

Appendix B: Initial Codebook

NAME OF CODE	CODE DESCRIPTION	Files	References
Burden on emergency food system (EFS)	Increased Reliance of NYC Residents on the Emergency Food System Throughout the Pandemic	9	13
Before & after changes	Numbers/ Situation of Emergency Food System Before vs. After the Pandemic Hit	13	14
Emergency food system organizations	Food Banks, Food Pantries, Mutual Aid Groups, Non-profit all geared towards easing food insecurity	21	33
Failures & Issues	Failures and Issues that the NYC Emergency Food System faced from COVID-19	9	16
Closures	Food Bank or Pantry Closures	5	5
Lack of volunteers	Lack of Volunteers due to illness, age, or just unable to meet demand	3	3
Lines	Reports of long lines for emergency food system orgs	16	20
New people relying on EFS	Reports of new people relying on emergency food system	4	7
Shame around using emergency food system	Feelings of shame around using the emergency food system	2	2
Sustainable qualities of emergency system	Sustainable Qualities of Emergency System	6	8
Technology used	Technology Emergency Food System Orgs are using to increase efficiency around logistics	3	3
Culture of food	Culture around food, what it means to people, how people are gaining more respect for food workers	4	6
Respect for workers	Change in respect for food workers	1	1
Differences in Impact	Differences in the Impact of COVID-19 on food security in terms of location, demographics and from previous disasters	0	0
Differences between disasters	Difference of COVID-19 Impact from other disasters that have affected the NYC food system	5	5
Most vulnerable groups	Most vulnerable groups/areas in terms of food security and how COVID-19 impacted it	0	0

Boroughs	Most impacted boroughs in terms of food security and COVID-19	13	21
Demographic	Most vulnerable racial and socio-economic groups hit with increased food insecurity because of COVID-19	37	59
Exposure of existing problems	Existing problems in the NYC food system revealed by COVID-19	14	18
Disconnects between food system actors	Exposure of disconnects between food system actors that the COVID-19 crisis that had revealed	3	3
Food Insecurity	Food Insecure definitions/ aspects found in articles	10	10
Definitions	Food Insecurity Definitions Found	7	7
Four pillars	Four Food Insecurity Pillars	10	13
1. Access	- Income - Purchasing Power - Transfer - Market Infrastructure - Food Distribution within households - Gender Issues	10	13
2. Availability	- Crop Production - Import Capacity - Efficient Water use - Food Stocks - Trade - Food Aid	0	0
3. Stability	- Weather variability - Price Fluctuation - Political Factors - Economics Factors	0	0
4. Utilization	- Food preparation and nutrition behavior - Cultural tradition - Knowledge, standards - Health status - Hygiene - Care opportunities - Diet Quality	4	4
Government Response	Federal, State, City response to COVID-19 caused food insecurity	10	11
City	City response to food insecurity caused by COVID-19	22	37
Failures	Failures in Government response to food insecurity in NYC	12	15
Federal	Federal response to food insecurity caused by COVID-19	16	19
Need for funding	Emergency orgs/ non-profits/ mutual-aid groups appealing to the government for funding	6	6

Appendix C: Final Codebook

| NAME OF CODE	CODE DESCRIPTION	Files	References
Current COVID-19 Regime Dynamics of NYC's Food System	*How NYC's food system regime operated when the COVID-19 pandemic hit*	**73**	**208**
I. Food Insecurity	Food Insecurity Definitions/ Aspects Found in Articles	26	34
i. Definitions	Food Insecurity Definitions Found	7	7
ii. Four pillars	Four Food Insecurity Pillars	13	17
1. Access	- Income - Purchasing Power - Transfer - Market Infrastructure - Food Distribution Within Households - Gender Issues	10	13
2. Availability	- Crop Production - Import Capacity - Efficient Water use - Food Stocks - Trade - Food Aid	0	0
3. Stability	- Weather variability - Price Fluctuation - Political Factors - Economics Factors	0	0
4. Utilization	- Food preparation and nutrition behavior - Cultural tradition - Knowledge, Standards - Health status - Hygiene - Care opportunities - Diet Quality	4	4
II. Burden on Emergency System (EFS)	Increased Reliance of NYC Residents on the Emergency Food System Throughout the Pandemic	44	89
i. Before & After Changes	Numbers/ Situation of Emergency Food System Before vs. After the Pandemic Hit	13	14
ii. Emergency Food System Organizations	Food Banks, Food Pantries, Mutual Aid Groups, Non-profit all geared towards easing food insecurity	21	34
iii. Failures & Issues	Failures and Issues That the NYC Emergency Food System Faced From COVID-19	9	16
1. Closures	Food Bank or Pantry Closures	5	5
2. Lack of Volunteers	Lack of Volunteers Due to Illness, Age, or Just Unable to Meet Demand	3	3

3. Lines	Reports of Long Lines for Emergency Food System Organizations	16	20
vi. New People Relying EFS	Reports of New People Relying on Emergency Food System	4	7
v. Shame Around Using Emergency Food System	Feelings of Shame Around Using the Emergency Food System	2	2
vi. Technology Used	Technology Emergency Food System Orgs Are Using to Increase Efficiency Around Logistics	3	3
III. Differences in Impact	Differences in The Impact Of COVID-19 On Food Security in Terms of Location, Demographics and From Previous Disasters	45	85
i. Differences between disasters	Difference Of COVID-19 Impact from Other Disasters That Have Affected the NYC Food System	5	5
ii. Most vulnerable groups	Most Vulnerable Groups/Areas in Terms Of Food Security And How COVID-19 Impacted It	42	80
1. Boroughs	Most Impacted Boroughs in Terms of Food Security And COVID-19	13	21
2. Demographic	Most Vulnerable Racial and Socio-Economic Groups Hit with Increased Food Insecurity Because Of COVID-19	37	59
Responses & Exposures in the NYC Food System to COVID-19	*Actor responses to the COVID-19 pandemic and exposures of exiting problems in the food system*	60	147
I. Exposure of existing problems	Existing problems or inequities in the NYC food system exposed by COVID-19	16	20
i. Disconnects between food system actors	Exposure of Disconnects Between Food System Actors That The COVID-19 Crisis That Had Revealed	3	3
ii. Education System	Role the Education System Plays in Achieving Food Security for Vulnerable Groups/ Inequities Within It	13	23
iii. Supply Chain Problems	Food System Supply Chain Problems Resulting From COVID-19	3	3
II. Government Response	Federal, State, City response to COVID-19 caused food insecurity	47	93
i. City	City response to food insecurity caused by COVID-19	22	37

ii. Federal	Federal response to food insecurity caused by COVID-19	16	19
iii. State	State response to food insecurity caused by COVID-19	11	20
iv. Need for funding	Emergency orgs/ non-profits/ mutual-aid groups appealing to the government for funding	6	6
Explicit and Implicit Vision Expectations	*Themes of implicit and explicit restructuring and realigning visions among NYC food system actors*	57	160
I. Landscape	Landscape level	5	8
i. Actor Groups	Projections of Future Context Conditions as Shared With Specific Actor Groups	0	0
ii. Collective	Broad Societal Visions About the Future (Science Fictions and Utopias)	0	0
iii. Individual	Individual Beliefs About Long-Term Trends	5	8
1. Change in Diet from Pandemic	Increased Focus on Health and Nutrition Resulting from Pandemic	1	1
2. Culture of Food	Culture Around Food, What It Means to People, How People Are Gaining More Respect for Food Workers	5	7
3. Respect for Workers	Change in Respect for Food Workers	1	1
II. Niche	Niche Level	30	75
i. Actor Groups	Hopeful alternatives preferred by certain actor groups	14	24
1. Food Pantry Preferred Alternatives	Food Pantry Group Preferred Alternatives	1	7
2. New Partnerships Between Food System Actors	Partnerships Between Actor Groups that Imply Preferred Restructuring Alternatives	13	17
ii. Collective	Sectoral or national priorities in innovation policy to support "promising" technologies	8	13
1. Policy Changes Recommendations	Ideas About Policy Change That Is Needed Going Forward from Food System Actors	8	13
iii. Individual	Individual Assessment of Development Potential for Specific Innovative Technologies and Products	13	38

1. Community Urban Farms and Gardens	Individual Assessment of Community Urban Farms and Garden Potential	5	14
2. Free Food Fridges	Individual Assessment of Free Food Fridges Potential	8	24
III. Regime	Regime Level	37	63
i. Actor Groups	Expectations Shared Within Specific Actor Groups (E.G., Associations of Electric Utilities About Future Sector Structures)	11	15
1. Pathways Forward	Envisions of The Future to Create A More Sustainable Food System In NYC	11	15
iii. Collective	Broadly Shared Visions About Future Sector Structures	20	33
1. Collective & Community Working	Ideas That Pathways to A Sustainable Food System Should Be Focused on Community And Collective Paradigms	20	33
ii. Individual	Individual Believes About Ability of Regimes to Respond to External Pressures	12	15
1. Beliefs About Ability of Regime To Respond To Pressure	Failures in Government response to food insecurity in NYC	12	15
IV. Barriers to Visions	Bottlenecks or challenges to achieving expected visions	10	14
i. Barriers to Pathways Forward	Barriers to sustainable food system pathways forward in NYC	8	12

Appendix D: Regime-Collective Level Articles

Figure D-1: Articles Containing Thematic Visions of a More Collective & Community-Based Food Sector
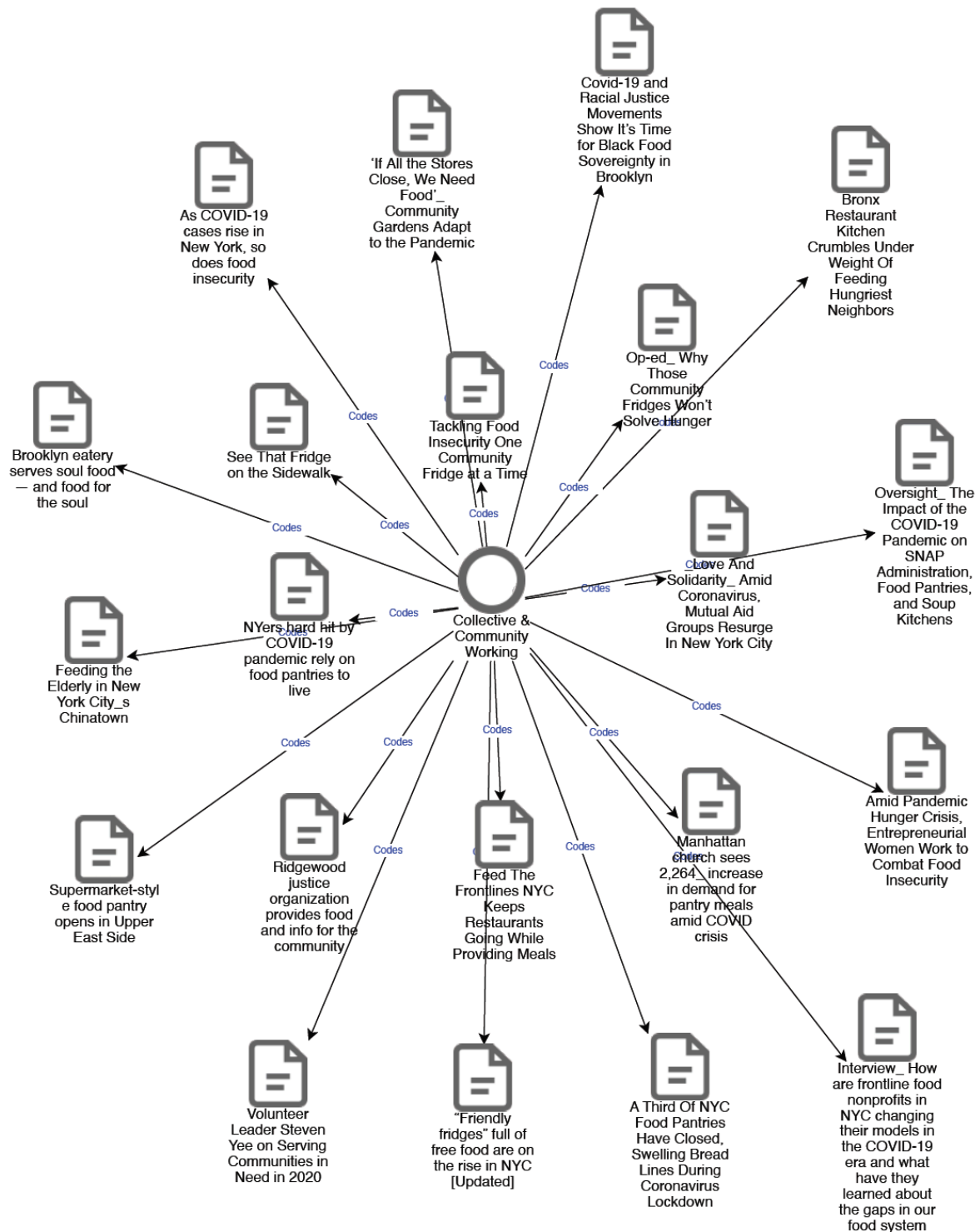
Appendix E: Niche-Individual Level Articles Breakdown by Code
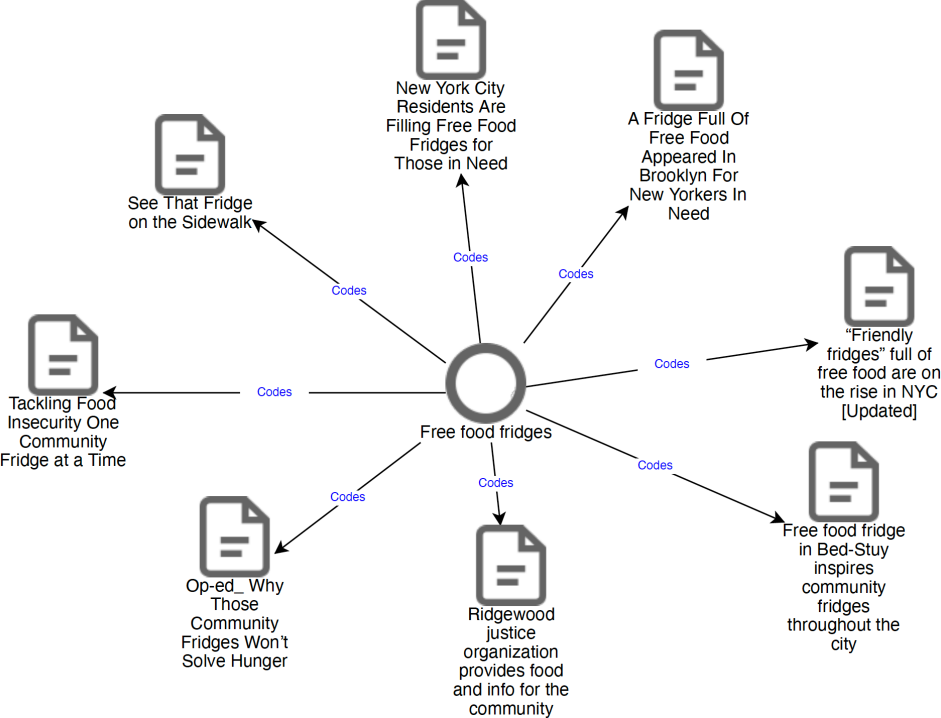
Figure E-1: Articles with Free Food Fridge Codes

Figure E-2: Articles with Community Urban Farm & Garden Codes