

FoodMap NY

Leveraging Private-Sector Innovation
and Investment for Food Security

RESEARCH SPOTLIGHT REPORT

Supply Chain & Infrastructure

November 2024



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Introduction

More than 44 million Americans experience food insecurity today, including more than 2.2 million people in New York State alone. Despite decades of government and philanthropic efforts, levels of food insecurity continue to rise, depriving millions of a decent quality of life, and costing our nation billions in preventable health care expenses.¹ In response to this crisis, federal and state leaders have called for private sector collaboration to improve food access and affordability; integrate nutrition and health; empower consumers to make, and have access to, healthy choices; support physical activity for all; and enhance nutrition and food security research.²

The NYU Stern Center for Sustainable Business, in partnership with Cornell University, and with the support of Mother Cabrini Health Foundation, sought to better understand where private sector interventions and investment could enhance food and nutrition security in New York State (NYS).

Research was conducted between April 2022 and May 2023 to assess current knowledge, efforts, and opportunities for private sector engagement in six focal areas:

1. Controlled Environment Agriculture
2. Supply Chain & Infrastructure
3. Healthy Food in Retail Environments
4. Food and Nutrition Assistance Programs
5. Food as Medicine
6. Food Finance

This report focuses on research and opportunities in the area of **Supply Chain & Infrastructure**. Food hubs serve to connect local producers to markets—including wholesale buyers, institutions, and processors—through a range of functions such as product aggregation, storage, processing, and distribution; technical assistance to farms and food businesses; and farm-to-institution programs involving schools and hospitals. Enhancing food-hub capacity and coordination, as well as investing in key points along the food supply chain, have significant potential to both address the needs of farmers and producers, and improve access to nutritionally rich regional food products.

Separate reports for each of the other areas are available here:

[view resources](#)

Background

The United States Department of Agriculture (USDA) defines a food hub as “a centrally located facility...that support the aggregation, storage, processing, distribution, and/or marketing of regionally produced food products.”³ The reality of food hubs, however, is much more complex. Food hubs can act as middlemen in the food distribution system, connecting local producers to wholesale buyers. Many food hubs often manage the collection, processing, and distribution of regional ingredients, and in some cases provide rural farmers with supportive services—such as marketing and sales assistance, food storage, and operational management—to help them expand their businesses.

As an example, Meals on Main Street is a publicly funded 501(c)(3) nonprofit that works within the transportation/distribution component of the supply chain, with a focus on reducing food waste. While not necessarily a traditional food hub, Meals on Main Street’s operations align with the goals of a food hub—namely, to sustain the continuous and efficient flow of food to end-stage distributors. Many food hubs in NYS also explicitly work to incorporate equity initiatives into their approach, such as by connecting farmers directly to underserved communities, or by redistributing excess food efficiently to avoid waste and alleviate hunger.

Food hubs and their counterparts (wholesale distributors, farmer coalitions, and market authorities) all support the delivery and distribution of locally grown food across the state. Many of these institutions were founded in the wake of the Great Depression, as a result of federal policies intended to build local food centers—a history that several of the organizations we interviewed spoke about with immense pride. But the age of these institutions has begun to hinder their ability to adapt to a modern marketplace. Shifting demand, combined with the need to adapt to shifting labor practices and food safety laws, aging infrastructure at food hubs exacerbates this issue in NYS. As a result, the survival of these critical components of our food system is threatened and must be addressed.

Funding represents a clear challenge for both larger hubs like the Genesee Valley Regional Market Authority and smaller organizations like the Central New York Regional Market Authority (CNYRMA) or the Plum & Mule Community Market. The factors impacting funding limitations are as varied as the definitions of food hubs themselves. Based in Syracuse, the largely self-funded CNYRMA is a retail-wholesale market that facilitates the collection and distribution of food. As a nominal state authority and public benefit corporation, CNYRMA is ineligible to receive much public funding or partake in philanthropic funding opportunities. In the wake of the COVID-19 pandemic, this lack of public funding hit the organization especially hard, leading to the suspension of CNYRMA programs that help combat food insecurity in Central New York (CNY).

While some hubs are organized as nonprofit organizations, enabling them to seek grant funds to cover their expenses, many distribution centers operate as for-profit entities, making them ineligible for grant funding. These for-profit hubs may take a portion of sales or charge rent to producers who use their space, but these approaches rely heavily on the vitality of local markets and the ability to sell regionally. The intense draw of New York City (NYC) and other downstate markets is both a blessing and a curse for for-profit hubs. On the one hand, it provides opportunities for farmers to sell their produce within a huge and demanding market. On the other, it diverts resources away from central and northern regions of the state. As a result, it is challenging for consumers in those regions to access regional produce, driving up food insecurity and putting immense pressure on farmers to transport their wares hundreds of miles away rather than selling closer to home.

CNY is one of the largest food producing regions in the state, generating over \$670 million in annual sales. Nearly half of the land in this region is classified as prime farmland, and a significant number of food hubs and distribution centers are located in the region, to assist with the distribution of agricultural products. However, connections between CNY agricultural producers and consumers have broken down over the last several decades. These “last mile issues” pose a significant challenge. Significant demand and ability to pay for produce downstate in NYC, coupled with the loss of local processing capacity upstate—due to the proliferation of multinational corporations that overtake retail operations and transportation pathways—have created an environment where food is removed from communities in need. While this challenge can potentially be addressed by further supporting regional foodways and farmers markets, there is a clear need for investment to build distribution and transportation capacity that keeps food local.

Nonprofit food hubs face a different set of obstacles, while still grappling with limited administrative resources and staffing challenges that might restrict their capacity to secure funding. These organizations do at times compete with for-profit hubs for financial capital, but the former are often limited in their scope due to their reliance on external funding to accomplish their goals. While competition for resources can present a problem for both for-profit and nonprofit food hubs, the lack of coordination and partnership among food hubs is a much larger issue. These gaps in service cause food to fall through the cracks, leading to wasted products and ultimately harming both producers and the food’s intended recipients.

Defining the Opportunity

There is a clear desire and urgency from food hubs and distributors to modernize their operations and build stronger marketplaces for farmers and producers. Addressing the needs of both farmers and food hubs by improving their ability to sell, distribute, and market their wares also has significant potential to improve consumer access to food. Several conversations with stakeholders in this space highlighted innovative ideas for how to connect community members in need of food with the farmers who are able to provide it, while also ensuring that farmers are adequately compensated for their labor. At the heart of many of these ideas stands an impressive commitment to community building and regional foodways.

Food hubs are, at their heart, regionally based organizations with deep, place-based roots. As such, opportunities abound for local entrepreneurs who are equally invested in building up the value and infrastructure of their own communities to step in and provide support where it is needed.

Current Food Hubs in NYS include:

Food Hub Name	Location	Legal Status	Year Founded
Brady Market	Syracuse	Hybrid Nonprofit, LLC	2021
Capital Roots	Troy	Nonprofit	
Catskills Food Hub	Liberty	Nonprofit	2018
Central New York Regional Market Authority (CNYRMA)	Syracuse		1935
Corbin Hill Food Project	Schoharie	Nonprofit	2009
Eden Valley Growers/Western New York Food Hub	Eden		
Essex Food Hub	Essex		
Farmshed Harvest Food Hub	Syracuse	S Corp	2013
Field Goods	Athens	LLC	2011
Foodlink	Rochester	Nonprofit	2012
Genesee Valley Regional Market Authority	Rochester	Nonprofit	1951
Glynwood	Cold Spring	Nonprofit	
GrownBy			
GrowNYC New York State Regional Food Hub	Bronx	Nonprofit	Underway
Headwater Foods, Inc	Rochester	S Corp	2008
Hudson Valley Farm Hub	Hurley		
The 607 CSA	Hamden	LLC	2013
Meals on Main Street	Port Chester	Nonprofit	2013
North Star Food Hub	Lyons Falls	Nonprofit	2018
Plum & Mule Community Market	Syracuse	LLC	
Regional Access	Ithaca		1989

Key Learnings From Stakeholder Interviews

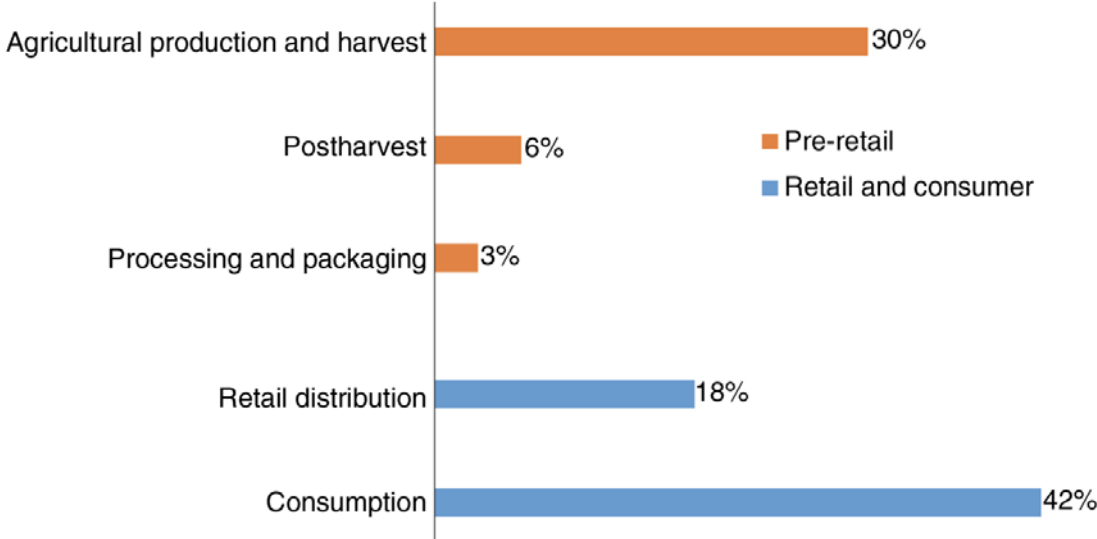
We conducted interviews with 12 stakeholders in the food infrastructure space, spanning traditional food hubs, market distributors, farm hubs, and collectives. From these, we determined two key areas of learning and opportunity: 1) infrastructure and cold storage needs, and 2) access to networks. Across both of these areas, access to capital, the desire to modernize, and the importance of partnering directly with farmers and producers were common themes that could be addressed by private investment.

Infrastructure and Cold Storage Needs

Food hubs provide storage and distribution of frozen food, produce, and dry goods. Many wholesale food hubs and market distributors in NYS utilize infrastructure that has remained relatively unchanged since the 1930s. Several industries cite a need for improved post-harvest infrastructure, product handling, and/or processing in order to find markets for food products,⁴ and improvements in transportation, cold storage, and other supply chain factors may improve New York's ability to compete.⁵

The lack of cold storage, and its consequences for perishable food waste, is part of a nationwide issue: the USDA estimates that 31% of food harvested in the U.S. goes to waste, representing over 130 billion pounds of food.⁶ An estimated \$161.6 billion in food is uneaten every year.⁷ Moreover, a significant share of food harvested by producers is not sold by distributors due to a lack of refrigeration infrastructure, which would decrease the occurrence of food spoilage before food reaches retailers and consumers.

Estimated food loss for fruits and vegetables in North America throughout the supply chain



Note: Number do not add to 100 due to rounding. Product loss is estimated by weight.
Source: USDA, Economic Research Service using data from the Food and Agriculture Organization of the United Nations, 2011.

Agricultural production and harvests generate the second-largest share of food loss for fruits and vegetables in North America at 30%, followed by retail distribution at 18%. According to the estimates shown above, more than half of all food loss for fruits and vegetables—which are highly perishable but critical for communities struggling with poor diet and food insecurity—occurs before these products even reach the consumer.⁸

There are many complex reasons why and how this food is lost, but one challenge is the inability to support the transportation of these products across shorter distances, to reach communities with the greatest need. In NYS, this issue is exacerbated by food hubs' aging infrastructure. Ineffective cold storage facilities and distribution infrastructure create a host of inefficiencies that lead to wasted food, lost investment, increased greenhouse gas emissions, and greater food insecurity throughout the region. Food hubs rely on their ability to effectively collect and distribute wares to wholesalers and retailers. They may also support distribution at farmers markets or to families in need of food assistance. When these processes are interrupted, food—especially produce—quickly begins to spoil.

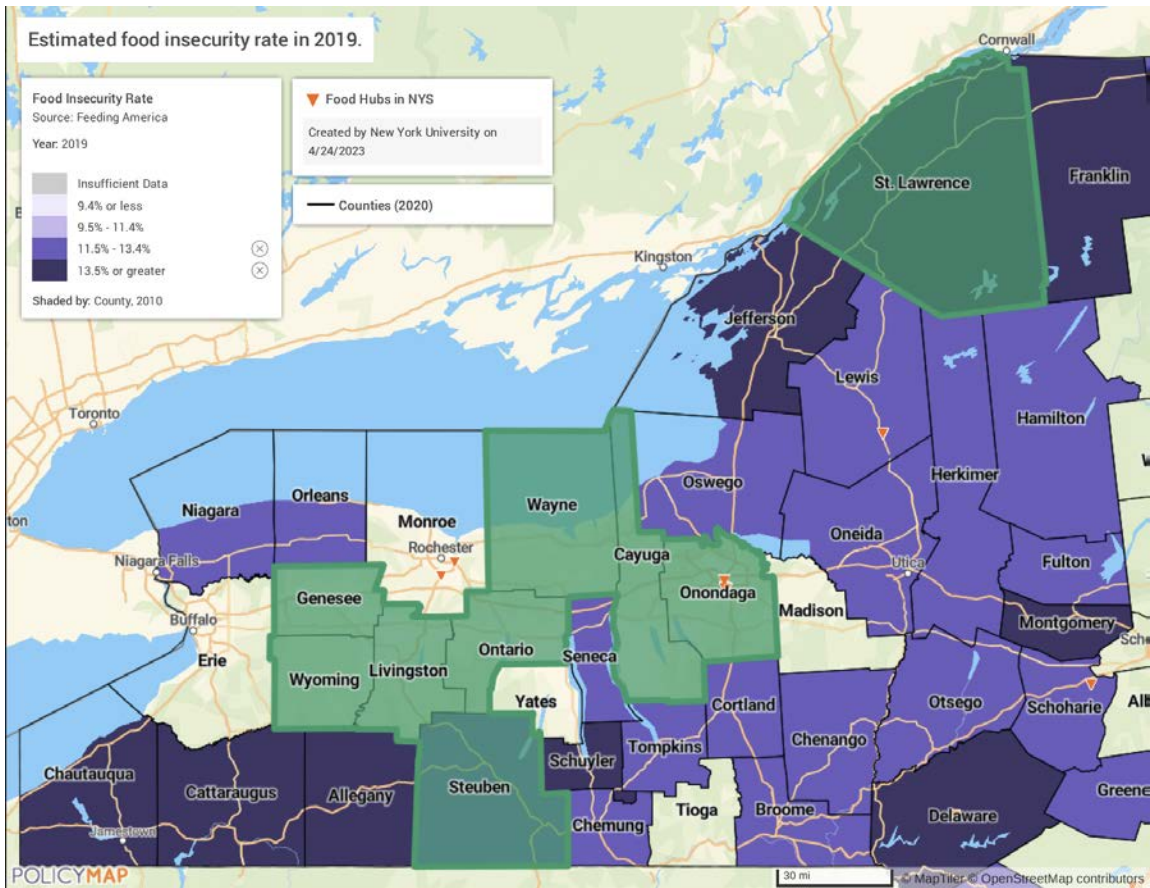
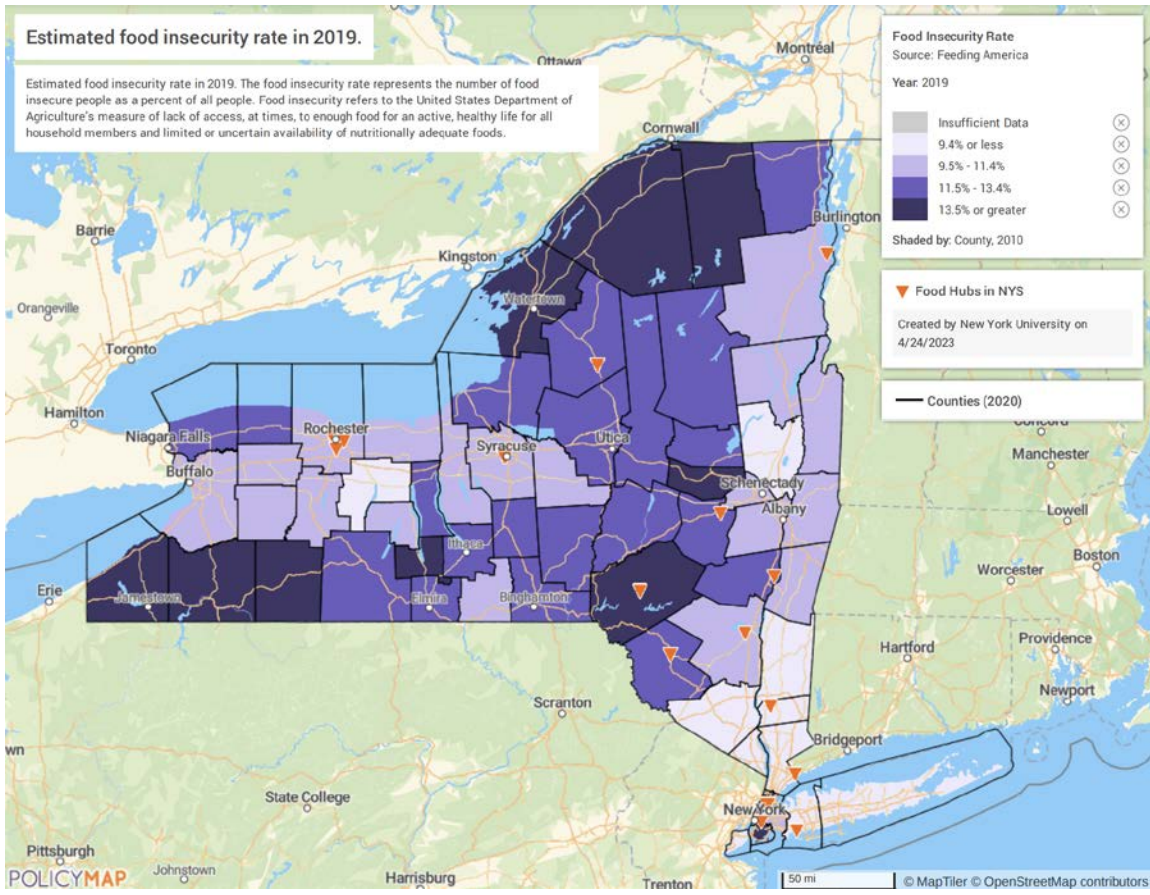
The pressure, felt especially by small farms, to secure a premium price that can earn them a profit and get food to buyers as quickly as possible is partially what drives business away from aging local food hubs and towards hubs with more resources and better infrastructure, such as those located downstate and in NYC. The pressure to distribute exclusively within NYC, which is home to a thriving market where farmers can fetch premium prices for their wares, also draws regional food away from where it's grown, making it more challenging for local communities that are struggling with food insecurity to access local products. Many stakeholders in this space spoke to the irony of being located in rich growing areas that produce significant amounts of food, but seeing that food is rerouted away from their communities.

These conditions make it extremely challenging for distributors, however well meaning, to think beyond meeting their bottom line, let alone partnering with community-based organizations to distribute excess food or locally grown food to those in need. Many of the food hubs we interviewed have limited refrigerated and frozen food storage space, making it even more difficult to store produce effectively. Timing precision and effective storage allocation systems are vital components that significantly impact the success of efforts to mitigate food waste. Fresh fruits and vegetables, for instance, may be sourced locally and sold directly to consumers at farmers markets or through community-supported agriculture (CSA) programs, but these outlets require significant administrative capacity and person-power to coordinate. They also do not provide the kinds of profit margins that farmers can get from wholesale.

Reconciling the abundance of food with the lack of modern and efficient ways to get it into the region and keeping it there is a problem for regional food producers and distributors. Existing food-hub infrastructure, as well as established transportation routes and a limited ability to store food regionally, make keeping food local an uneconomical prospect for farmers. Without effective storage or transportation infrastructure, farmers risk their products going bad or not getting sold in time. While these communities near farms certainly wish to have access to healthy, locally grown produce and other desirable goods, the power of the market makes it difficult. Glynwood, a center for regional food and farming based in Cold Spring, mentioned that farmers are often frustrated by having to bring their food into cities instead of supporting their local communities, but while transporting their food to far-flung locations can be costly, the appeal of having a stable flow of income makes it hard for farmers to make different choices.

Moreover, existing food hubs are scattered unevenly across the state. While food-hub access is pivotal to the equitable distribution of food, most food hubs in NYS are located in the eastern half of the state, where there are comparatively fewer agricultural producers but a higher preponderance of smaller farms.⁹ Foodlink, the Genesee Valley Regional Market Authority, the Headwater Food Hub, and Regional Access are all located in New York's Finger Lakes region, which has seen a high turnover of food hubs over the last few decades. This suggests their uneven allocation, considering that a disproportionate number of rural residents live in areas that lack adequate access to affordable locally grown food; interestingly, these areas possess some of the highest proportions of agricultural land in NYS.





Many of the counties with the highest rates of food insecurity border and/or are among the most profitable in terms of overall farm sales.¹⁰ USDA data displayed in figure 9 shows that eight of the top ten counties in total farming sales are clustered in western regions, particularly the Finger Lakes (5), Central New York (2), and Western New York (1). Of the top-10 most agriculturally productive counties, nine are located in Upstate New York and border one or more counties enduring a food insecurity rate greater than 11.5%.

For generalized representations of NYS agricultural land, Cornell University’s Institute for Resource Information Sciences (Cornell IRIS) and the NYS Department of Agriculture and Markets’ (NYS DAM) interactive geospatial [mapping tools](#) display the locations of all agricultural districts, both statewide and by county.¹¹

Approximately 20% of NYS’ land area is used for farming, which generates approximately \$3.3 billion in revenue. However, rural communities continue to record high rates of food insecurity.¹² A significant share of the rural NYS population is located in areas that have attracted relatively little investment in food processing and manufacturing.

Investment in cold chain and cold storage technologies has emerged as a key priority for markets, food hubs, farmers, wholesale coalitions, and depot centers. Market hubs need support updating their buildings and infrastructure, to address new safety regulations and accommodate vans and trucks in spaces that were previously intended for trains, horses, or carriages. When building infrastructure breaks down, funds that might otherwise be allocated to expand programs that address food insecurity, provide market space for new farmers, offer community resources get shifted to focus on immediate repairs.

Figure 9. Top Ten Counties for Farming in New York by Sales, 2017

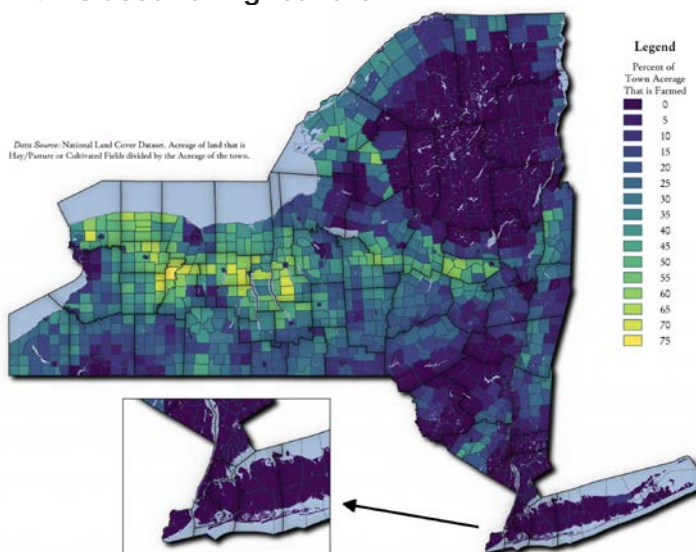
	Total Sales (Millions)	Number of Farms
Wyoming	\$307.5	729
Cayuga	\$287.9	842
Genesee	\$234.9	485
Suffolk	\$225.6	560
Wayne	\$221.3	829
Ontario	\$205.2	833
Steuben	\$195.9	1,542
St. Lawrence	\$191.1	1,253
Livingston	\$183.7	661
Onondaga	\$178.5	623
Total Top 10 Counties	\$2,231.6	8,357
Total New York State	\$5,369.2	35,537

Source: U.S. Department of Agriculture

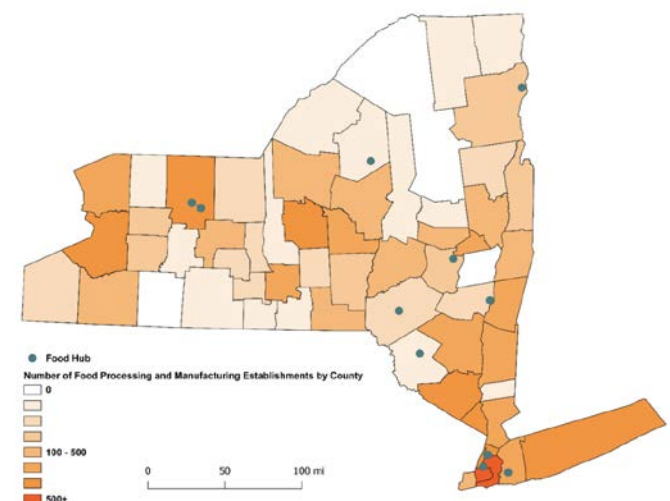
“What I hear from my partners in the field is that [one of] the major challenges is storage. Cold storage, [...] storage in general, [as well as] distribution, getting the food where it has to go and also food quality. Cold storage. Cold storage is major.”

MEGAN LARMER, GLYNWOOD

Percent of Town Landmass that is used for Agriculture



Map of current processing facilities and food hubs in New York State



The staff of Glynwood noted that there is also an opportunity to integrate cold chain technology and storage into delivery logistics. Refrigerated trucks, improved transportation vehicles, and the use of cold storage in community facilities could support a more equitable system, ensuring that farmers are able to adequately sell their produce, and that the produce makes it into the hands of local community members who are in need of food. There are, however, concerns that these upgrades represent a significant expense for organizations that are already struggling to make do with limited funds.

Managing distribution requires investment, not only in cold chain infrastructure and the infrastructure of the buildings where markets take place, but also in the systems that allow market managers to oversee what is getting sold, when, and where. For instance, a source of frustration in the transportation portion of the supply chain is the volatile pricing of transport, specifically fuel and labor.¹³ This volatility makes it hard for farmers and food hubs alike to have a clear understanding of the costs associated with sending products to cities. As a result, their already slim margins are eroded by the inability to forecast standardized pricing for overhead. Along with optimized transportation routes, improved technology, such as cold storage, could go a long way toward avoiding bottlenecks. Investment in cold storage would allow for stronger community development of programs and infrastructure to support local foodways, while also reducing food waste and ensuring that community members have a dignified and accessible opportunity to purchase food grown in their regions.

Ultimately, many of these changes will require upgrades to infrastructure. Materials and products to support better efficiency and longer preservation exist, but they are not always accessible at smaller food hubs and distribution centers due to prohibitive costs.

Networking and Industry Coordination

For distributors, pressure from retailers and producers to sell their food makes it nearly impossible to think much beyond meeting projected marks, let alone partnering with community-based organizations to distribute excess and/or locally grown food to those suffering from food insecurity. This does not suggest that there is a lack of strong need for supply partnerships and better industry coordination. Throughout our interview data, numerous stakeholders called for greater networking. Many argued for the importance of partnerships/coalitions to withstand obstacles within the supply chain.

Some organizations have expressed the need for greater cooperation within and between coalitions. In many instances, lack of knowledge has proven to be a large barrier to market entry among new farmers. Cooperatives like GrownBy base their work on establishing connections between farmers and customers, and improving access to public sector certifications, which may be necessary to sell and label food as organic in large scale wholesale and grocery stores.

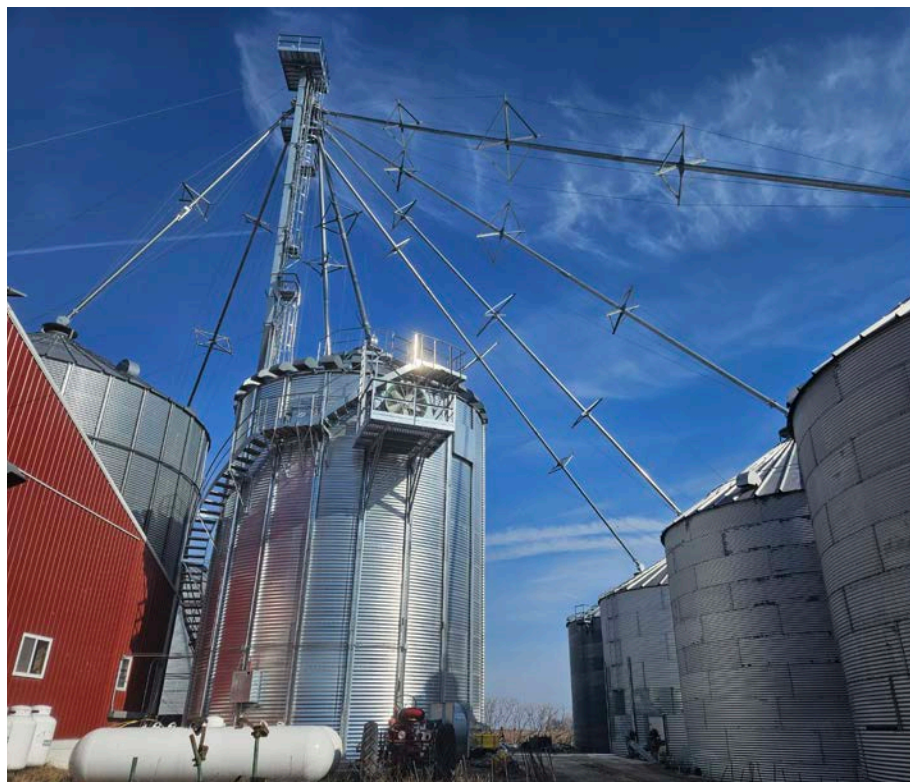
While some food hubs are keen to operate on multiple levels of the supply chain, some organizations recognize the need to restructure the food system to facilitate better cooperation between local producers and food hubs, and across food hubs, to address food insecurity, especially in light of challenges surrounding the swift distribution of perishable food items. Such concerns have necessitated greater focus on establishing new lines of communication between hubs through initiatives like Rensselaer Polytechnic Institute's local food cooperation (LFC) program. The Rensselaer project aims to create a network of state-level food hubs in NYS that enable coordination of multiple regional food hubs, and regional farm to institution programs that address regional food insecurity and inequity.¹⁴

Cornell Cooperative Extension's (CCE) Harvest New York project recently established the NY Food Hub Collaborative as a way to explore opportunities for food hub collaboration—to meet consumer demand, decrease overhead, and move product with greater ease. Currently in its development phase, the collaborative includes food hubs as well as partners such as the Center for Agricultural Development & Entrepreneurship (CADE) and Syracuse University. This need and concept is not unique to NYS, as demonstrated by the successful development of the Michigan Food Hub Learning and Innovation Network, a food hub collaborative led by Michigan State University.

Glynwood and Meals on Main Street are two food hubs in Upstate New York that have ardently supported greater cooperation, arguing that it is necessary for alleviating critical bottlenecks in the supply chain. Glynwood has shown strong support for reforming the food industry, insisting that working across systems to form partnerships with existing organizations that improve coordination within the supply sector, which could enhance efficiency in food distribution. According to a 2022

NYS report on consumer food access, food hubs that effectively streamline the supply chain also significantly reduce the time needed to preserve food, especially when it comes to “last mile” food distribution where capital infrastructure (e.g., trucks) is limited.^{15, 16}

Meals on Main Street, in particular, places a heavy focus on the food mobility and transport aspects of the supply chain. While the nonprofit has also expressed the great need for cold storage technology, Meals on Main Street has treated the problem as one that hinges not only on access to capital but also on the pace at which food is supplied to end retailers. Executive Director Bill Cusano reimagined the traditional conceptualization of a food hub, describing their organization as “more of a fountain rather than a pool.” In a sense, the current system is designed to encourage businesses to vertically integrate their supply systems.



For many food hubs, the emergency feeding system used during the COVID-19 pandemic was purely an emergency response. Organizations like Glynwood, however, recognize that emergency procedures dedicated to supporting vulnerable rural populations have a strong potential to be developed into a sophisticated system, with a network of food procurement specialists who ought to be compensated for their expertise. Some organizations, like the Genesee Valley Regional Market Authority, have conducted studies and taken up political action initiatives to advocate for better food policy in Upstate New York.

Insufficient networking capabilities in rural environments have made it difficult for organizations to obtain labor or provide essential services to smaller vendors/farmers. Many of the centers we talked to have secured funding via grants, but many lack the necessary human capital to support local farmers. For example, GrownBy is facing a shortage of R&D and marketing workers. This barrier imposes further impediments to its mission of connecting farmers with the resources needed to secure the flow of food. Furthermore, some food businesses have reported product sitting at food hubs due to a lack of the necessary marketing and brokerage relationships needed to move it, resulting in the offloading of old, less desirable food that are close to expiration and do not fully represent the freshness and quality of local food.

Organizations like CNYRMA and the Genesee Valley Regional Market Authority together serve hundreds of producers and wholesalers; both, however, have experienced similar challenges with insufficient staff in recent years. In light of the COVID-19 pandemic, organizations like these have been forced to move much of their operations, particularly administrative work, online. Not only does this pose an added obstacle, forcing many food hubs and producers to navigate new online systems in order to meet the pressing demand for food, but it has also cast a sharp light on the lack of means/support for performing administrative tasks. According to the NYS Department of Labor, food industry employment (i.e., agriculture, forestry, fishing and hunting) in 2020 was approximately 144,400 jobs, which represents approximately 1.5% of the state's total employment.¹⁷ If however, we include direct and indirect food-related services (i.e., food manufacturing, wholesale and distribution, and retail), food industry employment made up approximately 12.1% of the state's total employment.

As of April 2021, the NYS Department of Labor reported a 21.8% decline in employment in the accommodation and food services industries compared to the previous year, as a result of the COVID-19 pandemic.¹⁸ While these percentages vary depending on the ways in which we define the food services industry, COVID-19 created unprecedented challenges, resulting in mass unemployment among most hands-on labor sectors.

At the same time, insufficient broadband access continues to pose a large obstacle for food hubs and rural workers in Upstate New York, making it hard for them to connect to farms and regional food hubs/distribution. Investing in broadband infrastructure and supporting technology training initiatives in NYS would likely mitigate connectivity barriers for local producers, farmers, and small businesses.

We identified two additional issues facing food hubs and other food distribution centers: 1) investment being funneled into new and emerging food hubs that do not have a long-term economic sustainability plan, and 2) long-established food hubs lacking the means to modernize to the same extent that newer organizations do. First, while the overall five-year survival rate of food hubs is relatively high, at 88% compared to 53% for all new businesses, a key factor behind food hub closure is a lack of a solid financial foundation and the amount and types of capital to support growth as well as provide a buffer for challenges.¹⁹ While grant funding and in-kind contributions of free warehouse space and labor can help support emerging food hubs, long-term sustainability entails being able to support costs through the business itself.²⁰

The second point is illustrated by the case of CNYRMA. Established during the New Deal, CNYRMA brings together retail and wholesale food businesses to facilitate sales. Most of the organization's revenue is raised through its wholesale services and by renting out space to local vendors, but this revenue is not sufficient to fully support the market's operational costs. As CNYRMA Executive Director Amanda Vitale notes, established markets and wholesalers like CNYRMA, often suffer from a lack of investment. On the other hand, newer food hubs and businesses may attract funding, despite lacking much of the knowledge or connections necessary to sustain their long-term operations.

“We have even seen the same person obtain grant funding for another start-up food hub, only a couple [of] years after [a] failed startup funded by a grant.”

AMANDA VITALE

Summary of Stakeholder Learnings

Food hubs represent a unique opportunity for private industry interested in streamlining foodways and getting products to consumers more efficiently. The most obvious opportunities lie in untapped markets that food hubs and distribution centers indicate could address gaps in their ability to function efficiently. Investment in cold storage and improved infrastructure is a potential avenue that private sector manufacturing, transportation, and refrigeration firms might consider exploring.

The USDA acknowledges that equipment malfunctions (as well as over-ordering and the culling of blemished produce) can result in extensive food loss. Investing in and updating equipment is a basic intervention by private markets that could lead to significant reductions in lost or wasted food. As noted above, produce is particularly challenging due to the nature of the product—which is more susceptible to spoilage, often requires refrigeration, and may become blemished or further degraded if it is not effectively and efficiently moved on time.

Mechanisms to incentivize the distribution and growing of produce are limited, while much U.S. food policy offers subsidies for the grains, soy, and corn used for animal feed and the creation of processed shelf-stable snack foods. Though farmers are motivated to continue growing fresh produce and sell their wares to their local communities, aging infrastructure and the resulting distribution barriers it poses cause challenges in this market.

Suggestions for Action

Proprietary Solutions

Private industry could explore ways of making cold storage and infrastructure solutions available to smaller hubs via unique pricing options, low-cost or no-cost loans, or rental fees that could allow these hubs to gain access to produce-saving cold chain technology while still helping out their bottom lines. Food hubs could provide new farmers with cold storage and other types of infrastructure they lack. Additionally, both food hubs and private investors could play an instrumental role in removing structural barriers in the current food system, helping local food systems become fairer and inclusive. For example, GrowNYC is constructing the NYS Regional Food Hub, a 60,000-square-foot cold storage facility that will benefit local farmers and underserved neighborhoods in NYC. For regional farmers in NYS who have been constrained in their ability to reach wholesale buyers in NYC, this hub will provide the opportunity to expand their range and earn more revenue.

There is a clear opportunity for private investment to support cold storage solutions. Interest in the development of proprietary solutions that meet the needs of food markets could lead to the domination of this market. Emerging research²¹ emphasizes the growth of new freezing technologies, such as supercooling, that allow for better and longer food preservation. Automated technology²²—to help with processing deliveries and payments, streamlining the end-user experience, and managing this work remotely—could allow for more efficient food processing and delivery. Inventions that can track and update the temperature of storage facilities remotely could present a huge boon to this industry.



From our interviews, we learned that many stakeholders in this space are eager for solutions to the infrastructure problem but they are struggling to make the business case for why private investors should support this capital investment. Beyond marketing and social capital opportunities, there may not be enough market incentives outside of philanthropy to drive this work forward. Materials and products that support better efficiency and longer preservation exist, but smaller food hubs and distribution centers are not always able to access them, due to prohibitive costs. There is an industry-wide opportunity to innovate new products and be the first to create a system-wide solution that connects farmers and markets more efficiently. A potential model may be a public-private partnership that connects the existing network of publicly funded CCE offices with logistics and aggregation expertise. Anecdotally, one food hub owner interviewed by CADE suggested that attaches a cold storage facility to each county or regional CCE office would provide farmers with a place to drop off their products.

Mapping and Network Building

Early-stage start-ups such as [Permanent](#) and [GrownBy](#) are using technological solutions to better connect farmers and distributors, in the hope that doing so will eliminate some of the barriers described in this chapter. At once a cooperative (with USDA-MarketLink) and “tech company,” GrownBy has made it a large part of its mission to help small businesses and farmers with outreach and sales, particularly through the use of its app. The GrownBy app not only allows for greater connectivity and sales for farmers, but it also provides an easier route to USDA certification for enrolled producers.²³

These solutions, however, are only the beginning of what must eventually be a systemwide investment in improved access and the prioritization of local food, to ensure that constituents in areas where food is grown have equal access to products.

Various stakeholders recognize the benefit in devising a map/platform that displays the locations of regional and local food distributors, farms and the crops/food they produce, and nearby farmers markets where they can sell their food. Plum & Mule

Community Market, for instance, expressed interest in something that would map out the producers involved and inform them of what they're growing/producing in an effort to collaborate rather than compete with one another. Cooperatives like GrownBy base their work on establishing connections between farmers and customers (outreach), and improving access to public sector certifications, which are necessary to sell and label food as organic in large-scale wholesale and grocery stores. Mike Parker, GrownBy's head of finance and operations, emphasized the need for information-sharing systems that all stakeholders can access, particularly when it comes to navigating systems created to connect farmers to hubs, consumers, and other producers, and to access other important resources that are necessary to sell their food to meet today's health standards.

Apart from projects that will emerge from the needs of food hubs as outlined above, FoodMap NY is working with CADE to develop two projects that address gaps in the food supply chain.

Dry Beans

Dry beans are a nutrient-dense, plant-based protein which is high in vitamins, fiber and micronutrients, with many nutritional benefits that are clearly cited in U.S. dietary guidelines. Compared with meat products, dry beans are a relatively inexpensive, shelf-stable source of protein, which means they are highly accessible year-round in any wholesale or retail setting. NYS is the leading bean producer in the Northeast, representing 79% of all dry bean farms, primarily located in the state's Finger Lakes region. The production of dry beans, especially darker varieties, is ideally suited to the state's growing conditions. Moreover, NYS' proximity to end users within the state and in major East Coast markets represents the greatest competitive advantage available to the state's producers and processors, thanks to reduced shipping costs when compared with beans coming from the Midwest and Great Plains states, the largest bean production centers in the U.S.



With these benefits in mind, FoodMap NY will explore the expansion of the dry bean industry and dry-bean products for low-income communities as a potential strategy for addressing food and nutrition insecurity. Enormous potential exists to scale up production and unleash this premier food security product, particularly with the support of private sector investment in infrastructure and the supply chain—namely, targeting processors who can clean, sort, dry, process, package, store, market, and sell the beans to buyers that serve low-income communities. In partnership with Cornell University's Dyson School of Applied Economics and the Cornell Small Farms Program, CADE conducted comprehensive research that was completed in summer 2021 around the potential for the dry bean market and industry, confirming proof of concept.²⁴

Minimally Processed Produce

Enormous potential exists in NYS to scale up the production of minimally processed, frozen, and dehydrated produce for the state's markets, particularly with private sector investment in processing. There is significant demand for stabilized (frozen or dehydrated) produce across the Northeast, and few food businesses that manufacture stabilized fruits and vegetables at scale using individual quick freezing (IQF) technology or dehydration, according to both The Common Market, a distributor that is seeking to supply packaged frozen produce to Northeast buyers, and a 2019 NYSDAM study. The Common Market also reports that institutions that are looking to procure more local produce lack access to certain products with a limited growing season and are often forced to exclude these items from menu planning. With these opportunities in mind, FoodMap NY will explore expanding the industry for minimally processed, frozen, and dehydrated vegetable and fruit products as a potential strategy for addressing food and nutrition insecurity in low-income communities.

- ¹ Berkowitz SA, Basu S, Gundersen C, Seligman HK. State-Level and County-Level Estimates of Health Care Costs Associated with Food Insecurity. *Prev Chronic Dis* 2019;16:180549. DOI: <http://dx.doi.org/10.5888/pcd16.180549>.
- ² The White House. *FACT SHEET: The Biden-Harris Administration Announces More Than \$8 Billion in New Commitments as Part of Call to Action for White House Conference on Hunger, Nutrition, and Health*. September 28, 2022.
- ³ USDA. *Getting to Scale with Regional Food Hubs*. December 14, 2010. <https://www.usda.gov/media/blog/2010/12/14/getting-scale-regional-food-hubs>.
- ⁴ CADE, "Vision 2050: A NYS Vision for a Profitable, Regenerative, Equitable & Healthy Food System Future by 2050", July 2022, p. 33.
- ⁵ *Ibid*, p. 34.
- ⁶ Jean C. Buzby, Hodan F. Wells, and Jeffrey Hyman, USDA Economic Research Service. *The Estimated Amount, Value, and Calories of Postharvest Food Losses at the Retail and Consumer Levels in the United States (EIB-121)*. February 2014. https://www.ers.usda.gov/webdocs/publications/43833/43680_eib121.pdf.
- ⁷ Gregory Astill, USDA Economic Research Service. *Food Loss: Why Food Stays On the Farm or Off the Market*. March 2, 2020. <https://www.ers.usda.gov/amber-waves/2020/march/food-loss-why-food-stays-on-the-farm-or-off-the-market/>
- ⁸ Travis Minor et al, *Economic Drivers of Food Loss at the Farm and Pre-Retail Sectors: A Look at the Produce Supply Chain in the United States*. January 2020. <https://www.ers.usda.gov/webdocs/publications/95779/eib-216.pdf>.
- ⁹ Please note that the data collected to devise the map includes the organizations listed in this spotlight report as well as organizations listed in the USDA's food-hub directory, a term it defines as a "business or organization that actively manage the aggregation, distribution, and marketing of source-identified food products to multiple buyers from multiple producers, primarily local and regional producers, to strengthen the ability of these producers to satisfy local and regional wholesale, retail, and institutional demand."
- ¹⁰ Office of the New York State Comptroller. *A Profile of Agriculture in New York State*. August 2019. <https://www.osc.state.ny.us/files/reports/special-topics/pdf/agriculture-report-2019.pdf>.
- ¹¹ Please note that the described mapping tool (<https://cugir.library.cornell.edu/catalog/cugir-009010>) solely displays agricultural "district boundaries," which are under the protection of NYS Agricultural District Law, administered by NYSDAM. This tool should NOT be misconstrued as a means for finding the precise location of all existing NYS farmland/agriculture.
- ¹² Office of the New York State Comptroller. *New York's Agriculture Industry: A Resilient Part of State and Local Economies*. August 2022. <https://www.osc.state.ny.us/reports/new-yorks-agriculture-industry-resilient-part-state-and-local-economies#:~:text=According%20to%20the%20U.S.%20Bureau,U.S.%20Bureau%20of%20Labor%20Statistics>.
- ¹³ Myron Thurston, Center for Agricultural Development & Entrepreneurship (CADE). *Wholesale Readiness: Distribution & Logistic Costs* [Webinar]. January 31, 2023. www.cadefarms.org.
- ¹⁴ Center for Flow Physics and Control, Rensselaer Polytechnic Institute. *Improving Food Access*. February 7, 2023. <https://news.rpi.edu/content/2023/02/07/improving-food-access>
- ¹⁵ "Last Mile" definition: "The final step in the context of supply chain: the delivery of a product or service to the destination or end user." GEP. *What Does "Last Mile" Mean In Supply Chain?* <https://www.gep.com/knowledge-bank/glossary/what-is-last-mile-in-supply-chain>.
- ¹⁶ NYS State of Opportunity, Agriculture and Markets. *NYS Advisory Group for Improving Urban and Rural Consumer Access to Locally Produced, Healthy Foods 2022 Report*. 2023. <https://agriculture.ny.gov/system/files/documents/2023/02/urbanruralconsumeraccessreport.pdf>
- ¹⁷ The information on employment by industry, including the food industry and its sub-industries, can be found in Table 2 of the NYS Department of Labor's report, *Employment by Industry, 2019 and Projected 2020-2022*. <https://www.labor.ny.gov/stats/nys-employment-projections.shtm>
- ¹⁸ New York State Department of Labor. *Unemployment Insurance Weekly Claims*. May 2021. Retrieved from <https://www.labor.ny.gov/ui/claimantinfo/UIWeeklyClaims.shtm>
- ¹⁹ USDA. *Running a Food Hub*. August 2017. https://www.rd.usda.gov/files/publications/SR77_FoodHubs_Vol4_0.pdf. p. 13, 54.
- ²⁰ <https://www.ams.usda.gov/sites/default/files/media/Regional%20Food%20Hub%20Resource%20Guide.pdf>. p. 24.
- ²¹ https://www.mdpi.com/journal/foods/special_issues/Innovative_Cold_Storage_Technologies_Food_Supply_Chain
- ²² Food Logistics. "Top 10 Technologies Driving Cold Chain Innovation" December 2021. <https://www.foodlogistics.com/software-technology/article/21903900/roadsync-top-10-technologies-driving-cold-chain-innovation>
- ²³ USDA. "The required certification process assures consumers that organic products meet Page 5 USDA National Organic Program consistent standards throughout their lifecycle. Certification provides a complete audit trail and protects organic integrity from farm to market." https://www.ams.usda.gov/sites/default/files/media/who_needs_to_be_certified.pdf, and "USDA certified organic foods are grown and processed according to federal guidelines addressing, among many factors, soil quality, animal raising practices, pest and weed control, and use of additives." <https://www.usda.gov/media/blog/2012/03/22/organic-101-what-usda-organic-label-means>.
- ²⁴ CADE. *Vision 2050: A New York State Vision for a Profitable, Regenerative, Equitable & Healthy Food System Future by 2050*, pp. 100-113. July 2022.