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Wholesale Produce Markets: An On-Site Infrastructure Assessment

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Executive Summary

In the fall of 2023 Cornell University, with support from USDA AMS and the National Association of Produce Market Managers (NAPMM), conducted a survey to understand the current state of wholesale produce market infrastructure across the country, with an emphasis on identifying infrastructure shortfalls and areas that would benefit from targeted investment. For this study, wholesale produce markets are defined as facilities where multiple fresh produce wholesalers, that primarily conduct business to business (b to b) transactions, are co-located. While business to consumer (retail sales) may occur at the markets they are not a large part of the volume of sales at the market. The research team identified 50 markets and received 20 usable survey responses.

Wholesale produce market facilities were originally constructed in major cities to provide efficient spaces for moving, handling, and storing produce. At that time, the Agricultural Marketing Service (AMS) contributed significant resources to the design and renovation of several wholesale produce markets across the country to modernize wholesale produce supply chains.

Investments in the infrastructure and transportation networks that underpin wholesale produce markets have lagged in the last 50-60 years. They are struggling under the weight of outdated facility design and deferred capital investments, while constraints that limit the transportation of products to, from, and within their market facilities have emerged.

Researchers surveyed and interviewed wholesale produce market managers about infrastructure challenges their markets face, and updates needed to ensure effective operations and usefulness for farmers, wholesalers, and consumers. The project findings suggest that wholesale produce markets require at least some major infrastructure investments, and that most require very significant investments.

The infrastructure improvements that are a significant priority to wholesale produce markets are:

	Percent of market respondents
• Dock improvements (including levelers, additional space, more, and temperature-controlled docks)	60%
• Building improvements, such as exterior walls, roofs, flooring systems, doors, etc.	50%
• Utilities including adequate power, such as amount of power, power sources, emergency backup power, etc.	50%
• Coolers and other controlled temperature zones	45%
• Waste, sewers, water treatment	45%
• Food waste disposal	30%
• Recycling	35%
• Security improvements	30%

Interviews with 10 market managers provided important insights about how infrastructure deterioration and obsolescence affect wholesalers' ability to conduct business, and the hurdles market managers face when they need to invest in infrastructure improvements. The interviews revealed common themes about the effects of obsolete infrastructure on business. These were grouped into six common themes.

Business efficiency – Most managers indicated that the layout in their market does not allow for efficient product flow on and around the docks and noted that improved dock infrastructure would allow them to improve product handling.

Food safety certifications – Updates and improvements needed to comply with third party food safety certifications include wall treatments, drains, lighting fixtures, and other structural features that can be cleaned more thoroughly. Docks are also open to ambient temperatures at most markets, making it difficult to maintain cold chain required for food safety certifications and to maintain product quality.

Maintaining product quality – As wholesalers have grown, they have expanded their product lines and thus require larger and/or additional coolers to provide a wider range of temperature and humidity environments. Market managers have also reported that the lack of cooler space has limited wholesaler tenants' business capacity, contracts they can take, and types of produce they can sell.

Space to grow – The need for additional square footage to meet current business obligations and expand sales was a theme closely related to improved efficiency. Currently, the only means for most wholesale market tenants to grow their business is to buy out another tenant on the market. Sales for the individual tenant may grow up to a point, but sales handled by the markets cannot grow without additional space.

Functional utilities – Almost all markets need to replace or upgrade some of the market utilities, including water and sewage pipes, repaving, power, interior plumbing, wi-fi and security infrastructure.

Centralized business services – Being able to provide business services that are managed by the market would streamline internal traffic, handling touchpoints, and reduce food waste. The services mentioned the most included packaging and food waste recovery and handling.

Funding the improvements needed has been a challenge for markets. For these improvements, which are complex and comprehensive, markets need external funding. Locating grants or low-interest loans and writing proposals is beyond the ability of many market managers and tenants, and they will need to hire additional staff, agencies, or consultants to do this for them.

"As the cost of these improvements continues to rise, the majority of markets are challenged in funding these improvements. This is an existential threat to these markets. Major stakeholders need to be highly engaged in articulating the value that these markets play in fresh food distribution and diligently advocating for local, state, and federal funding of these national infrastructure assets."

-Interview with wholesale produce market manager

The objective of this project is to understand the current state of wholesale produce market infrastructure across the country, with an emphasis on identifying infrastructure shortfalls and areas that would benefit from targeted investment. In addition, this report will be used to inform policymakers about the technical assistance needed to help market managers strategically plan the growth and modernization of their markets.

INTRODUCTION

Wholesale produce market facilities were originally constructed in major cities to provide efficient spaces for moving, handling, and storing produce as compared to the centralized urban farm markets commonly used for produce distribution and marketing before to the early 1900s (Crow, 1938). These wholesale markets were designed as permanent warehouses that housed multiple wholesale tenants under a single roof. These emerging wholesale businesses were needed to feed growing metropolitan areas and to ensure a safer food supply relative to the previously common urban farm markets. As an added benefit, the wholesale market facilities allowed customers from the emerging supermarket industry to examine and purchase products from several competing wholesalers as a "1-stop shopping" mall of fresh produce suppliers.

After the first wholesale produce markets were constructed in the early 20th Century, local, state, and federal governments continued to support and invest in constructing centralized wholesale markets in several urban areas in the late 1950s and early 1960s (Planning Advisory Service, 1955). Given that well-functioning wholesale produce markets are integral to the goals of AMS, it contributed significant resources to the design and renovation of several wholesale produce markets across the country during this period. At the time this investment represented a significant jump in modernizing wholesale produce supply chains. In addition, several states in the Southeast invested in and built state farmers markets that also contained common buildings with multiple warehouses for food wholesale tenants.

Since then, the U.S. fresh fruit and vegetable supply chain has changed in ways that impact the infrastructure of these centralized markets. First, we now primarily transport fresh goods via refrigerated tractor-trailers. This is a change from the use of smaller, box trucks and railcars that historically brought produce to the markets. As a result, many of the oldest markets are not designed for the size of modern trucks and trailers, with incorrectly sized docks and paved areas too small to accommodate larger turning radiuses needed by tractor-trailers today. Second, food safety requirements have changed significantly, especially since the implementation of the Food Safety Modernization Act (FSMA). Wholesale produce markets were not originally constructed with the strict cold chain protocols that we have today nor with an eye towards site security. Most docks are still open to the outside environment, for example, making it difficult to maintain the temperature of the products. Third, shocks to the supply chains due to extreme weather events to pandemics and global unrest demonstrate limitations in product aggregation and distribution processes. Markets were not originally designed with current technology and operational flexibility in mind, elements essential to ensure resilience in the face of increased frequency of disaster events. Fourth, many produce wholesalers have increased customer demand for value added services, such as repacking, avocado and banana ripening rooms, and fresh cut fruit and vegetables. The processes require added space, equipment, and food safety

protocols that markets were not originally designed for, and many wholesalers have had to retrofit spaces to accommodate these services.

Despite these significant changes, investments in the infrastructure and transportation networks that underpin wholesale produce markets have lagged in the last 50-60 years. As a result, while some produce wholesalers continue to utilize these centralized wholesale market facilities, marked by the co-location of multiple wholesalers on one site, other wholesalers opt to have their own stand-alone facilities and are not associated with the shared-facility wholesale markets. Using annual volume truckloads reported in wholesaler listings with the Produce Blue Book, Cornell estimates that about 47% of the produce in the urban areas in which wholesale produce markets operate is being moved through the wholesale markets. This does not include the fresh produce that is shipped directly from growers to area buyers, such as large retail supermarkets and restaurants.

Wholesale markets still serve essential supply chain functions, but many are struggling under the weight of outdated facility design and deferred capital investments, while constraints that limit the transportation of products to, from, and within their market facilities have emerged. And while aging infrastructure is not unique to wholesale produce markets, it is of particular concern given the essential role these markets play in ensuring a safe and reliable food supply. Ultimately, there is an important opportunity to take lessons learned from the past 50 years and use them to plan for the next 50.

METHODS

The researchers conducted a survey of wholesale produce market managers that asked about market operations and structural updates needed to ensure effective operations and usefulness for farmers, wholesalers, and customers. In addition to the survey, interviews were conducted with 10 market managers to add context to survey responses and gain additional insight on specific infrastructure and transportation needs.

Researchers defined wholesale produce markets as facilities that:

- have multiple produce wholesalers co-located on the market and sharing the structures and facilities
- house produce wholesalers that market produce business-to-business
- are publicly or privately owned

Using these criteria, researchers developed an exhaustive list of current U.S. wholesale produce markets. Sources consulted for the list include:

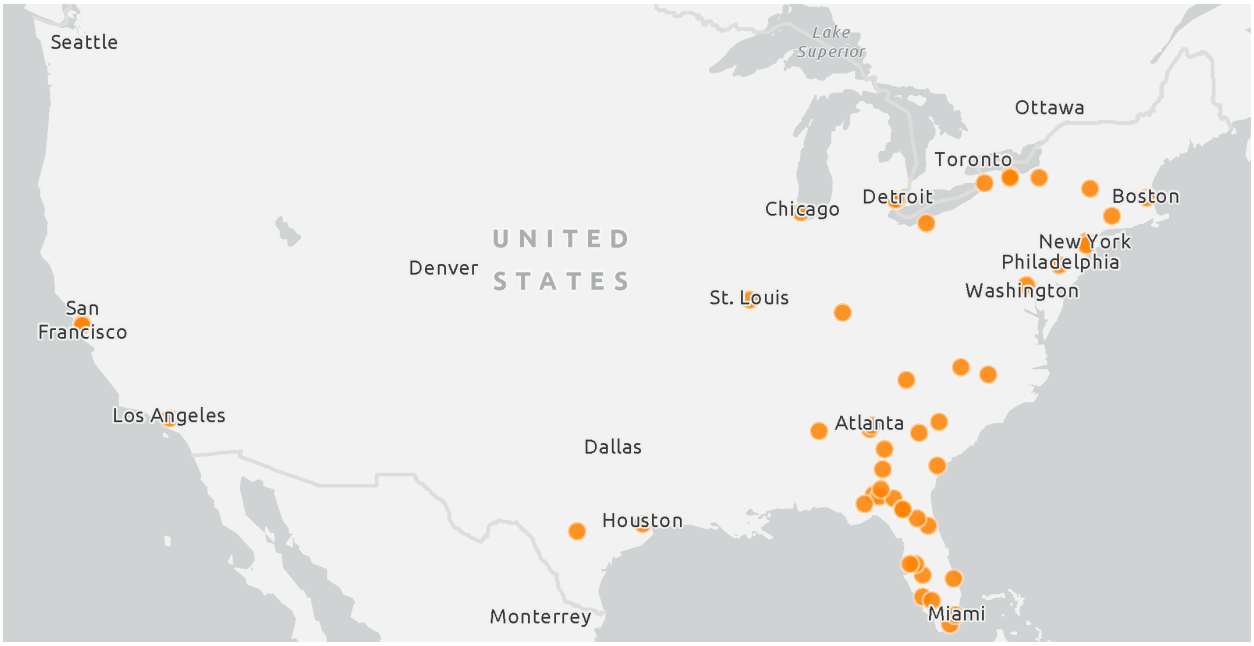
- the National Association of Produce Market Managers membership roster
- USDA Agricultural Marketing Service price reporting service at terminal markets
- the Produce Blue Book list of terminal markets
- Direct communications with state departments of agriculture

The research team identified 50 markets (Figure 1). During the survey distribution, two markets on the list were found to have closed, leaving 48 possible respondents. Most markets

identified are in metropolitan areas along the seaboards, with a few in large cities in the interior, such as St. Louis, Chicago, Detroit, Louisville, and Cleveland. Several states in the South and Southeast operate a series of wholesale markets maintained by the state departments of agriculture. The market survey list contained 28 of these state-run markets, just over 50% of the list. Often called farmers markets, they can also house wholesalers and have loading docks, coolers and other structures for wholesale trade.

The survey was designed to identify and prioritize specific infrastructures that need to be renovated, including buildings, market roads or drives, utilities, ancillary waste and food handling and disposal, and security. It also addressed potential traffic and transportation trends that may be impacting the ability of the market to function. The survey also included questions about the market's general operations, ownership structure, and investment decision making to gain a more complete understanding of the market functions. A copy of the survey can be found in the appendix.

Figure 1. Identified Wholesale Produce Markets in the U.S.



Note: Identified markets indicated with orange dot.

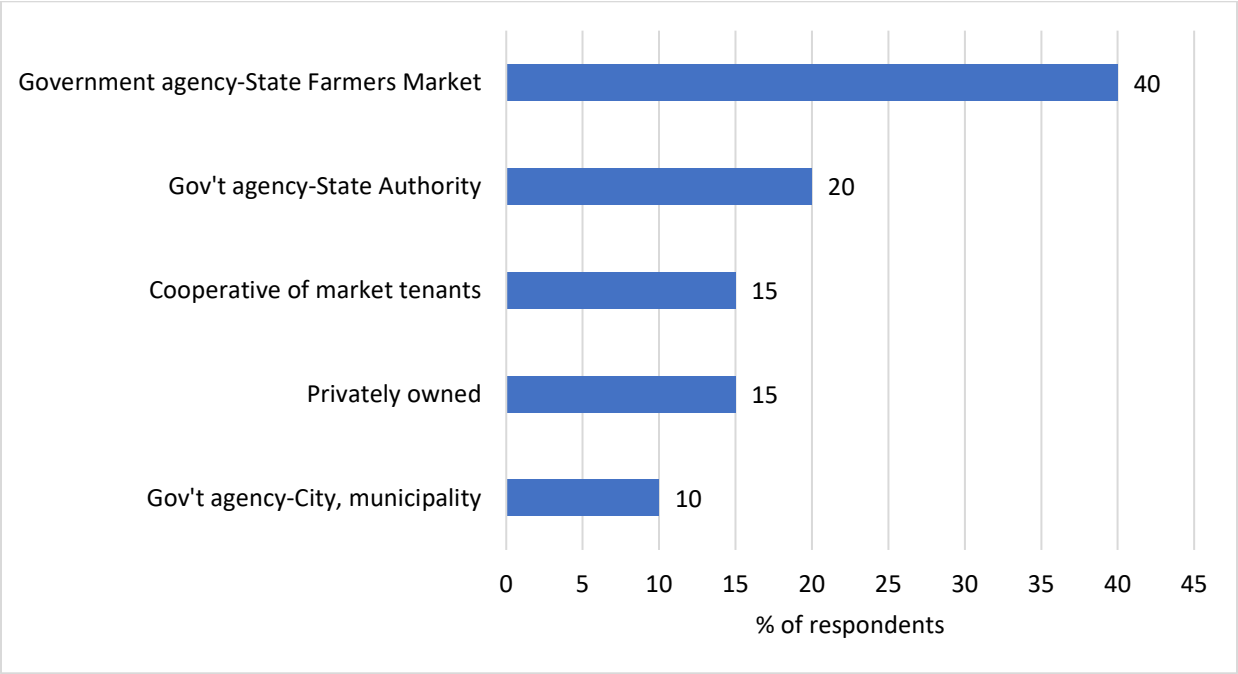
Survey Results

The survey was distributed to potential respondents electronically in addition to hard copies sent via mail. Twenty-five surveys were returned. After removing incomplete or otherwise unusable surveys, we ended with 20 usable surveys and cleaned data, a 42% response rate. During the cleaning process, responses to some questions were found to be unreliable, results reported below only include those from usable questions.

Description of the Markets

Many of the markets that responded to the survey (40%) reported being owned and operated by a government agency or entity as part of a state farmers market program (Figure 2). Another 20% are owned by a government agency or entity via a state authority[1] and another 10% by another type of government entity, such as a city. Fifteen percent of market respondents are cooperatives of their tenants and another 15% are privately owned and incorporated by their tenants.

Figure 2. Market Ownership Structure



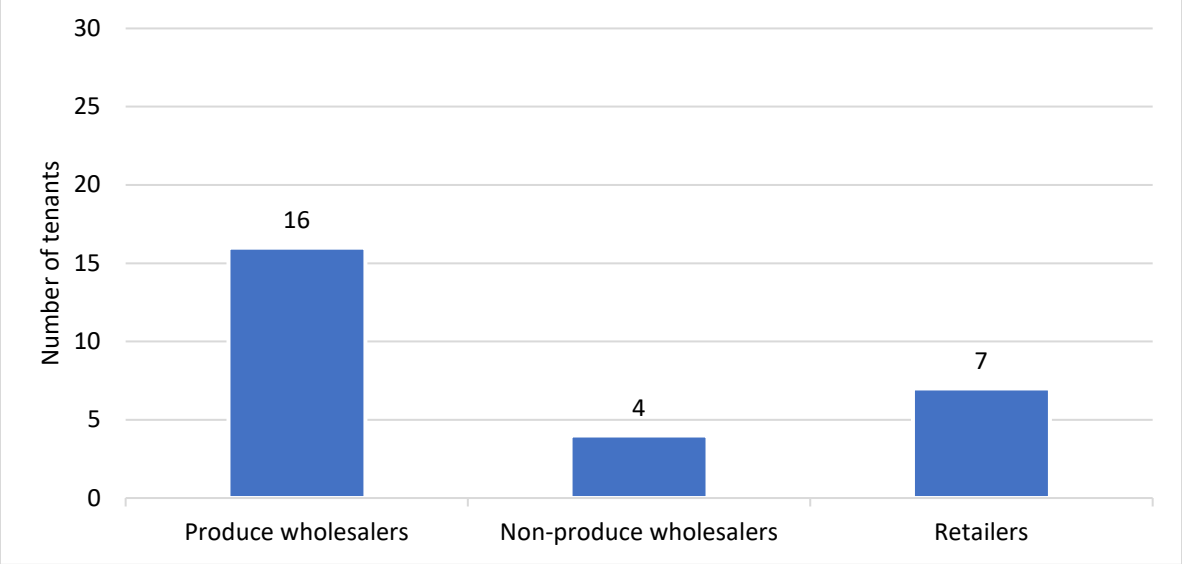
The wholesale markets that responded to the survey have an average of 16 produce wholesalers as tenants (Figure 3). More than half of the markets, 13 out of the 20 respondents, also have some tenants who are not produce wholesalers. On average, markets have 4 non-produce wholesalers, and 7 retail tenants. Most wholesale produce markets are also open to the public. Eighty percent of the respondents allow the public to shop at the market.

A few of the market respondents are a combination of wholesale produce market and consumer farmers market. These markets rent farmers stalls to sell directly to consumers and often have many farmer vendors. These farmers are mostly seasonal or intermittent vendors, attending the market a few days of the week. They can be quite numerous, and in a few markets,

[1] A public authority is a corporation created by a state to benefit the public. Public authorities are responsible for developing, operating, and maintaining critical infrastructure. Areas in which it is commonly used are roads, bridges, mass transit, and schools, as well as water and sewer projects, civic facilities, and economic development. They are governed by a separate board of directors appointed by elected officials.

they number over 100. We consider these large combination markets as outliers as they do not use the wholesale warehouse facilities and did not include them in Figure 3.

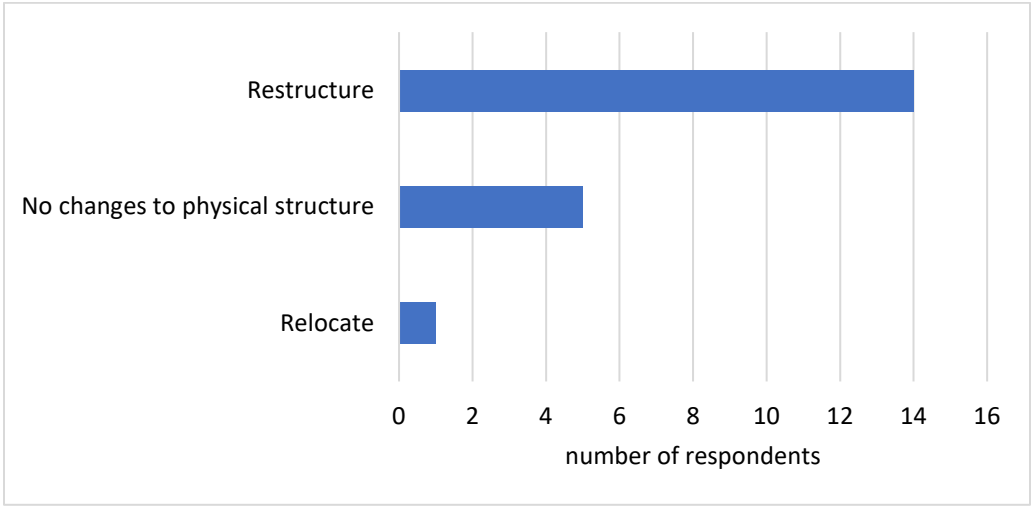
Figure 3. Average Number of Tenants in Wholesale Produce Market Respondents



Infrastructure

Most respondents plan to expand, restructure, or renovate their facilities in the next 5 years. Fourteen market managers indicated they want to conduct major physical improvements/renovations or expand their markets by adding buildings, other structures, or land (Figure 4). Five respondents have no plans to remodel or renovate while one market plans to relocate.

Figure 4. Plans for Market Facilities

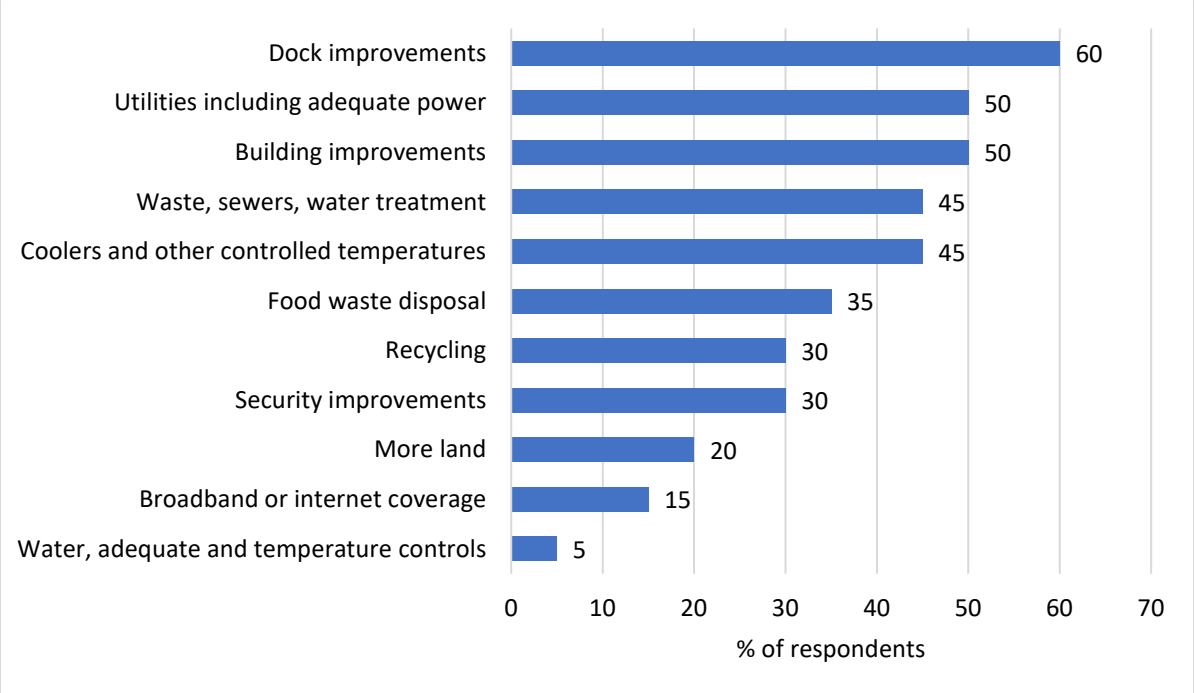


Our survey asked market managers which structural improvements were a priority using a scale of 1 to 4 where 1 = "not a priority" 2 = "small priority" 3 = "moderate priority" and 4 = "significant priority". While each market may have a different set of priorities, some common themes emerged. From a list of structures and facilities, the one that was a "significant priority" for the most markets (60%) was "loading dock improvements, such as dock levelers, additional dock space, temperature-controlled docks, etc." (Figure 5). In addition, half of all respondents reported that building improvements, utilities, and waste, sewers, and water treatment were significant priorities.

All managers reported that security was a priority, with 30% saying that security improvements, such as fencing, gates, and cameras, were of "significant" priority.

Paving and lot improvement needs were mentioned in an open-ended response by one manager and was mentioned in later interviews with a number of managers. Infrastructure for electric vehicles, food recovery, and resiliency plus energy efficiency improvements was also an open-ended response and was discussed in later interviews which are reported later in this report.

Figure 5. Significant Infrastructure Priorities

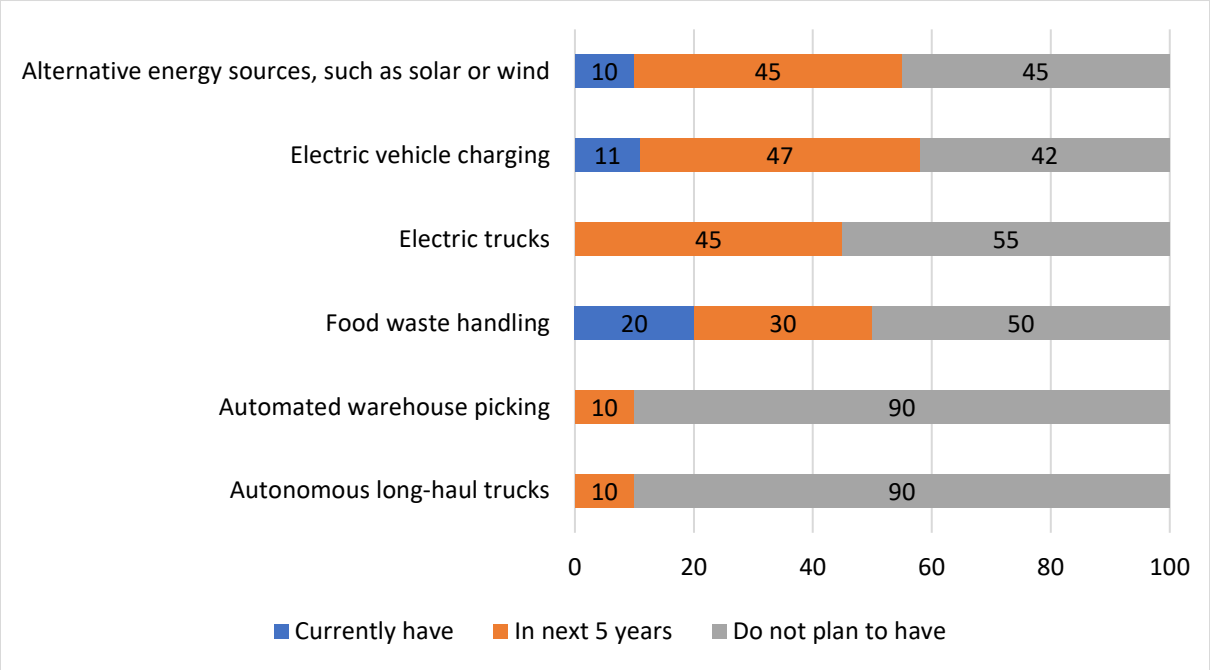


Technologies in logistics and transportation are emerging and will be more commonplace in the future. Driverless long-haul trucks and e-trucks are being tested to help alleviate the truck driver shortage and help reduce greenhouse gas emissions. Infrastructure may be needed to accommodate these technologies. We asked markets if they are considering investing in some of these within the next five years. There is interest from 45% of markets in electric trucks and

electric vehicle charging stations as well as in alternative power sources such as solar and wind investments (Figure 6).

Some technologies or structures may not be aligned with market tenants' interests or operations. Ninety percent of markets are not planning to invest in autonomous long-haul trucks or in automated picking. And 50% of markets do not plan to add centralized food waste handling systems, such as digesters, composting, etc.

Figure 6. Market Interests in Emerging Technologies



Traffic, Transportation, and Shipping

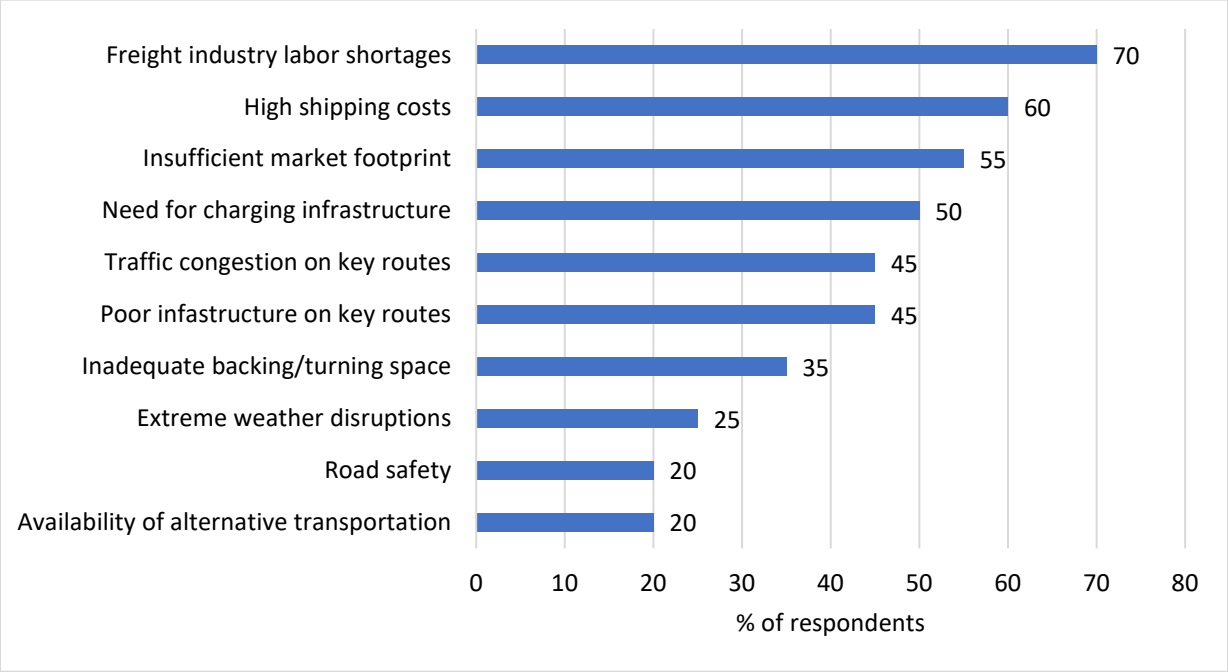
Along with the on-site infrastructure markets have control over, off-site transportation and traffic infrastructure, which the markets don't necessarily have control over, can also affect market performance and conditions. We asked market managers about transportation related issues.

All markets (100%) indicated that they receive regular shipments of produce via semi-trucks, with 20% indicating they also receive product via rail. Most markets also have a significant number of straight trucks moving in and out of the market. None of the markets use barges to transport produce.

Market managers reported concerns about several transportation items in the next five years. Seventy percent of managers reported that labor shortage in the freight industry is a concern for the next five years, and 60% of managers reported that high truck or rail shipping costs were of concern. Having enough space to grow their market footprint and needing to expand charging

infrastructure in the market to accommodate electric trucks were concerns of the most managers (55% and 50% respectively) (Figure 7). And 45% indicated they are concerned about poor infrastructure conditions of key routes to/from the market as well as disruptive or unpredictable traffic congestion. Other transportation concerns noted were changes to existing highway routes/bridges, construction on highway routes, and pressure from light manufacturing in areas near the market.

Figure 7. Transportation Concerns in the next Five Years



Market Interviews

Interviews with 10 market managers provided important insights about how infrastructure deterioration and obsolescence are affecting wholesalers' ability to conduct business as well as the hurdles market managers face when they need to invest in infrastructure improvements. We begin this section with a summary of market ownership structures and challenges managers face in making needed infrastructure improvements, with a focus on identifying financial resources. The remainder of the section presents findings about infrastructure needs, grouped into six common themes: efficiency, food safety compliance, maintaining product quality, space to grow, functional utilities, and centralized business services.

Market ownership and challenges to infrastructure improvements

In Figure 2 above, we show the ownership structures reported in the survey. During our interviews, we heard in more detail how markets are owned and managed. Some markets are governed by authorities or state departments and may have operating boards that do not include

market tenants. These markets often have specific governance or directives that influence how they operate. For example, a few markets have directives to support agricultural commerce in their regions which impact how they operate and how they make strategic decisions.

A few markets work closely with their urban food environment and have missions that align with the broader food community. Most, although not all, of these markets are a part of municipal government and have a long history of being a part of the traditional farmers markets of the late 19th and early 20th centuries. In addition to their produce wholesalers, such markets may have market tenants that are not wholesalers but might include processors, food organizations, restaurants, food operators and public farmers markets. These markets also might host more public-facing functions and activities.

Most of the remaining markets are corporations or cooperatives made up of tenant wholesalers who lease or rent the market land and/or buildings. These markets tend to focus on wholesaling operations while often including services to help improve wholesaler operations, such as common waste handling and recycling, investments in solar panels, and food waste recovery collaborations and operations.

Almost all markets reported that decisions on infrastructure improvements were made by a board. In the case of the corporations and cooperatives, these are composed of the market tenants who compete with one another and who may be influenced by this. In the case of the market authorities, the boards consisted of members appointed by county legislatures who may not have enough knowledge or interest to make decisions about the market's infrastructure needs.

In every interview, when asked what the biggest hurdle to making needed infrastructure improvements is, the answer was money or funding. Markets also reported during interviews that past maintenance and other market projects have been funded by the markets themselves via loans, cash reserves, bonds, and/or special assessments paid by the renters and tenants. Improvements to individual tenant facilities, such as coolers and offices, were sometimes paid just by the tenant or sometimes in partnership with the tenant.

A few markets said they have been able to apply for and receive grants. Very few have been able to access federal funds administered by their state or received state assistance for some of their larger projects. Some market tenants are incorporated but are themselves tenants of an authority or municipality that owns the market land and facilities.

Efficiency

Other than the markets that were moved to new facilities in the last 20 years, all of the market managers interviewed indicated that the layout in their market does not allow for efficient product flow on and around the docks and noted that improved dock infrastructure would allow them to improve product handling. The oldest markets have docks and coolers with inadequate footprints that were designed to handle the volume of product of decades past. Structural support pillars that were standard when lower volumes of product were moved by hand, now impede pallet jacks and forklifts that could be used to move the larger product volumes these markets now handle. The placement of pillars or doors sometimes requires pallets to be broken down and moved case by case with hand trucks.

More space for breaking down and re-assembling pallets for customer orders is needed. Currently, valuable dock space or any other open floor space often become de facto areas to split pallets or boxes, and reassemble them for orders, adding to congestion and slowing product movement. Such inefficient product flow creates redundant handling with redundant "touches" needed to move product. Each handling point, or touch, is a potential source of inefficiency, loss of quality, and loss of food safety integrity.

"Product flow is sort of impossible in terms of where the doors are located and how product can be moved/navigated."

-Interview with wholesale produce market manager

In addition, docks in older markets are often too low to accommodate tractor trailers. This means product is either unloaded away from the docks and moved to coolers with pallet jacks or dock levelers must be used. Most of the oldest markets need to rely on manual, rather than electronic, dock levelers that may weigh a couple hundred pounds and require several people to move repeatedly during the day. In these cases, the costs in time and labor to work around dock height issues is extreme.

Market managers say improvements in structures and concomitant improvements in efficiency and food safety, discussed below, would enhance their business capacity and increase the range of businesses they can sell to, types of contracts they can take, and variety of produce they can handle. Increased efficiency would also help these wholesalers reduce costs and remain more competitive in relation to other wholesalers.

Food safety requirements

Some market managers reported that the condition of the market's current infrastructure is limiting their ability to comply with some of the cold chain and food safety requirements of potential customers. And in fact, some buyers have stopped using the market wholesalers due to the inability to comply with their requirements. Updates and improvements needed to comply with third party food safety certifications include wall treatments, drains, lighting fixtures, and other structural features that can be cleaned more thoroughly. Docks are also open to ambient temperatures at most markets, making it difficult to maintain cold chain required for food safety certifications and to maintain product quality. Infrastructure needs affect some markets' capacity and eligibility for businesses they can sell to, contracts they can take, and types of produce they can sell.

"Food safety is an important requirement with every improvement need. We need better controlled environment in coolers. FSMA compliance highlighted is by industry, and wholesalers need to be in compliance. There is a lack of infrastructure, such as ability to maintain drains, floors and slabs need proper coating, and we need improvements to power to refrigerate product adequately."

-Interview with wholesale produce market manager

Maintaining product quality

Maintaining product quality was one of the major messages heard during the interviews. Maintaining the cold chain is difficult with unenclosed docks which are open to ambient temperatures. The open docks expose produce to environmental conditions, such as heat and freezing temperatures as well as precipitation which may fall onto products, increasing the potential to degrade the quality of the product.

In addition, larger and/or additional coolers with improved temperature controls are needed. Different produce has different temperature and humidity requirements for optimal storage, and the ability to create different zones is substantially limited in many current spaces. Expanded cooler space with more control over the environment will help maintain specific product requirements. As wholesalers have grown, they have expanded their product lines and thus require more cools to provide a wider range of temperature and humidity environments. Market managers have also reported that the lack of cooler space has limited wholesaler tenants' business capacity, contracts they can take, and types of produce they can sell. Updated facilities to improve product movement, efficiencies, and food safety as described above would also benefit product quality.

Space to grow

The need for additional square footage to meet current business obligations and expand sales was a theme closely related to improved efficiency. Most of the markets interviewed noted that they need additional dock space to support increased inbound and outbound truck loads. Increasing dock space will decrease the time to unload and load trucks and increase the volume of product being moved. In some markets, more dock space will speed up unloading and loading and reduce the number of trailers parked at the market waiting for their turn to unload. Expanded parking areas and dedicated truck lanes are also needed to accommodate increased traffic. Employee vehicles and delivery truck traffic share the same space at many markets which creates difficulties for commercial vehicles as well as warehouse staff. One wholesaler cited a story of wholesaler employees who were unable to find parking at the market and turned around and went home. Wholesalers don't want to lose business to competitors because of the lack of space for people, cars, and trucks. Lastly, truck driver facilities are needed at many markets and increased truck traffic will only increase this need.

Within the warehouses there is a need for larger receiving areas for moving pallets around, breaking boxes, and assembling cases into customer orders, as noted earlier. Additional cooler space is needed for business growth as well as for maintaining product quality. Some markets that have limited land and not enough area to increase their footprints have proposed raising ceilings to 40 feet which would allow them to have higher racking systems for produce cases.

In addition, managers noted a lack of space can delay routine maintenance and larger renovations. Dock and cooler renovations, in particular, impact day-to-day business in a way that paving and roofing maintenance did not. Without space that allows businesses to flex around disruptions inherent in conducting renovations, markets note that they often struggle to make the needed decisions to update their infrastructure.

In addition, the only means for most wholesale market tenants to grow their business is to buy out another tenant on the market. Sales for the individual tenant may grow up to a point, but sales handled by the markets cannot grow without additional space.

"The biggest issue is the lack of room to grow the market. There has been major consolidation in the industry and the market is fractured into members and businesses adjacent to the market but not officially part of it. The remaining businesses need volume to remain viable but there is no obvious alternative to move or grow the market."

-Interview with wholesale produce market manager

Functional utilities

Almost all markets need to replace or upgrade some of the market utilities. Examples of utility improvements needed include: water and sewage pipes that are over 100 years old and decaying, repaving, an original power feed that requires a specialist to service, power feeds that do not have the capacity to provide enough power, interior plumbing needs to be enlarged, wi-fi that does not provide adequate coverage across the market, and security infrastructure such as lights, fences, gates, and cameras.

Centralized business services

Several markets expressed interest in providing some centralized systems that would streamline waste handling. With a centralized waste handling and/or food waste management system, tenants may be encouraged to use waste handling and/or conduct food waste management practices. Such systems could reduce individual tenant waste handling fees and improve the efficiency of waste handling. Centralized services would also help with traffic conditions within the market as waste handlers would go to a central pickup location rather than picking up from each tenant. Improved efficiencies and cost savings could also be seen with centralized pickup for food recovery which would reduce food waste and, expensive landfill fees which are billed by weight. Interest was also expressed for state-of-the-art technology to help increase energy efficiency and reduce overall market operating costs, such as solar power and electric trucking.

Discussion

Our findings above reveal wholesale produce markets that are facing an existential threat as they struggle with outdated and deteriorating facilities that impede basic business operations. Outdated buildings, aging materials, inefficient layouts, cramped quarters, deteriorating utilities, and footprints constrained to existing land need to be addressed for tenant wholesalers to remain competitive in an increasingly consolidated and vertically integrated supply chain. By addressing these issues, wholesalers will be able to increase operational efficiency, comply with food safety requirements, maintain cold chain and product quality, reduce packaging waste, and implement food waste recovery strategies.

"I feel as the wholesale and terminal markets have been almost forgotten, which has led to a lack of available funding opportunities. I firmly believe that the impact that the COVID-19 pandemic had on the food system, highlighted the challenges that product outsourcing has caused, and shed some light back onto wholesale and terminal markets. However, inadequate infrastructure at these markets still limited their ability to get their products into the mainstream marketing sources (such as grocery stores), due to their inability to comply with the modern top level food safety requirements."

-Interview with wholesale produce market manager

In addition to the needs listed above, the Food Safety Modernization Act continues to have significant impacts on the wholesale produce supply chain, and customers need assurance that they are purchasing produce that has been produced and handled under its rules. Market wholesalers will become ineligible to compete in the food supply chain if they are unable to comply with buyer food safety requirements due to the condition of their facilities.

It is likely that if the markets continue to deteriorate, wholesalers that operate in these markets will find it difficult to remain competitive. Some may choose the expensive decision to relocate off the market or even close. The loss of multiple wholesalers at one market location would affect the 1-stop shopping appeal the markets have been known for, in turn impacting the viability of the rest of the market tenants. Most of the current wholesalers on these markets are independent, small business, family companies.

"It is in the public's best interests to have a market that is state of the art, bringing the best and safest food to consumers."

and

"The building shows its age. Yet, we are still the primary source of produce ... We need to start planning to expand the longevity of our ability to perform - either in this facility or elsewhere."

-Interviews with wholesale produce market manager

Funding the needed improvements has been a challenge for markets. Markets often focus on keeping rental rates affordable to wholesaler tenants who are operating on small margins. As such, previous maintenance and improvements have been made only incrementally and rarely on a comprehensive level that would make the market become "state of the art".

Markets will need external funding to make the complex and comprehensive improvement they need. Finding grants or low-interest loans and writing proposals may be beyond the ability of many market managers, who manage the facilities and operations of the market and may not be hired to secure major investment loans and grants. This may require hiring additional staff, agencies, or consultants to do this for them. Providing leads or examples of similar project

funding may help them find these resources and lead to possible funding sources. Economic development services may be an appropriate partner for some of the markets.

Yet we hear from many of the markets that their ownership structure makes them ineligible for many types of funding. One manager reported that being owned by a state authority makes them ineligible for many sources of funding. This is an additional hurdle for markets to manage. Identifying available and appropriate funding sources can be a challenge and the wholesale markets may require professional staff, agencies, or consultants to do this for them

No- to low-cost ways to support markets looking to invest in infrastructure improvements may include the following:

- Identifying and accessing funding sources
- Guidance for interfacing with their local government/municipality to form partnerships that may lead to infrastructure improvements, access to additional space etc.

The impact of infrastructure improvements on the business performance of market wholesalers could be significant. As an attempt to quantify the potential impact, a complementary project is being conducted by a research team at Cornell. The team is modeling the volume of fresh produce being transported to one market area identified in our study. Included in the model are the flows by county and by season. The model being developed will describe the effects of a theoretical increase in efficiencies in product handling due to a hypothetical increase in infrastructure investments to the market. When the investments are made, operations efficiencies, such as an increase in labor efficiency, will be increased for the companies on the market, and the model will produce effects in the scale and locations of these markets and changes in patterns of supply and volume of fresh produce.

"As the cost of these improvements continues to rise, the majority of markets are challenged in funding these improvements. This is an existential threat to these markets. Major stakeholders need to be highly engaged in articulating the value that these markets play in fresh food distribution and diligently advocating for local, state, and federal funding of these national infrastructure assets."

-Interview with wholesale produce market manager

CONCLUSIONS

The project conducted a survey and in-depth interviews of wholesale produce market managers to determine the infrastructure needs of the markets and how the conditions of the market are affecting tenants' ability to do business. According to the findings of this project, wholesale produce markets that have not moved into new facilities in the last 15 years will likely require at least some major infrastructure investments, most will require very significant investment.

These infrastructure needs are affecting the wholesale tenants' ability to be competitive, reducing efficiency, the ability to comply with customer food safety requirements, and maintain optimal produce quality. The infrastructure improvements of greatest priority are:

	Percent of market respondents
• Dock improvements (including levelers, additional space, more, and temperature-controlled docks)	60%
• Building improvements, such as exterior walls, roofs, flooring systems, doors, etc.	50%
• Utilities including adequate power, such as amount of power, power sources, emergency backup power, etc.	50%
• Coolers and other controlled temperature zones	45%
• Waste, sewers, water treatment	45%
• Food waste disposal	30%
• Recycling	35%
• Security improvements	30%

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APPENDIX (SEE BELOW)

We appreciate you taking the time to fill out this survey! If there is a question you are unsure of, please feel free to consult with others. If a question is not relevant to your market, you may skip it. First, we are going to ask you some general questions about the market itself.

Background Information about Your Market

What is the name of your market?

_____

1. Does your market plan to make any structural changes in the next five years? Please select the most likely option. By structural changes we mean changes to buildings, roads, or other physical structures.

   - ❑ No changes to the market's physical structures (continue with survey)
   - ❑ Restructure, such as major physical improvements and renovations (continue with survey)
   - ❑ Relocate (continue with survey)
   - ❑ Expand, such as adding buildings, other structures, or land (continue with survey)
   - ❑ Close the market (*You have completed the survey! Thank you very much for your time.*)

2. Approximately what percent of the fresh produce sold at your market is grown **within** a 400-mile radius of your market (but still within the U.S.)?

   _____%

3. Is your market also open to the public for consumer sales? Please select one.

   ❑ Yes ❑ No

4. Does your market own or lease the land on which the market is location? Please select one.

   - ❑ Market owns the land
   - ❑ Market leases the land
   - ❑ Other, please describe: _____

5. Who owns your market's facilities and structures? Please select all that apply.

   - ❑ Government agency or entity, such as municipality, state, or other
   - ❑ Privately owned
   - ❑ Cooperative of market tenants and businesses
   - ❑ Other ownership structure, please describe: _____

Doing Business at Your Market

Now we would like to learn about the types of business activities that occur at your market.

6. In general, how much fresh produce is received by your market? Please estimate using number of tons per week.

   Average **tons**/week: _____

7. What is the busiest **day** of the week in terms of overall market activity? Please select **one.**

   - ❑ Sunday
   - ❑ Monday
   - ❑ Tuesday
   - ❑ Wednesday
   - ❑ Thursday
   - ❑ Friday
   - ❑ Saturday
   - ❑ No busiest day

8. What is the busiest **month** of the year in terms of overall market activity? Please select **one.**

   - ❑ January
   - ❑ February
   - ❑ March
   - ❑ April
   - ❑ May
   - ❑ June
   - ❑ July
   - ❑ August
   - ❑ September
   - ❑ October
   - ❑ November
   - ❑ December
   - ❑ No busiest month

9. During your busiest times, how challenging is the traffic both within the market and getting to and from the market?

   - ❑ Not at all challenging
   - ❑ Slightly challenging
   - ❑ Moderately challenging
   - ❑ Very challenging
   - ❑ Extremely challenging
   - ❑ Does not apply

10. Please tell us approximately how many of the following types of businesses are located at your market. The numbers should sum to the total number of businesses at the market. If there are none of a certain type, please enter a zero. Some businesses might do more than one thing. Please count them according to their **primary** type of business.

Businesses at the market	**Number**:
Number of fresh produce wholesalers and distributors:	
Number of food wholesalers and foodservice distributors, other than fresh produce:	
Number of businesses selling primarily retail or direct to consumers (for example: farmers, retailers, restaurants, crafts people, etc.):	
Number of all other market tenants	

Infrastructure and Investments Needs:

In this next section we will dig into infrastructure conditions and challenges facing your market.

11. How much of a priority are improvements to each of the following infrastructure items? For each item, please select one response.

Infrastructure	Not a priority	Small priority	Moderate priority	Significant priority	Does not apply
Land					
More land (e.g., for market improvements or expansion)	❑	❑	❑	❑	❑
Buildings					
Dock improvements, such as dock levelers, additional dock space, temperature controlled docks, etc.	❑	❑	❑	❑	❑
Cooler improvements or temperature zones	❑	❑	❑	❑	❑
Building improvements, such as exterior walls, roofs, flooring systems, doors, etc.	❑	❑	❑	❑	❑
Utilities					
Adequate power, such as amount of power, power sources, emergency backup power, etc.	❑	❑	❑	❑	❑
Adequate water or water quality	❑	❑	❑	❑	❑
Broadband internet or Wi-fi coverage	❑	❑	❑	❑	❑
Waste, sewers, water treatment	❑	❑	❑	❑	❑
Others					
Food waste disposal	❑	❑	❑	❑	❑
Recycling	❑	❑	❑	❑	❑
Security, such as fencing, gates, cameras, etc.	❑	❑	❑	❑	❑
Any other? please describe	❑	❑	❑	❑	❑

12. For each of the following emerging technologies, please indicate whether you currently have it at your market, do not have now but plan to have it within the next 5 years, or do not plan to have. For each technology, select one response.

Technology	Currently have	Plan to have within 5 years	Do not plan to have
Electric trucks	❑	❑	❑
Electric vehicle (EV) recharging stations	❑	❑	❑
Autonomous long-haul trucks	❑	❑	❑
Automated warehouse picking	❑	❑	❑
Food waste handling systems, such as digesters, composting, etc.	❑	❑	❑
Alternative energy sources, such as solar panels, solar array, wind, etc.	❑	❑	❑
Other, please describe	❑	❑	❑

Transportation and Freight Activities:

Almost done! To wrap up we would like to learn about transportation and freight dynamics that you see at your market.

13. Which of the following transportation modes are regularly used by businesses in the market to receive shipments of fresh produce? By "regular" we mean at least once a month. Select **all** that apply.

- ❑ Truck
- ❑ Rail
- ❑ Barge
- ❑ Other, please describe:_____

14. In general, how many trucks travel in and out of the market per **day** at the market (by trucks, we mean "one truck or other vehicle making one drop-off or delivery").

Average number of trucks/day: _____

15. We would like to know what types of trucks travel to and from the market. Please indicate what percent of truck traffic is from each of the following types of trucks. Your responses should sum to 100%.

Trucks	% of all trucks delivering to and from the market
Semi-trailer (including refrigerated and unrefrigerated)	____ %
Flatbed with intermodal container	____ %
Straight or box truck	____ %
Cargo van	____ %
Other	____ %
Total	100 %

16. Are you concerned about any of the following transportation-related issues affecting your market and/or merchants/tenants in the **next 5 years**? Please check all that apply.

	Yes, this a concern in the next 5 years
High truck or rail shipping costs	❑
Poor infrastructure condition on key routes leading to/from the market (e.g. pavement quality, bridge weight limits)	❑
Disruptive or unpredictable traffic congestion on key routes leading to/from the market	❑
Road safety on key routes leading to/from the market	❑
Inadequate backing/turning space	❑
Insufficient space to grow market footprint	❑
Disruption of transportation to/from the market resulting from extreme weather events (e.g., flooding, strong storms, heat waves, wildfires	❑
The need to expand charging infrastructure within the market to accommodate electric trucks	❑
Availability of alternatives – other than truck – for moving goods(e.g., rail, waterway)	❑
Labor shortages in the freight industry (e.g., truck drivers, longshoreman, etc.)	❑
Other (please specify:)	❑
Check this box, if you are not concerned about any of the issues listed above affecting your market and/or merchants/tenants in the next 5 years.	❑

17. Are you aware of any major transportation changes planned in your area that will affect how products move in/out of your market? If yes, please describe.

_____

_____

_____

Final Thoughts

18. Is there anything else about your infrastructure needs that you would like us to know? Please feel free to give us your thoughts:

_____

_____

_____

Please share your name and contact information so we can be in touch in case we have questions about your market. Be assured that your responses will be totally confidential.

Name_____

Email_____

Would you be willing to participate in a follow-up call to talk further about your infrastructure needs for the next phase of this project?

- ❑ Yes
- ❑ No

Thank you for completing this survey!

Please return using the self-addressed and stamped envelope included with the survey or mail to:

Kristen Park
Food Industry Management Program, Cornell University
475C Warren Hall
Ithaca, NY 14853

OTHER A.E.M. EXTENSION BULLETINS

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