

Food Hub in New Brunswick II

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Introduction

The Fall 2012 Community Development Studio worked with Elijah's Promise and the New Brunswick Food Alliance to explore the potential to create a community food hub. The Studio team built on the work of the Fall 2011 Community Development (CD) Studio that explored where food can be grown in New Brunswick and the Spring 2012 CD studio that examined the potential to create a community food hub in New Jersey. This semester, our partners asked us to 1) Better understand and map the farming landscape in New Jersey, 2) Explore how food moves around the state, 3) Investigate how food hubs handle aggregation and distribution and 4) Consider what food hub elements are already in place in NJ and how the Food Alliance might build on these elements to develop a food hub. To do this, the studio team mapped produce growers, markets, CSAs, and other distribution systems (such as the gleaning system). It interviewed farmers, market directors, emergency food providers, farmers, and food system experts. Learning about New Jersey's farming landscape and the problems farmers currently have helps to visualize the role a food hub could play in addressing these challenges in a way that benefits farmers and the local food system as a whole.

The report starts with an overview of food hubs. From there, the team looks at the problem of ag-in-the-middle and provides an overview of the landscape of farming in NJ. The report then turns to the potential to create a food hub in NJ and identifies the existing elements that could be woven together to enhance their capacity. The report concludes by considering how the partners might move forward in their efforts to create a community food hub in partnership with farmers.

Food Hubs

A food hub is a centrally located facility with a business management structure that facilitates the aggregation, storage, processing, distribution and/or marketing of locally produced food. While the terms "food hub" and "community food hub" are often used interchangeably, a food hub mostly deals with the aggregation and distribution of food, while a "community food hub" refers to a center which aggregates and distributes food and seeks to improve food security, provides education and training, and may engage in a variety of community development activities. To understand how these food hubs work, the team created a spreadsheet (see appendix A) and recorded how each hub handled a variety of tasks relating to produce transportation, number of farmers, demographics, storage space, and the advantages and disadvantages of working with the community. The team explored the demographics for each food hub, honed in on the challenges that each hub faces, and looked comparatively to find similarities and differences. The team used this information to identify four community food hubs to interview: Appalachian Harvest, Greensgrow Farms, Farm Fresh Rhode Island, and Oneida. The team chose these particular hubs for their innovative aggregation and distribution methods as well as their deep understanding of their community and geographic context. We hope that the rich, detailed portraits of these hubs will illustrate the possibilities for the New Brunswick Food Alliance, draw out some universal lessons and demonstrate the advantages/disadvantages of certain models.

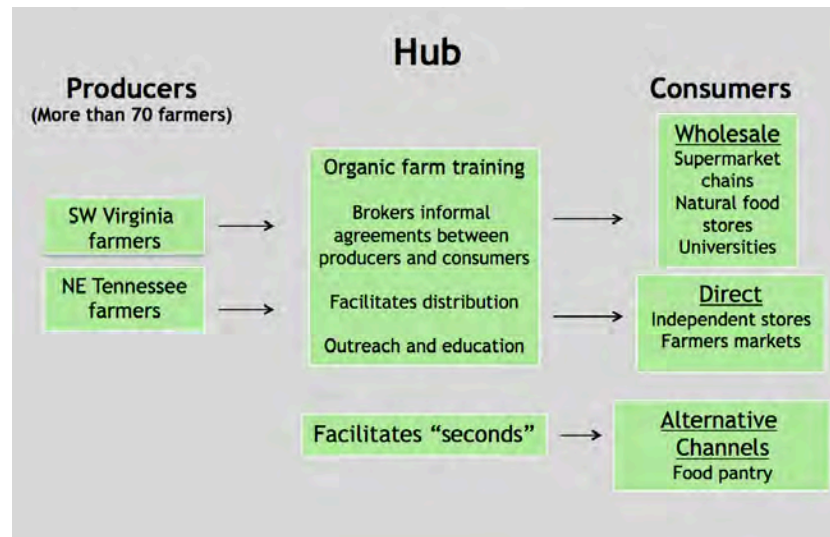
Community Food Hub Examples

Appalachian Harvest

"We had the 'wrong' demographics for sustainable and organic, but there was also a real need to support farmers and improve health behaviors... In this region, we are used to being behind the curve. But we were ahead of the local food movement and growing national consciousness about local and fair and organic food." Anthony Flaccavento, Founder of Appalachian Harvest (Schuman, Barron, and Wasserman, 2009)

The non-profit Appalachian Sustainable Development Appalachian Harvest (AH) founded Appalachian Harvest as a social enterprise to develop economic opportunities for farmers in southwestern Virginia and to ease the transition out of

tobacco production. It provides technical assistance, mentoring, aggregation and distribution services. It developed a 15,000 square foot aggregation and distribution facility in Duffield, VA. It leveraged grant income to expand its facilities and equipment and grow the business and is starting to make a profit. It has been successful in developing alternative market channels for seconds such as farmers markets and prepared foods and donations to food pantries (Appalachian Harvest website).

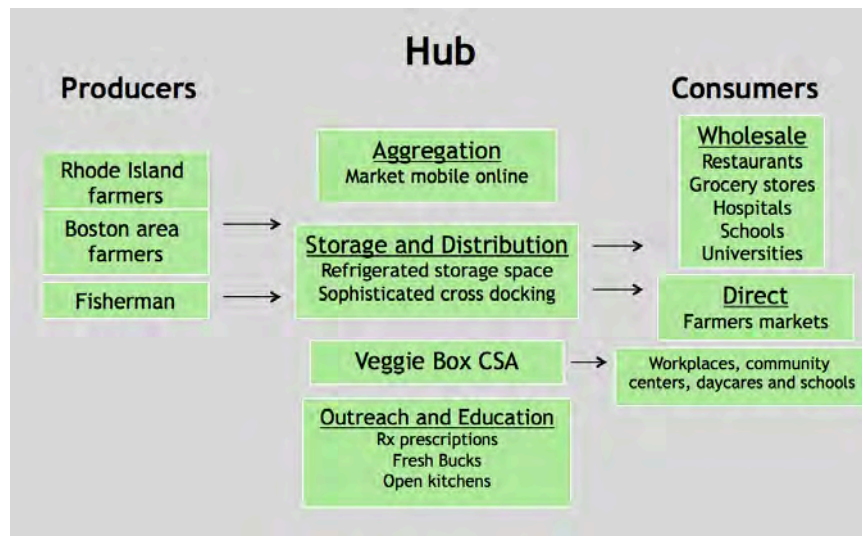


AH was a pioneer in marketing to retail buyers and has successfully established large wholesale markets. It focuses on supermarket chains, natural food stores and direct market channels and sells organic produce and eggs to regional supermarkets and specialty chains in the Southeast and Mid-Atlantic. Its informal, relationship-based approach to aggregation distinguishes it. AH is an informal cooperative. Members can sell through the hub, but AH does not take ownership of the product. It brokers agreements between suppliers and buyers. AH's flexible negotiation process helps keep prices stable and creates long-lasting partnerships (Diamond and Barham, 2012).

One challenge AH faces is a shortage of organic farmers. It has overcome cultural suspicion about organic farming through education and mentoring, and offers technical assistance to overcome environmental barriers. AH also struggles to maintain a cost-effective distribution system. Its facility is in a remote area and has too small a volume for competitive trucking prices. AH has compensated for these barriers by partnering with other distributors or picking up produce on the way back from deliveries. AH's community-based outreach and education activities also generate business opportunities. In this way, it has let education and distribution inform each other and form a natural synergy. It has taken a comprehensive approach to creating a market for organic food in its development of consumer demand and expansion of community supply (Richman, 2011; Appalachian Harvest website).

Farm Fresh Rhode Island

Farm Fresh Rhode Island is a community-driven food hub created in 2004 to get healthy food to low-income areas. They teamed up with Downcity Farmers, Pawtucket and Providence, the RI Department of Health, and the RI Division of Agriculture to preserve Rhode Island's farmland while creating a sustainable food distribution network. They sponsor up to 12 farmers markets which they run through their offices at their mill site near Pawtucket. They accept EBT, run a CSA and a delivery service, and have developed partnerships with restaurants, chefs and small grocery stores.



Through their website, www.farmfreshri.org, FFRI provides extensive community programming and aggressively seeks grant funding. These programs include their Nutrition Education and Healthy Seniors Programs, which provide nutrition and food education. Their Fresh Bucks Program converts credit and debit card payments into local currency coins called “Fresh Bucks” for use at the farmers markets. Recipients get 5 Fresh Bucks for every \$2. Local community groups distribute the coins, which help offset food costs for low-income families. They also participate in the Veggie RX program which gives extra spending power to the most in need through Wholesome Wave, a non-profit organization. Consumers receive a “prescription” for one serving of vegetables per day that they can redeem at Farm Fresh-sponsored farmers markets. This gets healthy food to low-income consumers and guarantees sales for farmers. They run a Farm to School Program and recently launched a Farm to Food Pantry Program. Their Harvest Kitchen, also new, focuses on commercial food processing and trains adjudicated youth in food processing. To make all of this viable, Farm Fresh has expanded its partners to include the RI State Department of Environmental Management Division of Agriculture, Americorps, VISTA, the Providence Housing Authority, Rhode Island Foundation, and local WIC clinics. They look to these organizations for money, staff, voice, and clients.

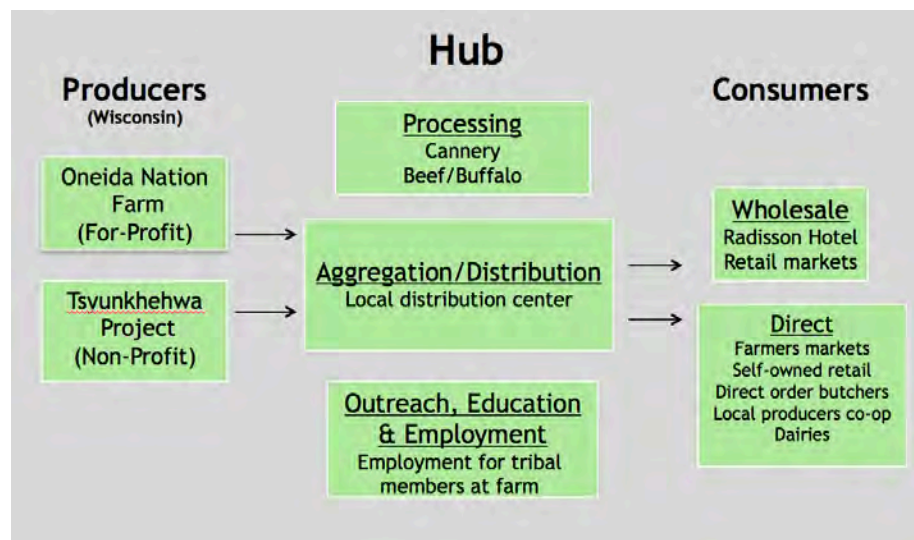
Their interactive website is a highly dynamic place for current and potential producers, consumers, and entrepreneurs. Farms showcase their produce and where to buy it, creating traceability and a personal connection. Consumers can select specific produce, find farmers markets, and join the Veggie Box CSA. They identify churches, bakeries and others that rent their unused processing space and they explain how to become certified to process at home. Each restaurant and grocery store member has a website profile and shows where they get their produce. This extends the traceability of Farm Fresh sponsored produce and gives positive exposure to businesses that buy local (Farm Fresh Rhode Island website). Once a year they meet with farmers to discuss what should be planted the next year. The hub gathers information from online ordering and what is sold at farmers markets, which they share with farmers to predict the following year’s demand in the hopes of helping farms plan to improve their bottom lines and reduce waste (Farm Fresh Rhode Island; Mellion, 2012).

They facilitate aggregation to wholesale and direct markets through their virtual hub and distribute using their Market Mobile. Consumers, chefs, restaurants, and small grocery stores create an account and place orders for delivery and pick-up. Farmers bring their produce to the hub where employees package and organize deliveries. They coordinate price lists and delivery dates with an online database. They have refrigerated and non-refrigerated storage space and

their cross docking system allows for continuing movement of produce. The Market Mobile also delivers orders placed in the Veggie Box CSA. The delivery service helps 60 local farmers sell and distribute their products to over 200 customers. Farm Fresh rents out 16,400 square feet of space for the office, vendor storage, and the Market Mobile. They have multiple levels of refrigerated systems and two loading docks. This space allows for the Market Mobile, farmers' markets and Harvest Kitchen to function and produce revenue for the organization (Farm Fresh Rhode Island; Mellion, 2012).

Oneida Nation Farm and Tsyunhehkwa Project

The Oneida Nation Farm is a farm and a non-profit community food hub the Oneida Tribe of Indians of Wisconsin owns. It consists of a for-profit entity established in 1976, the Oneida Nation Farm, and a separate non-profit entity, the Tsyunhehkwa (pronounced Jun-ik-wa) Project, established in 1994. The Tsyunhehkwa Project is the community food hub which processes and distributes the farm's products. It focuses on sustainable production, processing and distribution



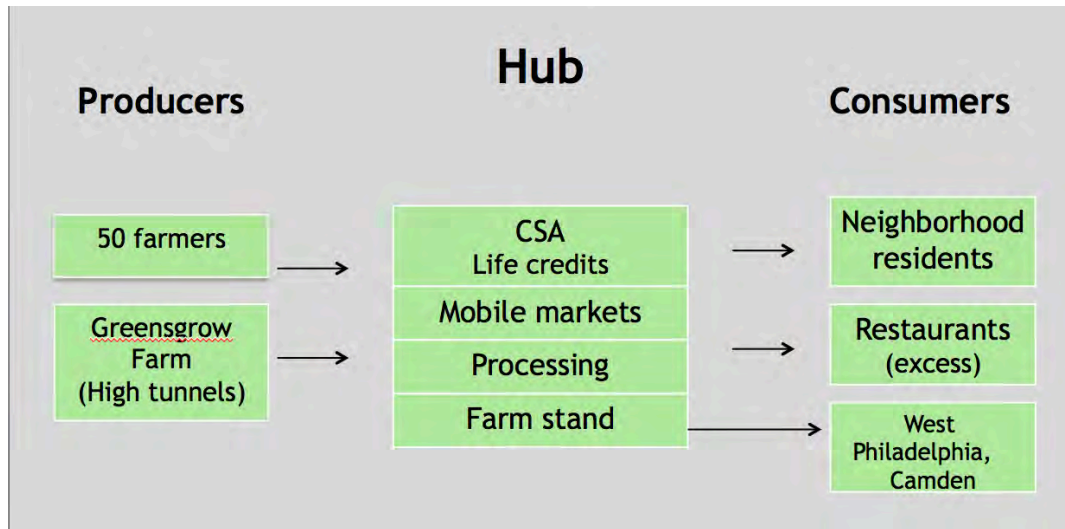
practices, food security and food education. It owns an 83-acre certified organic farm and a cannery which processes farm products into value-added products. The Farm's products include beef and buffalo, field crops, including corn, soybean, alfalfa and winter wheat, and a variety of produce such as sweet corn, squash and pumpkins. Oneida also owns a 4,000-tree apple orchard established in 1994.

They sell through wholesale and direct market channels, including their self-owned retail store, their Raddison Hotel and local retail stores. The Farm provides employment for Tribal members and fresh food to the reservation and the nearby Green Bay community. Food stamps can be used in Oneida's farmers market and retail stores, which ensures that the low-income community can access fresh food and have opportunities to learn about the importance of food in a healthy lifestyle.

Oneida Nation was in the unique position to create its own self-contained food system. It has taken advantage of its existing network of business enterprises as a wholesale market for its farm products. It sells direct to consumers at three farmers markets and its self-owned retail store. It also has direct orders from consumers such as butchers. Of its commodity crops, 10% is used as feed for herds, and 90% is sold to large area dairies and a local producers' cooperative (Richman, 2011; Oneida Nation Farm).

Greensgrow Farms

Greensgrow Farms started as an urban agriculture venture in 1998 in Philadelphia's Kensington neighborhood. Its mission is to promote social entrepreneurship through land reuse. In the process, it connects urban dwellers with rural food producers and promotes sustainable practices in Philadelphia homes and gardens at Greensgrow.org. They run a variety of programs and attain most of their revenue from their summer and winter CSA (City Supported Agriculture). It also runs a farm stand on its main farm. Greensgrow grows produce at three farms. Because their yield is small, compared to the number of residents they serve, they combine their harvest with food from about 50 farms in the region. All of this produce is packaged at Greensgrow and distributed through the CSA. The Life Credits program enables low-income residents to use food stamp credits to purchase CSA shares during the summer.



As an urban farm, Greensgrow considers community a key part of their mission. Not only do they support local entrepreneurs, but they offer community education in composting, hydroponic growing, and raising bees. They also have a mobile produce market, a food truck which provides reduced price food to low-income residents in West Philadelphia and Camden. The Philadelphia Project is their non-profit arm which supports green ideas.

Greensgrow is the only urban agriculture model we studied. Its unique land reuse philosophy views urban agriculture as one of the best interim uses for brownfields which cannot be immediately redeveloped. In post-industrial cities like Philadelphia, these types of contaminated lands often result in vacancy and blight. In low-income neighborhoods like Kensington, putting formerly industrial and environmentally contaminated vacant lands back to productive use can be an important part of a neighborhood revitalization strategy (Interview: Rebecca Frimmer, 12/9; Greensgrow Farms website and onsite visit).

Common Issues and Solutions

This is a sampling of the diverse food hubs we studied throughout the semester. As you can see, each is unique. How they work depends on their location, producers, founding organization and objective and community need. From these organizations, we identified some common issues and characteristics to help inform the Food Alliance's efforts to create a food hub.

First, the hubs we featured are attuned to the unique characteristics of their local farming culture. They use this knowledge to structure the separation of responsibilities between farmers and management team. Informal brokerage relationships such as Appalachian Harvest's pseudo co-op enables a more hesitant farming community to retain ownership of their product. In this way, the hub can slowly build trust and rapport. An interactive website makes the "business" of a

food hub highly dynamic. It also encourages efficiency, minimizes entry barriers for small farms and consumers and helps target customer demands.

Second, hubs are flexible and creative in transportation arrangements. With an interactive website, they arrange highly sophisticated cross-docking services as seen in the Farm Fresh Rhode Island model. In some cases, warehousing facilities and supplier/buyer sites are not optimally located. To address this issue, hubs get the most of deliveries and make sure trucks are full in both the coming and going legs of deliveries. Extra space is filled with hauls for community groups and food pantries. Appalachian Harvest uses extra truck space to deliver produce seconds to a regional food pantry. Greensgrow uses the truck itself in its mobile market.

Third, hubs leverage their reputation and community trust to approach local buyers. For example, Farm Fresh Rhode Island approached buyers like the Rhode Island School of Design. Hubs were also ambitious in establishing connections with wholesale markets which aligned with their mission. Appalachian Harvest, for example, successfully connected to grocery chains like Whole Foods. Finally, hubs created alternative market channels for seconds and extra produce to improve community food security. Appalachian Harvest created a program which raises funding from local community groups like churches to purchase seconds at a discounted rate. The seconds are donated to a regional food pantry. Greensgrow Farms created their own processed food brand which uses their extra produce.

Fourth, hubs take advantage of the natural synergies between their hub and community activities. Their missions to increase access to fresh food to their low-income populations infiltrate their programs. They extend programs for the general community to low-income people and/or create programs for low-income people which work in tandem with their other programs. For example, Farm Fresh Rhode Island's Fresh Bucks program doubles the purchasing ability the low-income population at their farmers markets. Greengrow's Life Credits program works in tandem with their normal CSA to serve low-income people.

In summary, we want to emphasize the relationship-based nature of community food hubs. The hubs we looked at changed their food systems. They did this, not only through creating infrastructure and establishing markets, but through establishing farmer trust, wooing wholesale outlets, and educating communities to create markets for healthy foods. Elijah's Promise's reputation, networks and history of service in partnership with the New Brunswick Food Alliance, is a great foundation for the creation of a community food hub in New Brunswick.

We turn now to an exploration of the problem of ag-in-the-middle that drives some farmers to food hubs.

Ag-in-the-Middle

Agriculture in the middle refers to farms that are too small to participate in vertically integrated commodity markets but too large to participate solely in direct markets (Kirschenmann, 2008). Ag-in-the-middle is “a market-structure phenomenon. It is not, strictly speaking, a scale phenomenon. Yet, while it is not scale determined, it is scale related. That is, farms of any size may be part of the market that falls between the vertically integrated, commodity markets and the direct markets” (Kirschenmann, 2008: 1). These farmers may not produce enough to contract with major institutions or corporations and may need help reaching broader retail or wholesale markets. Food hubs might provide the aggregation these farmers need, plus services like post-harvest processing, aggregation, and connections to consumers and institutional buyers (Barham et al., 2012).

Since ag-in-the-middle refers to a market function rather than an explicit farm characteristic, it is hard to identify the universe of farms in this category. These farms are often defined in terms of size, business characteristics, and/or production and marketing strategies. Size is frequently used to identify them since ag-in-the-middle farms tend to be larger family-run farms in which the owner is responsible for much of the labor and uses farming as the main source of income (Characterizing Ag of the Middle, 2012). However, as the Agriculture of the Middle Initiative (2012) points out, the size of farms that fit the criteria varies with geographic region, crop type, and market. Using physical size to identify these farms is problematic as NJ produce farms are very productive, so a small NJ farm might really fit in the category of ag-in-the-middle although it does not appear to based on its size. The United States Department of Agriculture defines ag-in-the-middle as farms that gross \$250,000 to \$1,000,000 in sales, but again, that captures few NJ farms.

Small- and mid-sized farmers face many challenges in getting food from farm to customer. These challenges occur all along the road from production to market. Many farmers are “challenged by the lack of distribution and processing infrastructure of appropriate scale that would give them wider access to retail, institutional, and commercial foodservice markets, where demand for local and regional foods continues to rise” (Barham et al., 2012:1). These farmers may produce too much for their current market, resulting in food waste and an inability to maximize profit. Alternatively, they may not produce enough or have enough variety to reach a larger market. The farmers that fall on this scale tend to be mid-sized farms also known as agriculture of the middle (Kirschenmann, 2008).

Without infrastructure, farmers have limited market and distribution options and high transaction costs (Barham et al., 2012). Smaller farmers can take advantage of farmers markets and other direct market options, but the mid-size farms struggle with reaching direct and wholesale markets, and they may lack access to facilities to store, process, and transport products. Without storage and processing facilities, it is hard for them to do value-added production which could increase profit margin and minimize loss. Farmers markets are important outlets for many of these farmers, but they require significant investments of labor and time. Farmers are limited in how many markets they can participate in. In addition, they may want to expand production beyond the capacity that can be handled within farmers markets (VanVranken, 2012). Or they might have access produce that they would like to sell outside of the farmers markets. Small and mid-sized farmers have a more difficult time accessing wholesale markets as large institutions would rather buy product from distributors than invest additional money and time in buying from multiple farms (Barham et al., 2012). The limited access to a wholesale market can make it difficult for farmers who want to expand their size and variety of product. However, some agriculture in the middle farms participate in aggregating organizations such as co-ops and in wholesale markets and some even manage to use some sort of value-added production to increase profit.

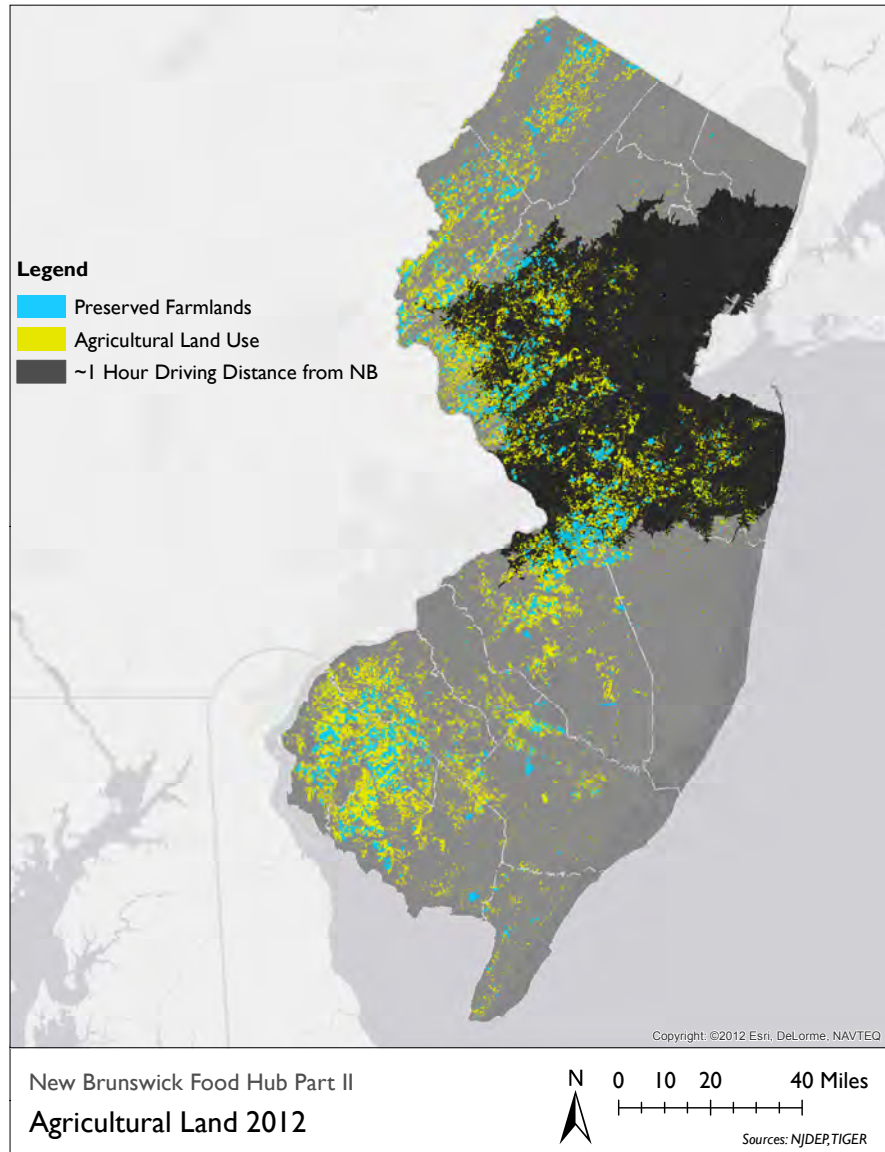
Interstate and international competition is another obstacle for farmers trying to sell locally. For institutions like Elijah's Promise, it is often cheaper to purchase bulk food from California or Florida rather than to source locally because of the lack of a local distribution system that effectively moves products from multiple farms to the buying institution (Finston, 2012). For example, to get an order of 1,000 pounds of tomatoes, Elijah's Promise could call and place an order across

the country and have them delivered for a certain price. However, to source locally requires going through multiple co-ops to find the best prices from the farmers or to access the variety needed to fulfill the order. Some of these co-ops deliver while others require pick-up, which presents transportation problems. Not only does Elijah's Promise have to source all of the produce using several organizations, but it also has to figure out the cheapest way to transport the product to New Brunswick. It is a challenge to access locally grown food directly. The food is there but it requires massive amounts of time and energy to get it (Finston, 2012).

Map 1. Agricultural Land

These aggregation and distribution difficulties have made it difficult for farmers to reach their local buyers. A food hub could alleviate some of these problems by providing the resources and infrastructure necessary to address them. By connecting buyers and sellers and potentially also aggregating goods, a food hub can build relationships between buyers and sellers that make it easier for institutional buyers to buy local. Building relationships, as we've seen above, can help farmers understand what buyers want and help buyers get to know their farmers. The hub can also address transportation issues with the objective of easing the strain on farmers and on buyers. The hub could ensure traceability and create the documentation structures that enable buyers in

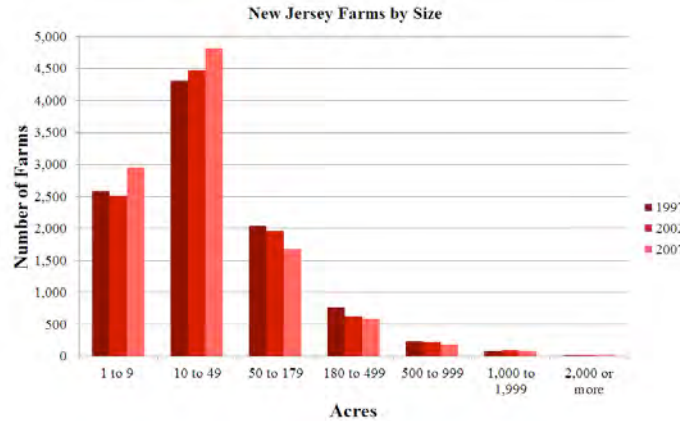
universities, hospitals, and other institutions to purchase. And, a food hub could facilitate the movement of fresh food into the emergency food system. In the next section, we turn to an overview of the landscape of farming in NJ to better understand how big our farms are, where they are, and how many sell through direct retail outlets, a phenomenon that may suggest a growing need for a food hub in the future.



New Jersey's Farming Landscape

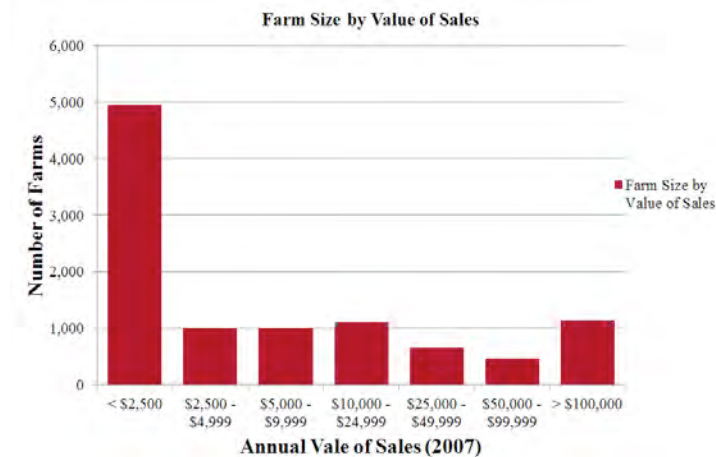
Even though New Jersey has lost many farms, it still has many small farms (it ranks around 40th in terms of total farm acreage nationally) and it is known for its high produce yields (Schilling, 2012). While there are some smaller farms near urban centers, its large agricultural areas lie to the south, west, and just south of Central Jersey (Rabin, 2012; see Map 1). In the last few years, the number of small farms between 1 and 49 acres has been increasing and the number of farms between 50 and 499 acres has been decreasing (see Figure 1 and Map 2).

Figure 1. New Jersey Farms by Size 1997-2007

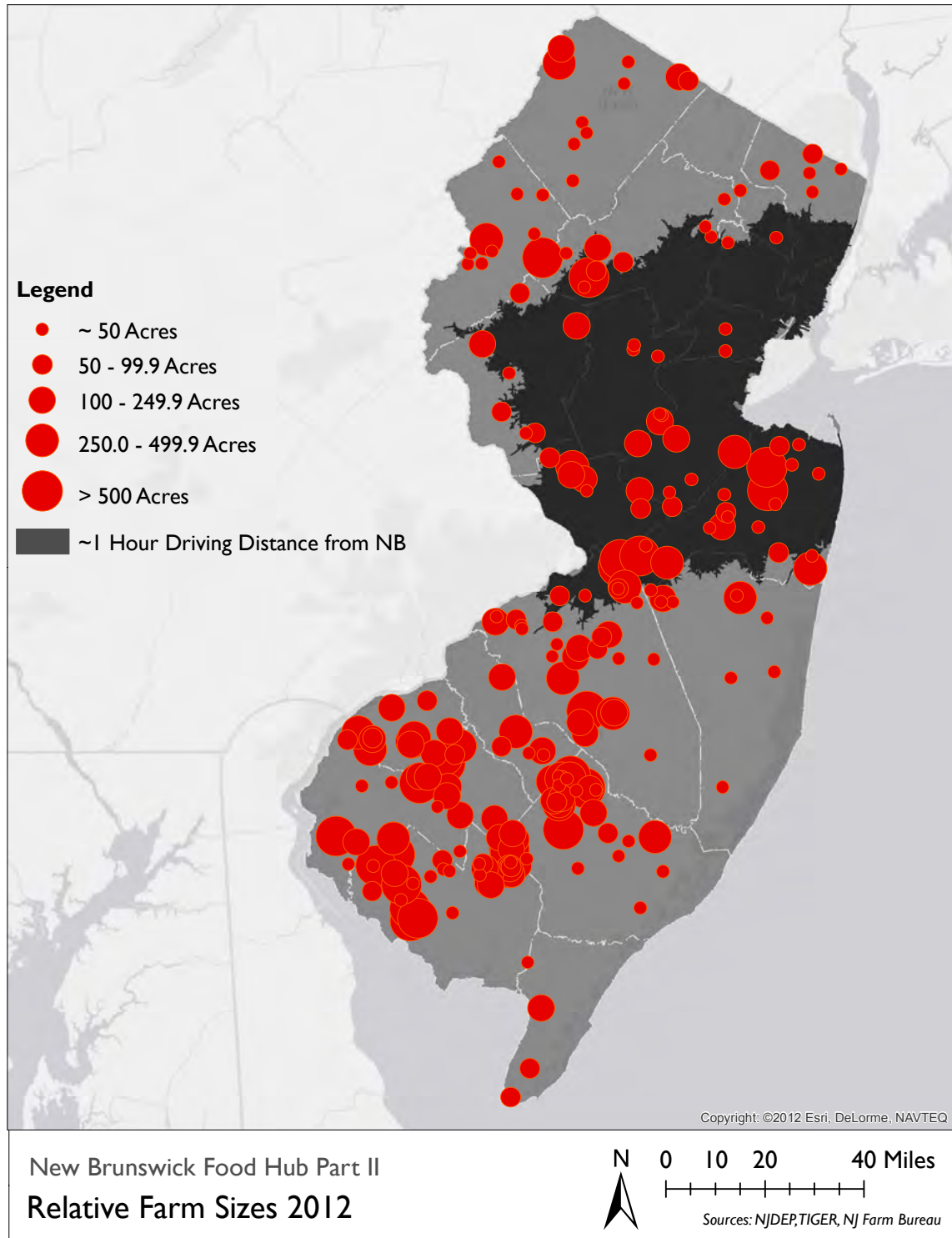


To understand the farming demand for a food hub, we attempted to identify which NJ farmers fall into the ag-in-the-middle category. But this proved difficult since, as we discussed earlier, ag-in-the-middle is a function of market rather than of farm size measured as acres or revenue. And many farms grow very little. Nearly 7,000 NJ farms make less than \$10,000 annually (see Figure 2). These farms account for 67% of farm operations yet produce less than 1% of the state's farming output (Brennan, 2011). In New Jersey there is a five acre requirement to receive farming property tax incentives and farms need only produce \$500 of product (Schilling, 2012). These small farms can be excluded from farms targeted for a food hub since they are not producing enough to benefit from a food hub and most likely are not interested in the services they could provide. Farms with less than \$250,000 in gross sales number 9,641, account for 93% of farm operations and are responsible for 16% of sales (Brennan, 2011). This is the range we think is likely New Jersey's target for a food hub.

Figure 2. Farm Size by Value of Sales 2007



Map 2. Relative Farm Size 2012



Given how difficult it is to find ag-in-the-middle farms by size or gross revenue, we opted not to survey farmers and instead spoke with farmers at local farm markets and an auction to better understand their interests and concerns and we reviewed two recent reports that surveyed NJ farmers on similar issues. The farmers we spoke with at the farmers markets were happy selling only to the markets and had no need for or interest in a larger wholesale market. But it was difficult for us to explain what they might get out of a food hub because we couldn't quite explain what the food hub was. Food hubs generally have emerged as collaborative efforts between farmers and whoever is organizing the hub (which, in some cases, is the farmers themselves). The collaboration is what shapes whatever the hub will become. In our case, the discussions of what a food hub can be need to happen between the farmers and the Food Alliance to see if it is possible to create something that would meet everyone's needs.

The two recent reports did shed some lights on farmer concerns that offer some helpful thoughts that the Food Alliance might consider before meeting with farmers. The 2007 Market Ventures Report that was done when people were thinking about creating a new wholesale farmers market in New York City sheds light on the needs and desires of farmers in this area. Many farmers show interest in a year-round market. However, this would depend on the understanding that their participation would depend on several things, including the weather, the number of days per week and the number of hours per day they would be required to attend. While there should be some flexibility in the number of days, say three to six days a week, there should overall be a minimum of a three month commitment to the market. This prevents farmers from coming in on a high sale day and dumping on the market, making the prices bottom out. To support local farmers, only farmers from adjacent states can participate. Further, 50 percent of the produce sold by one farmer has to come from that farmers' farm; the rest can come from other farms, as long as they are located within a 20 mile radius. Finally, in an attempt to ensure previous customers return, the farmers felt that there should be different times for sales to wholesalers and the public (Market Ventures, 2007); this would enable the farmers to make maximum profits. In short, the report raises questions and tensions related to some important topics that might help frame a discussion with farmers: who participates, what sort of commitment will a hub entail, how much produce can be non-local, and how price is arranged.

Storage and distribution are two elements that would be important for any food hub. The Market Ventures report found that many farmers would like cold storage to leave the cold chain unbroken. However, some farmers feel that this would be redundant, since many already have refrigeration on their farms or in their refrigerated trucks (Market Ventures, 2007). The Food Alliance might consider the challenge of refrigerated trucks since drivers often leave them running to maintain the cold. Some communities have installed plug-in stations to improve driver conditions and reduce particulate emissions.

Along with storage, distribution is viewed as the key element for success. However, there are some concerns about distribution, but as one farmer stated: "Perhaps because they are so focused on being direct marketers who sell to their end users (retail customers and some individual wholesale accounts), they did not envision the wholesale farmers market as a distribution node itself, which would have wholesale buyers and private distributors as primary customers" (Market Ventures, 2007:105). This raises a question about who would buy from a food hub. Many of the food hubs we discussed above sold direct to institutions. Could a food hub sell to distributors?

The Delaware Valley Regional Planning Commission (DVRPC) conducted the second study that informs this work. DVRPC surveyed the Greater Philadelphia food system actors to better understand how food moves through the region and how to best manage it into the future. The target range was a 100 mile foodshed around the city of Philadelphia, which includes all of New Jersey, Eastern Pennsylvania, and parts of Delaware and Maryland. The report looked at the existing state of production and distribution. They found farmers markets were more successful if they had market

managers, and the managers identified advertising, publicity, and local food promotion as the most common issues impeding market success (DVRPC, 2010:61). Location plays a large role in success. An average of 61% of customers travel five miles or less to get to a farmers market while only 5% traveled more than 20 miles (DVRPC, 2010:61). This may be useful if the NB Food Alliance considers creating farmers and other direct markets within or related to the food hub.

The report also noted that farmers face a decline in agricultural support businesses in the region (this is a point Jack Rabin at Rutgers frequently makes). This includes resources like finding wholesale markets, equipment rentals, labor, training and education programs, and financing. With a rise in direct market sales, many farmers are finding that they need to hire staff to secure retail contracts, fulfill orders, or sell at markets (DVRPC, 2010:62). A food hub may be able to help with this work and may find that working closely with farmers to understand these challenges may enable a collaborative effort between farmers and community to find a new strategy that would improve the system. A food hub could potentially offer services to help farmers navigate these kinds of financing channels to get them the most benefit for their investment.

This report emphasized that the food system is economic development which needs technological and financial support just like other economic enterprises. Their stakeholder analysis showed demand for regional processing and value-added activities. Local producers have echoed these concerns in prior studio projects. They note that the Rutgers Food Innovation Center helps to grow food produce companies but after the companies grow, it is hard for them to find a suitable place to produce within New Jersey. Stakeholders also note that technology is another big concern, with one respondent suggesting developing a system to connect trucks with inventory warehouses and demand at retail locations to minimize the amount of time product stored at warehouses (DVRPC, 2010: 148). Without a doubt, technological advances could facilitate moving products around to reduce waste and maximize what farmers sell. These systems could also move excess produce more efficiently into the emergency food system.

We expect that it is only by working with farmers that the Food Alliance can develop a food hub that makes sense given NJ's context. We turn next to review how and where farmers sell their food focusing on direct retail markets and some larger wholesale auctions that have a long history in NJ.

Retail and Wholesale Markets

What a food hub looks like and how it operates depends on the context. How the farmers are organized, the geography and landscape of farming, existing relationships and capacities, and the ways that each sought to reach consumers is different in each place. While the essence of a food hub is the same, how precisely the pieces fit together depends on who does it and what they hope to achieve. To consider developing a food hub in New Jersey means getting to know the landscape of farming, what people grow and where they grow it, and how that produce is aggregated and distributed. New Jersey has a robust food economy infrastructure. Building a food hub should build on that infrastructure, not reproduce it.

Figure 3: Farm Produce Distribution (Direct and Indirect Markets)

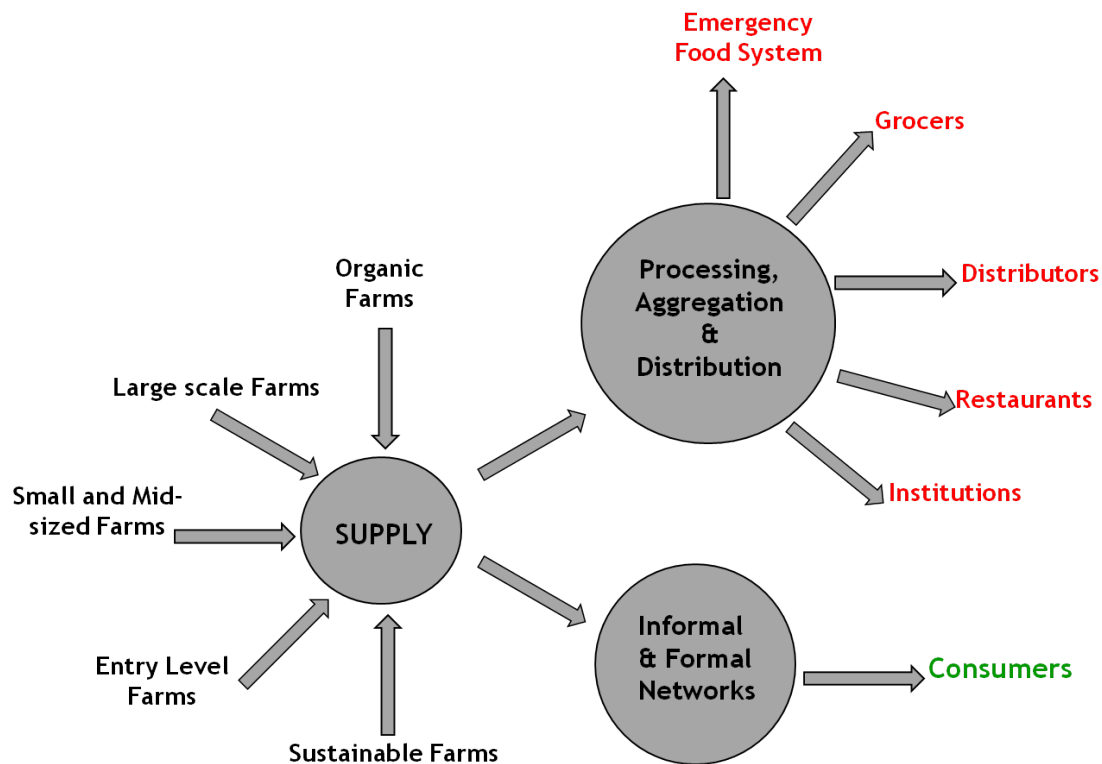
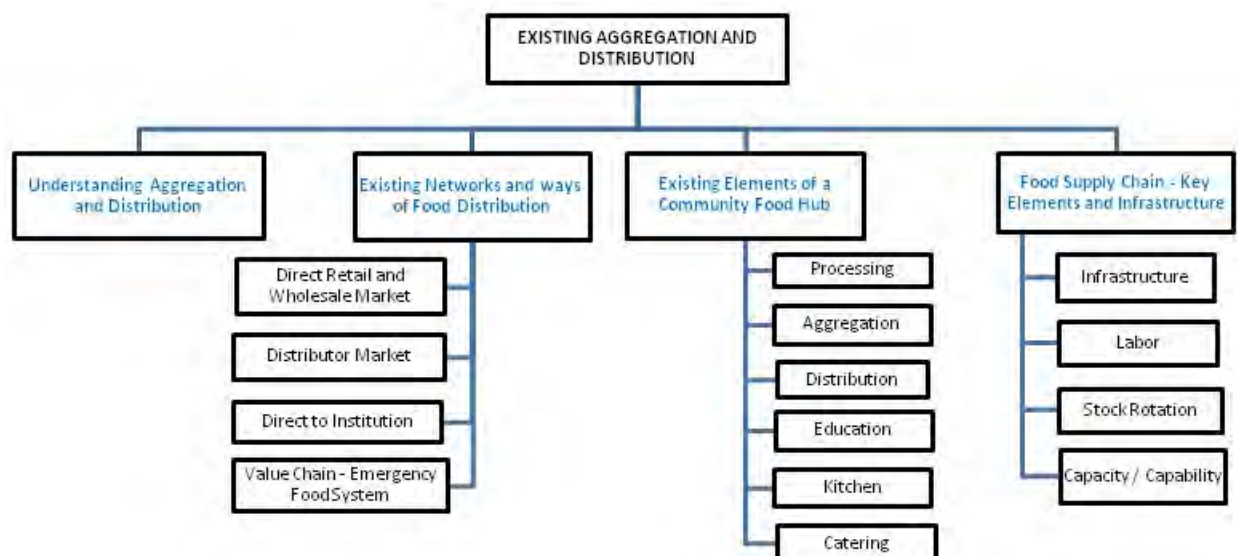


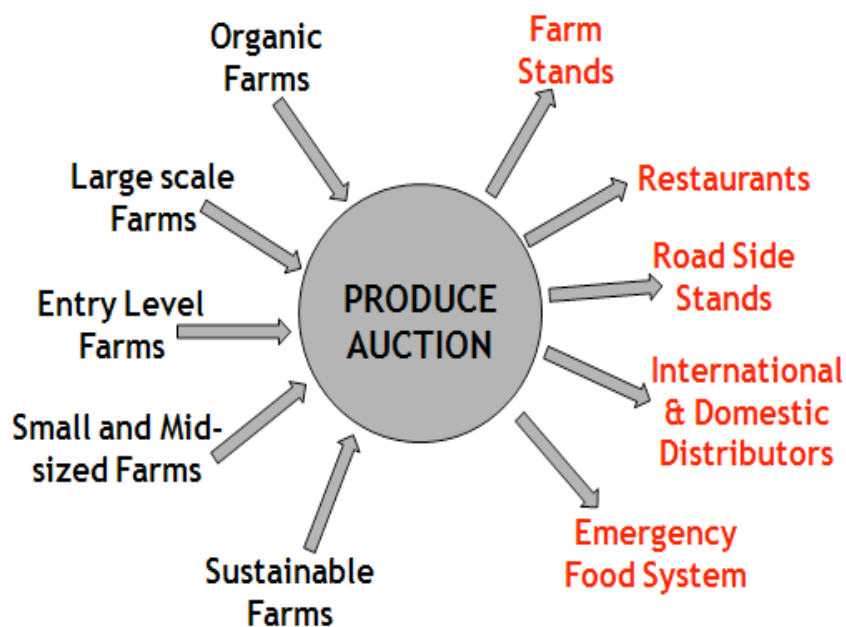
Figure 4: Framework to Understand and Analyze Existing Aggregation and Distribution Networks and Systems



We identified existing elements of non-aggregation and distribution elements of food hubs in NJ. Drawing from the previous reports, we found resources that could help support the potential for a food hub.

New Jersey has a complex food aggregation and distribution system that includes different approaches to meet farmer and consumer needs. While it is too ambitious to map out this system in its entirety, we started by exploring how farmers get their goods to consumers. How this happens depends on farmer location, farm size, type of output (produce, ornamental, livestock, etc.), and realized value in the market. NJ has a long history of produce cooperative marketing and there are ten cooperatives in NJ (Jersey Fresh). These cooperatives offer an array of services including wholesale sales provision, post-harvest treatments including packaging and branding, value addition and promotions, financing options for growers, and cold storage and warehouses. Some of the larger NJ farmers participate in wholesale markets such as the Vineland Produce Auction and other larger regional operations like the Philadelphia Wholesale Produce Market. In these markets, well-developed supply chains provide a vast selection of local and seasonal produce. Extra services like delivery systems, custom packaging, and wholesale pricing offer customers tailored experiences. While customers may be individuals, the majority are brokers or large distributors. It may be difficult for small farmers to sell within these markets because of the standards required for lot sizing, packaging, and transportation.

Figure 5: Produce Auction Distribution System



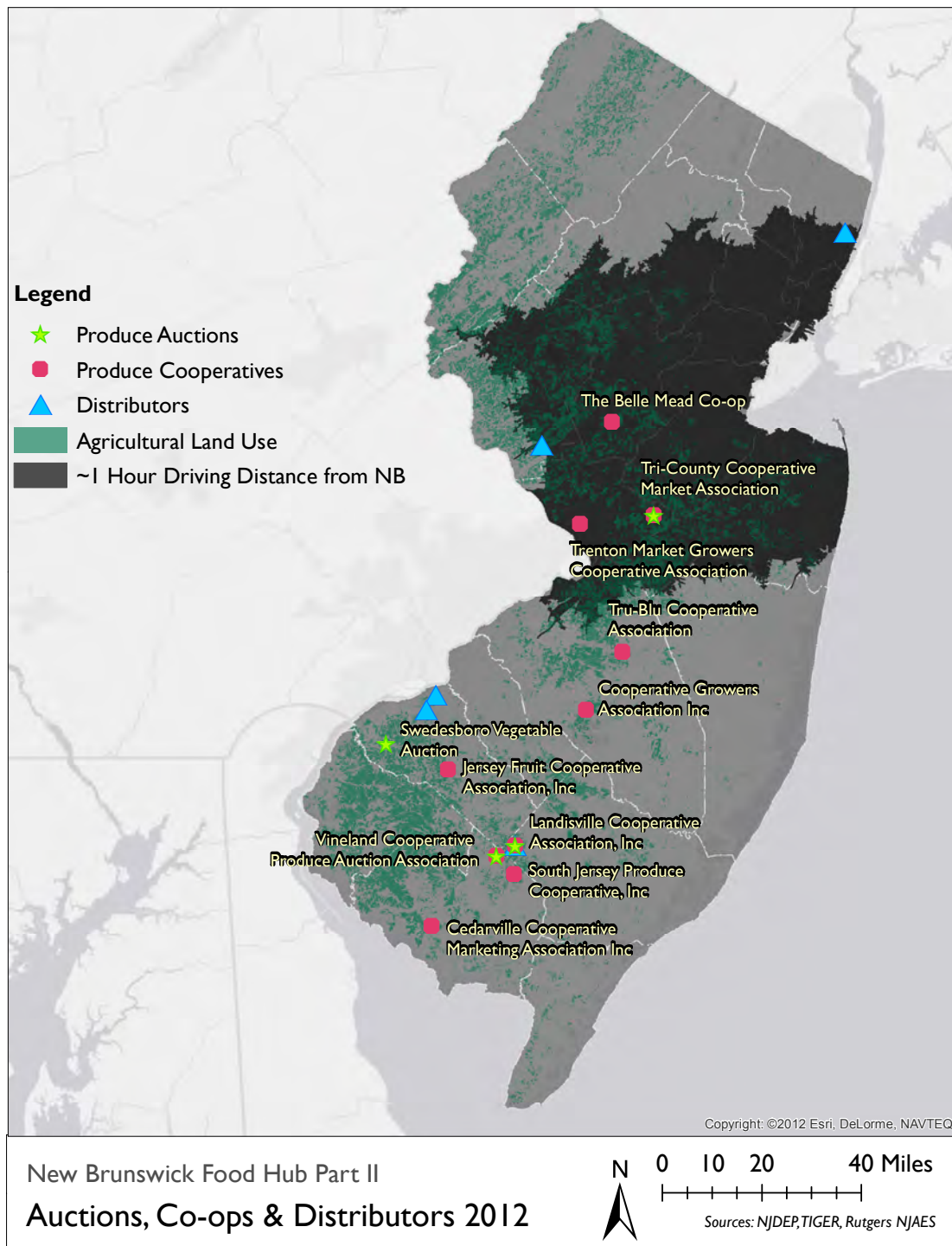
New Jersey was one of the first states to hold produce auctions and it is still home to four large produce auctions. The South Jersey auctions, such as Vineland, which is the oldest and largest and has regional and international clientele, cater to larger growers. Tri-County Cooperative in Hightstown is a farmer cooperative that holds direct sales and a weekly auction. Two cold storage units are on-site, and a tomato cold room is pending. Pallets and standard produce boxes, which are for sale, are a necessity for any farmer wishing to sell their produce in a wholesale market. Because of

its location in Central NJ and the role it already plays as a produce aggregator, we were interested in learning more about how it works and whether this might be a way to tap into an existing aggregation infrastructure (see Map 3).

The USDA identifies Tri-County Cooperative as a food hub. It is an integral player in the agricultural community, and fills a niche in the aggregation and distribution networks that link smaller farmers with each other to support farmers individually and collectively. Many farmers run their own farm stands and markets but they may not grow the variety of produce themselves. At the farmer cooperative run Tri-County Cooperative, they buy and sell produce with other farmers to round out what they offer. Most of the sales are between farmers to fill gaps in produce varieties which are then sold at farmers markets, or to landscapers, in the case of ornamentals. The direct market is operated efficiently, where farmers and other buyers place orders ahead of time which Cooperative staff compile for ease of pick-up. Many farmers prefer this arrangement because the prices are set for seller profitability, the orders are prepared in advance, and it preserves a long-standing tradition within the farming community (Kaufman, 2012). Tri-County also keeps products like eggs and cranberries on site for sale to direct markets. While many of the farmers who buy and sell at the Cooperative participate in farmers markets, they are part of the farming population that produce too much to rely solely on direct retail markets. Also, most, if not all, of these auction sites donate surplus produce to food pantries through the emergency food system. Farmers Against Hunger maintains a refrigerated truck at the Cooperative and uses space in the cold storage units for gleaned food before distributing into the emergency food network.



Map 3: Vegetable Auctions and Farming Cooperatives



While ag-in-the-middle farmers may participate in these larger markets, we expected that many sell to consumers directly. Farmers may participate in roadside stands, tailgate markets, and they may open their farms for gleaning or picking leftover produce for the emergency food system (see Table 1).

Table 1. NJ Retail and Wholesale Produce Outlets

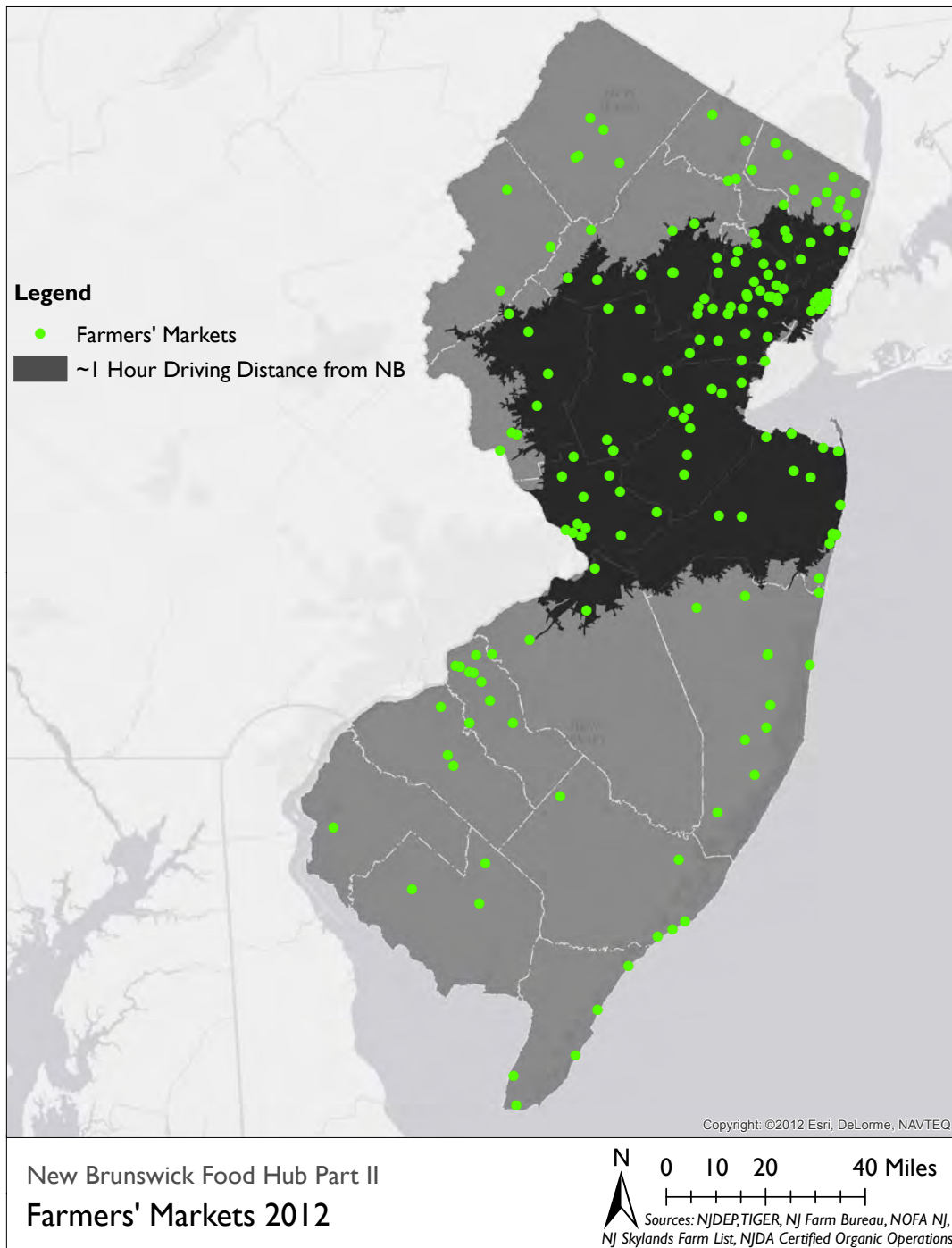
Retail	Wholesale
46 CSAs	4 Auctions
156 Farmers Markets	10 Cooperatives
168 Pick-Your-Own Farms	
526 Roadside and Farm Stands	

Farmers Markets

Farmers markets are a popular model of direct farm to consumer distribution. Consumers are more aware of fresh and locally grown food and may enjoy buying produce from farmers. New Jersey witnessed a nearly 400% increase in the number of farmers markets in the last the twelve years, from 40 in 2001 to 156 in 2012 (Feehan and Coren; 2008). Map 4 shows the distribution of 156 farmers markets in New Jersey. Perhaps reflecting the population density in the northeastern part of the state, there is a higher concentration of farmers markets there. Many farmers markets are within a 45 minute driving distance from New Brunswick.



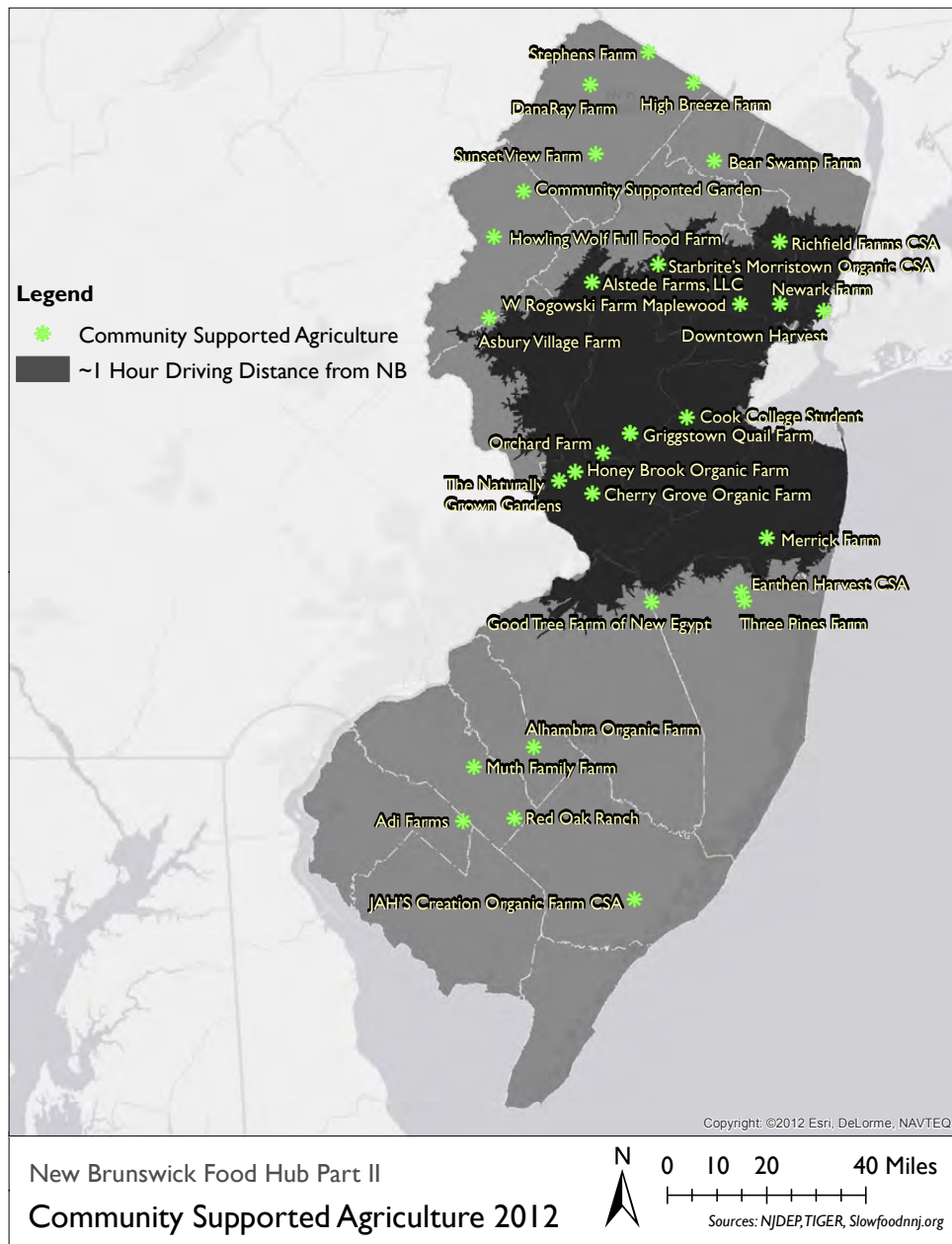
Map 4. Farmers Markets



Community Supported Agriculture (CSAs)

Like farm markets, the number of Community Supported Agriculture (CSA) efforts has grown and there are now 46 active CSAs (see Map 5). New Jersey is home to HoneyBrook Farms, one of the older, larger, more successful CSAs, and it has been joined by many others. Most provide vegetables and fruit shares but farms have attempted to source other locally produced food as well. Griggstown, for example, tried to source bread and other items during its first year. Some CSAs require full payment in advance but others spread out payments. The CSA arrangement provides farmers with an upfront and predictable income from committed consumers.

Map 5. Community Supported Agriculture (CSA)



Roadside and Farm Stands

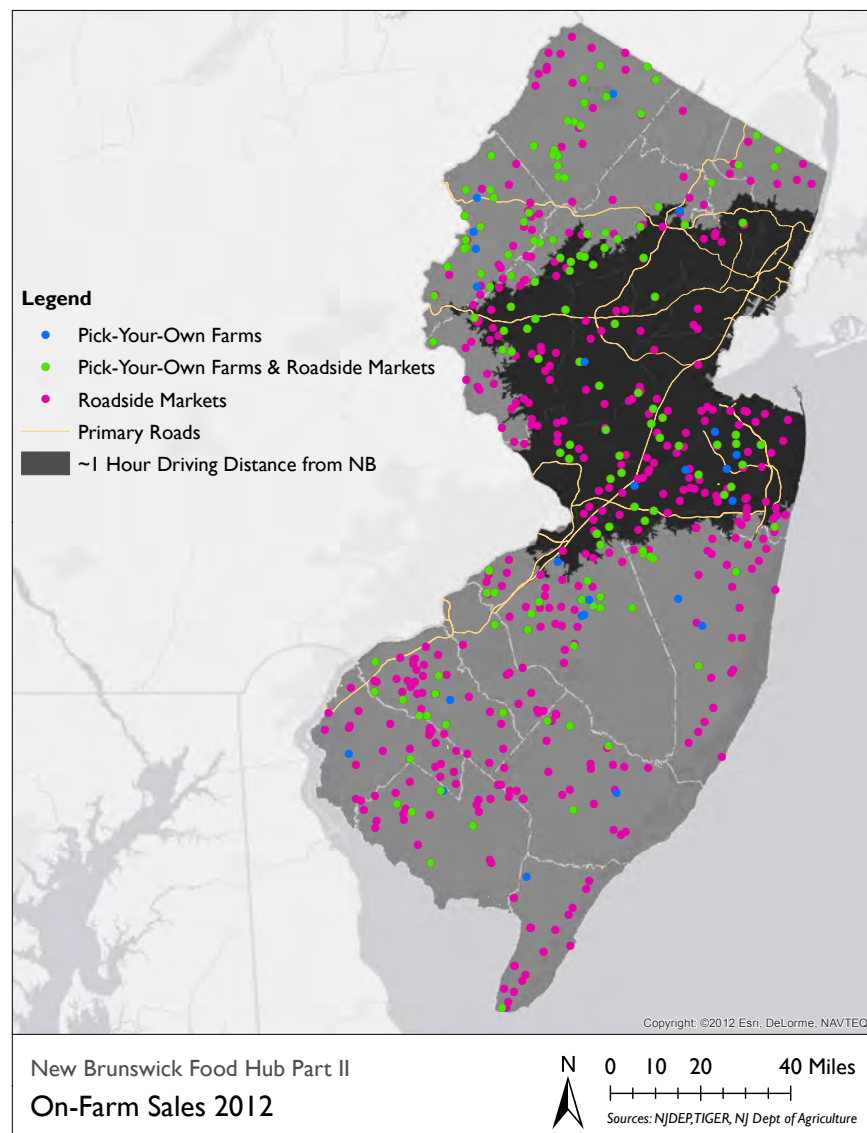
Many farms also run roadside and/or on-farm farm stands; there are 524 in New Jersey (NJ Jersey Fresh website).

Farmers may get better prices for their produce by avoiding transportation cost and selling directly. These may be family run and present a social and community/consumer building opportunity. This is especially important given the challenges fringe farmers face as suburbia creeps into former farmland (Rabin, 2012). The farm stand or roadside market is likely just another market that the farmer manages. If the farmer is tending the farm, participation in other farm markets, and hosting an on-farm market or stand, this presence may be fulfilled by a family member.

Pick-Your-Own Farms

Like other direct marketing models, pick-your-own farms have been gaining in popularity over last few years. Currently, there are 168 farms that host pick-your-own programs. These are often seen as an opportunity to link recreation with access to fresh produce and there is a growing interest in agritourism.

Map 6. Farm Stands, Pick-your-own farms, and Road-side Stands



Tailgate Stands

Tailgate farm stands are less formal than the outlets described above. Sometimes these are also a part of weekly farmers markets, or they can be seen in busy commercial areas. There is no comprehensive information about the number and location of these stands.

Farm to Institutions

Some farmers sell direct to institutions including K-12 schools, universities, hospitals and prisons. Selling to these institutions is often valuable for producers and consumers but it is challenging given farming schedules, unique distribution needs, institutional buying contracts and processes, safety requirements, traceability rules, and a lack of resources, which may make it difficult for institutions to use fresh produce. Nationally, each of these areas has been expanding and there are interest groups that work on resolving the problems to capture the benefits. In NJ, institutions in each of these categories have been working to find ways to reap the benefits of using fresh produce.

The National Farm to School Network seeks to create healthier school food by connecting farms with local schools and by assisting advocates by providing training, technical assistance and networking support (Joshi, 2012). New Jersey's Farm to School Network works on many of these things. Their approach helps children understand why it is important to know where their food comes from and how it affects their bodies and the environment. While demand for fresh food on public school menus has increased, there is little overlap between the academic calendar and New Jersey's growing season. Moreover, most schools contract with large food providers as they lack adequate kitchen facilities and staff. Even so, some NJ school districts like Vineland are offering food made with Jersey Fresh produce on their menus, including Flame Farm eggplant and local blueberry parfait (Spring 2012 Community Development Studio; Feehan, 2012). Applegate Farms, Fernbrook Farms, farmers market like Ringwood Farmers Market, Margate Farmers Market and associations like NJ Agricultural Society and the Northeast Organic Farming Association (NOFA-NJ) participate in NJ's Farm to School efforts (Feehan, 2012).

Hospitals and healthcare facilities are increasingly seeing farmers as partners in improving health. They may bring fresh, locally grown food into their cafeterias, host farmers markets and CSAs, and offer programs to educate people on the health benefits of eating better. In 2010, Valley Hospital of Ridgewood, NJ made a Health Care pledge for healthy local foods. Valley partnered with Catalpa Ridge Farm of Wantage, NJ, to create a culture of organic, locally grown produce. Valley receives shipments of salad greens, onions and herbs (Smith, 2010). In 2011, Newark Beth Israel Medical Center, Children's Hospital of New Jersey, and Garden State Urban Farms jointly opened The Beth community garden. This is the first hospital-based garden in Newark. It works with the Maple Avenue School to showcase good food and develop a healthy lifestyle. This idea was developed from an indoor farmers market in 2010. As their dedication to healthy community grew, the hospital brought the farmer's market outdoors and designed a miniature farm in an empty lot on Lyons Avenue (Mumford, 2011).

Some states are facilitating connections between farms and prisons. Two NJ state prisons run farms. The 250-acre Jones Farm Minimum Security Unit, west of Trenton, operates a work camp for inmates serving non-violent, short-term sentences. Bayside State Prison in Leesburg, Cumberland County operates a Regional Bakery with a teaching program and it delivers to institutions throughout New Jersey. The Mountainview Youth Correctional Facility and the North Jersey Developmental Center in Totowa offer farm-to-work programs (Lanigan, 2012). These programs suggest an interest in healthy food and community economic development.

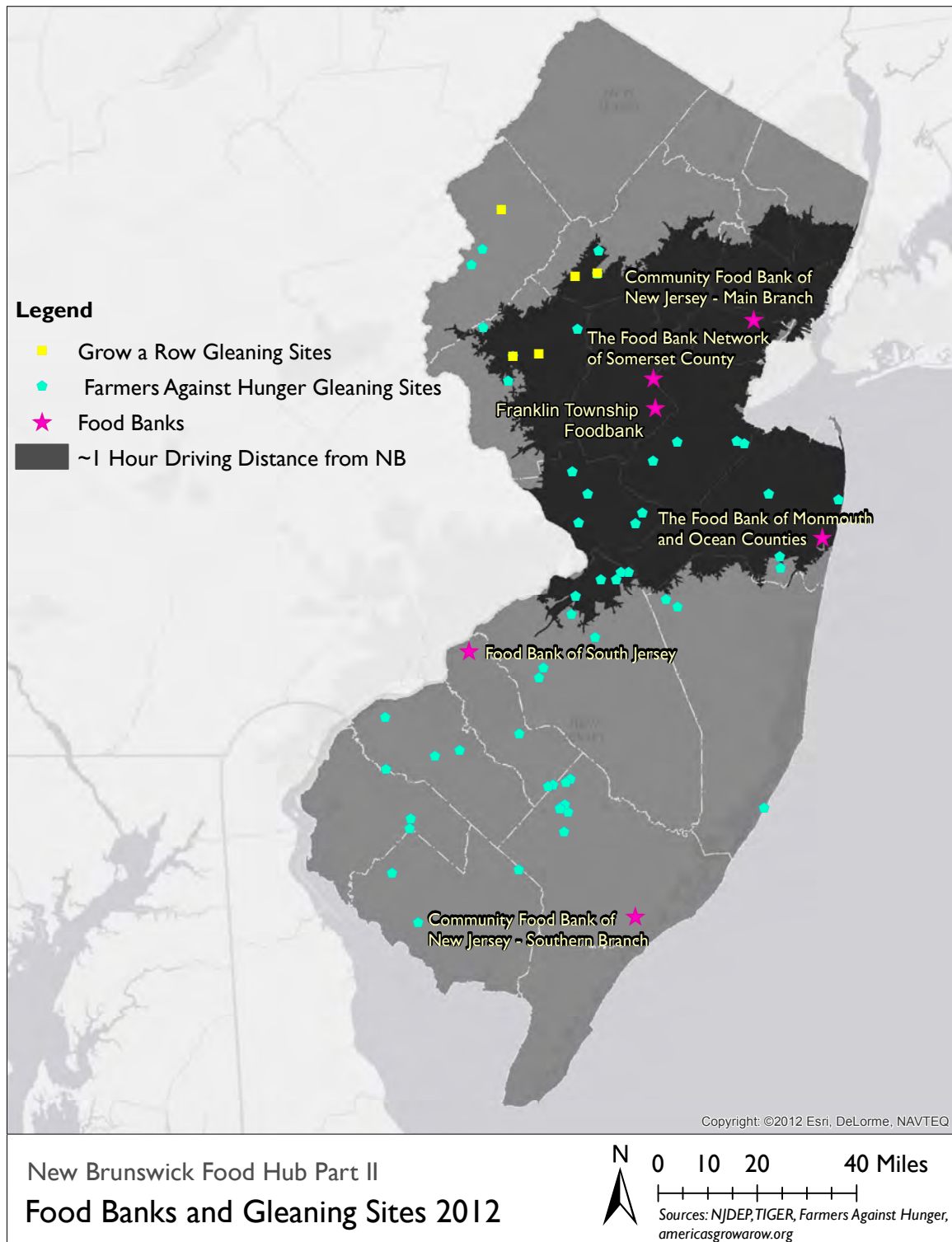
The farm-to-school initiative is the most developed in NJ but there is growth and interest in all of these areas. The universities serve tens of thousands of meals each year as do hospitals, schools, and prisons. Working out a system to get NJ produce into these institutions year-round can benefit farmers and eaters.

Food Rescue and Emergency Food Distribution

Farmers and emergency food providers have built extraordinary and relatively unknown relationships to ensure that extra fresh produce goes to people who lack access to it. In NJ, food banks, food pantries, and two gleaning organizations work with farmers to gather excess produce from farmers markets, auctions, and directly from the farm fields. Gleaning benefits the entire food system by reducing food waste and providing food insecure families with fresh local produce (USDA Gleaning toolkit). Food banks (see Map 7) provide shelf-stable food and, as interest in improving access to fresh produce has grown, have expanded their capacity to move fresh produce. New Jersey's six state-contracted food banks collect food using their own fleet of trucks and aggregate food in on-site warehouses, some of which include refrigeration and/or freezer space. NJ's 728 Local Distribution Agencies (LDAs) which include food pantries and soup kitchens typically pick up the food at the warehouses several times a week (Emergency Food Assistance Program). Food banks also work with local retail outlets to glean leftover food. The NorthWest Community Action Partnership, a private non-profit food bank, collects leftover food several times a week from Walmart, Shoprite, Bagelsmith, Panera Bread, and Auntie Anne's Pretzels. Last year, NORWESCAP gleaned a little more than two million pounds of produce (Interview with Helene Meisner, 11/12). Food banks also receive gleaned produce from farms, auctions, markets, and retail stores. While food banks have increased their capacity to receive and hold fresh produce, it is still challenging to get that produce from the fields and markets to the food banks before it perishes and many food pantries and soup kitchens lack refrigeration and freezer space, which means they have to move fresh produce to consumers quickly (Community Food Bank of NJ).

NJ is home to two produce-gleaning organizations that gather excess produce and move it to people who need it (see Map 5). Farmers Against Hunger (FAH), started in 1996 and collects food from 35-50 farms and several supermarkets which it then distributes to community food organizations and state food banks. In 2012, they organized 40 on-farm gleanings and provided food for 7,000 people per week through their 70 partnership organizations. Farmers alert FAH when they have excess food in their fields. Given the vagaries of farming, FAH often has little time to alert their cadre of volunteer gleaners who must then quickly mobilize, glean, and get the food to consumers quickly, especially during the hot summer months. Summer is also tough on volunteer gleaners who are not professional pickers or farmers and often tire quickly when doing this strenuous work. Finding and training volunteers is also a challenge. Many people are able to pick on the weekends but farmers need to move the crops at short notice and many host markets and other activities on the weekends making weekdays often the best for gleaning. Many volunteers want to arrange their efforts months in advance, which doesn't really work given that whether produce is ready depends on markets, sun, rain etc... And while gleaning may offer good educational opportunities for children and their participation may enable parents to glean, having children on a working farm brings its own challenges. The window of opportunity to glean food from a farm may pass if FAH cannot gather enough volunteers. FAH also runs a nutrition program (Produce Gleaned at Swedesboro..., 2011; Christie Administration Announces..., 2012; Kristina Guttadora, in-class presentation 2012). The other organization is America's Grow A Row, started in 2002, based in Pittstown, NJ. It works with farmers and small organizations like churches who grow food for those who need it and allow volunteers to glean that and other excess food. In 2012 the program gathered 325,000 pounds of produce and they recently bought a 138-acre farm in Alexandria, NJ. Community members volunteer for a week at a time to grow and harvest the crop off the donated land (<http://americasgrowarow.org/about>).

Map 7. NJ Gleaning Sites and Food Banks



Moving Forward

Through the New Brunswick Community Food Alliance, community, government, university, and business are building their capacity to engage in food-related economic development. This collaboration is a major asset as the city moves forward in its thinking about developing a community food hub. And many of the core elements of community food hubs already exist in and around New Brunswick. Non-profit community organizations, coalitions, universities, and others are working to improve food security, expand food-based economic development, and provide farming education. They do post-harvest handling, value-added processes, provide nutrition and cooking education, food-related job training, run commercial kitchens, operate catering programs to provide jobs and increase food security, and fund community economic development initiatives (Spring Studio, 2012). Below we identify through some of the main activities hubs engage in and we identified some of the existing infrastructure.

Aggregation

Food hubs aggregate locally and regionally produced food and facilitate its sale to wholesale buyers. This helps farmers provide diversity and make it more attractive for large-scale buyers. (Diamond & Barnham, 2012). Based on our understanding of the landscape of farming in New Jersey, there are a number of benefits a food hub could provide to farmers. By aggregating produce from multiple sources, the food hub could create orders large enough to participate in larger wholesale markets, for example to local area grocery stores and large institutional buyers like schools, universities, hospitals, and prisons. A food hub might communicate with growers and consumers through a virtual network. Consumers may place an order of what kinds of produce they want and how much of it, and growers may list the produce they have available. In this kind of system, each party is aware of the capacity for production and vital information is shared in an open forum. Understanding the supply and demand is critical for expansion of services, especially in farm to institution settings, and leads to mutually beneficial relationships.

Even if a food hub opts for a virtual brokering role, it probably will still need some infrastructural essentials. Most of the food hubs we looked at used warehouse and cold storage space. Warehouse space can be built on-site or leased. The food hubs we described above operate through on-site warehouses but New Jersey has an abundant supply of vacant warehouse space. The closest to New Brunswick is north off the NJ Turnpike. There is a possibility the owners of these buildings may be willing to donate space or provide it at a reduced cost to a charitable organization. While a complete infrastructure network is not necessary, each amenity allows for more services. For example, access to a refrigerated space allows for the rotation of stock and preservation of produce during the non-growing season. Transportation and produce packaging seem to be two of the largest uses of time and resources. To manage transit of produce, a food hub may provide a fleet of trucks that pick up raw produce from the farms to be taken to the hub where it can be washed, sorted, and packaged. This would leave more time to the farmer to stay on the farm, manage operations, and expand output. Within this kind of operation, the hub could provide traceability. The mobile truck fleet could also be used for distribution to larger markets. Another option is to employ the services of a third party logistics company which provides product transportation services to small and mid-size businesses.

- Tri- County co-op is a farmer-owned produce auction. The auction provides a central location for member growers to sell their harvest in bulk. "Items featured at the auction include: Fall ornamentals (straw bales, corn stalks, Indian corn, gourds, etc), Pumpkins, Mums, Fruits, and Vegetables" (Tri-County Cooperative Auction Market, 2012).
- Many of the food banks also operate as food aggregators and increasingly seek to draw in fresh produce to the emergency food system.

Community Education

A community food hub may opt to offer educational programs. Learning the nutritional value and how to prepare locally grown food is very important for communities that previously had limited access to healthy food. Classes like these build a sense of community and give community members opportunities to become comfortable preparing and eating locally grown food. Some community food hubs host demonstration gardens and farm plots for educational purposes (Diamond & Barnham, 2012).

- Elijah's Promise already runs two programs that help educate the community about healthy eating and cooking. The Promise Culinary School, a state-approved vocational program, provides job training and builds skills so people live happier and healthier lives. Using their commercial kitchen, Elijah's Promise's "Let's Cook," program teaches people how to cook. This one night class welcomes individuals and families to learn how to prepare healthy meals at home. The program combines basic cooking skills with seasonal produce to create meals at home (Elijah's Promise 2012).
- New Brunswick High School, which has two commercial kitchens, hosts the New Brunswick High School Culinary Arts Program. The facilities are used to help educate students about cooking, healthy eating, and food-related jobs (Bradshaw, 2012).
- Rutgers offers many community nutrition courses as do local hospitals and community organizations.

Farmer Education

Many food hubs provide educational opportunities for farmers.

- The Northeast Organic Farming Association of New Jersey (NOFA-NJ) launched a Beginning Farmer Program at Duke Farms to foster sustainable, financially viable farming enterprises in New Jersey through education, mentorship and land linkage. They have developed a program to bridge the gap between local demand, preserved farmland and the desire to farm (Northeast Organic Farming Association of New Jersey, 2012). Rutgers Agricultural Extension provides many resources to assist farmers as well.

Small Business Development

Some community food hubs provide small business development courses and other support to grow food-related businesses.

- The Rutgers University Food Innovation Center is an award winning small business food incubator located in South Jersey that has developed a network of food-related actors, provides small food business training and development and seeks to build New Jersey's food economy.
- The Rutgers New Jersey Agricultural Experiment Station (NJAES) does a variety of research, including food development and food systems (Research, 2012). Take for example First Field, where they take tomatoes and turn them into ketchup (<http://www.first-field.com>). They first started at Elijah's Promise, and, as their company expanded, they sought the help of Rutgers Food Innovation Center, which helped them create a more uniform product. The New Jersey Agricultural Experiment Station helped them work with farmers to obtain and grow the right tomatoes for their product. First Field is now sold at Whole Foods markets and through local farm markets.
- The New Brunswick based Intersect Fund has helped more than 200 clients grow their own businesses. By creating several courses for low-income local entrepreneurs, they teach how to start businesses, generate income, build assets, and inspire ideas to make change (Spring Studio, 2012).

Processing and Food Saving

Immediately following the harvest is the best time in which to prepare grade 1 produce. Post-harvest processing includes sorting, cleaning, packaging, light washing, chopping, and blanching, with washing and cooling being the most important for resale. These two processes are necessary, especially the cooling process, since they reduce the chances that the product will soften, wilt or become too ripe to sell as grade 1 produce. Produce is then graded, packed, and sometimes stored, in the case of a packing house, at a facility designed to handle raw produce directly after the harvest to prepare it for delivery (*Building Successful Food Hubs*, 2012).

Once the produce is graded, there remains a lot of grade 2, or seconds. The question is what to do with this produce, which is edible, just not as attractive. From this point on, value-added products will mean grade 2 produce that has been processed. Value-added products can range from light processing, namely trimming, cutting, and freezing (Barham, 2012); to much more labor-intensive products, such as canning, cider, pickled fruits and vegetables, salsa, and jams. As long as a farmer has the proper equipment and certification, they can process seconds. Large farmers are more likely to benefit from directly owning these facilities. Melick Farms makes a well-known cider out of apple seconds (it is also sold at Tri-County Produce Auction), and Fruitwood Farms makes a variety of products including cider, jam, honeys that vary by type of flower, molasses, nuts and honey, and pure bee pollen which acts as an immune booster (Interview with Melick Farms, 2012; Interview with Fruitwood Farms, 2012). However, this venture has a high startup cost, as well as maintenance costs. Instead, the food hub should provide a processing center. "A single shared-use commercial kitchen or contract processor can meet the needs of many local businesses and growers" (*Building Successful Food Hubs*, 2012: 27). With a contract processor, growers can hire the contractor, who then processes the produce, either with the growers own recipes or by allowing the kitchen to make what it wants. This way the food hub can tailor the value-added produce to what the buyers want, such as chopped and frozen carrots. The drawback to this approach is that it would require the food hub to hire and train a staff, as well as create a fully equipped kitchen (*Building Successful Food Hubs*, 2012).

With the proper amount of cold storage, freezer storage, and commercial kitchen space, a food hub may pursue value-added production using produce from its suppliers. It can rent out the kitchen space or take on the processing itself. Sales of these products can go toward funding the hub's operating costs. This avenue of production is especially good for farmers because it takes advantage of the seconds, or non-conforming produce that would otherwise not be accepted in the sales chain. Depending on the services the hub provides, there are other essentials including equipments for grading, cutting processing and refrigeration units. If the facility is also involved in processing and value addition, then labeling, handling and packaging the produce becomes an important function. All these services and the produce that goes out has to comply with USDA's food safety standards and quality control. Managing processing and distribution to maintain a supply/demand equilibrium is an important aspect of such a facility. And lastly, waste management, including excess and leftover produce, damaged produce or produce not matching the USDA's quality standards has to be considered.

Another option is the shared-use kitchen for farmers. This is a rent-by-the-hour or membership-based operation that would primarily serve the local farmers who want to do value-added processing. However, some farmers may not have the time to do the processing themselves, so they may have to hire chefs if they really want to do value-adding processing. One option which combines both previously discussed ideas, is to create a food business incubator. This provides certified kitchen space as well as technical support such as recipe development, label development, taste testing and ingredient sourcing (*Building Successful Food Hubs*, 2012; CD Studio FIC Report, 2012).

There are multiple ways to add value to products that involve no actual processing of the produce. These techniques do not modify the produce in a physical way, but use product differentiation to shape consumer demand. Identity preservation maintains provenance of the produce which serves to educate consumers on where their food is grown.

Product attributes refers to how produce is distinguished, such as heirloom produce over standard produce. Organic and certified organic labels also distinguish produce. Group branding (Barham, 2012) is a technique that will benefit both the producers and the food hub. If quality produce is associated with the food hub, then more buyers will buy produce with the food hubs label, creating a higher demand for produce and products. The creation of a local label to better facilitate the demand for local produce could be incorporated as a subset of Jersey Fresh.

- Elijah's Promise currently gleans and freezes food for use in their soup kitchen and culinary training programs during the winter. However, the organization lacks sufficient freezer space to store what they process (Spring Studio, 2012).
- The Rutgers Center for Advanced Food Technology (CAFT), an FDA-licensed processing center in Piscataway, supports product development and food economy business support and networking and provide laboratories and manufacturing equipment as does the Bridgeton-based Rutgers Food Innovation Center (Center for Advanced Food Technology, 2012).

Food-Related Community Economic Development

Some community food hubs run their own food-related enterprises to create jobs, job training and education opportunities, and to expand the reach of fresh healthy food in low-income communities. It is also a possible source of income and advertising. Spreading the recognition of good and healthy food encourages donations and partnerships. In turn, these benefit the organization and, more importantly, the community.

- Elijah's Promise takes in healthy food from the community, trains the community to cook, and then employs them within their catering business. Graduates of their Promise Jobs Culinary School help provide arranged meals to low-income students and adults and the income is then reinvested in the business (Promise Catering, 2012).
- The SouperVan, a healthy food truck, also employs Elijah's Promise trainees, sells healthy food in the New Brunswick college town, and provides a portion of money from each meal for the emergency food system.
- A Better World Cafe in Highland Park employes Elijah's Promise's graduates, cooks healthy food while creating minimal waste in a model that ensures that everyone eats.

Financing

A community food hub will need financing to get off the ground.

- New Jersey and the federal government have several opportunities to borrow capital to develop physical infrastructure and facilities, including food processing, marketing, and distribution business ventures for locally-grown products. Some federal grants incorporate educational opportunities (Lindsey, 2012). While many local residents may have brilliant ideas for mass producing a family recipe or creating a new value-added product, doing so requires business and technical expertise. The Intersect Fund, a non-profit organization located on Church Street in New Brunswick, helps address these issues by providing low-income entrepreneurs with the basics for running a business through one-on-one coaching sessions, along with small business loans ranging from \$500 to \$10,000 (The Intersect Fund, 2012).
- On a larger scale, New Jersey Community Capital, a New Brunswick-based community development financial intermediary, provides financing and technical assistance to support community development. As a nonprofit, it provides innovative financing and technical assistance to organizations that support sustainable community development ventures. They have a history of supporting community revitalization projects and have an interest in sustainable community development undertakings. And their vision is to help create jobs and strengthen neighborhoods through loan capital. (Jersey Community Capital, 2012).

We can think of these organizations and programs as the existing infrastructure for a food hub. These elements can be drawn together to and incorporated into a physical or virtual hub.

Where to Next?

The next step is for the NB Food Alliance to meet with farmers. To help guide the conversation, we identified some questions.

- What is the food hub's objective? What problems does it address and solve? What form will it take? Various revenue models exist including: producer cooperatives, non-profits and LLC.
- If the food hub will process food, what physical, legal, and technical capacity is necessary? How will the hub ensure that it processes food before it goes bad? How will the economic model work?
- Competitive landscapes and availability of produce from other regions at a cheaper price can be a barrier for success. How will the food hub address these problems and potentially turn them into solutions? By developing a stock rotation system, a food hub can ensure a constant supply of fresh local produce over the non-growing season. For example, during the winter months, the hub can have 20% fresh produce and 80% processed/ shelf stable and then do the opposite in summer with 80% fresh and 20% shelf stable. Will the hub distribute fresh produce from outside NJ? The greater amount of control a food hub has over its inbound stock, the more efficient it will be. A hybrid system of aggregation, consolidation and distribution can be beneficial. During the growing season, food hubs can expand to accommodate aggregation outside of the hub and reduce the complexity of managing a heavy inflow of produce. Compared to farmers throughout the country, NJ growers are relatively smaller so it is important to understand the capabilities of local producers to ensure equilibrium of supply and demand. Transparency in the distribution system is critical to ensure fulfilling demand.

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Appendix A. Food Hub Survey

Comparing Food Hubs

	New North Florida	The Stop	La Montanita	Appalachian	Oklahoma	Detroit	Farm Fresh	Greensgrow	Oneida	Tao Food
Model	Produce Driven	Community	Retail-Driven	Non-profit	Consumer	Community	non-profit	non-profit	non-	non-profit
TRANSPORTATION										IDK
refrigerated?	all	IDK	all	all	all	all	IDK	yes	IDK	Yes
non-refrigerated	none	IDK		none		none	IDK	yes	IDK	
# of trucks	8	IDK	2, leased 38-	4			IDK	3	IDK	
driving	max of 60 min	IDK	300 mile	interstate	once a	IDK	IDK	mobile	IDK	
delivery service	2 x a month to	IDK	delivers to	4 weekly		IDK	yes	no	IDK	IDK
FARMERS		The New	Originally			IDK		50		yes
# of farmers	100 farmers	volunteers	14 northern	70 in 2009		IDK	40 small to	80 farms	Farm	over 50
where?	FL, AL, GA, AK	Ontario	300 mile	SW Virginia		Michigan	Rhode Island	Pennsylvania	Wisconsin	New
demographic	minority, low-income	all types	communities	former		Low income	low income	urban	Low-	New
products	just collard greens,	all types	whatever the	over 30		All types	fruits and	20 types of	Beef,	produce
CONSUMERS										
schools	(thirteen	IDK	no	no		no	yes	no	no	IDK
grocery stores	60 independent	no	yes	yes		no	yes	no	yes	IDK
low-income	yes (through church	yes	IDK	no		yes	800 people	yes	yes	yes
independent health food		Their	yes	yes		yes	no	no	yes	IDK
regional chains	no	no	yes- whole	yes		IDK	no	no	IDK	IDK
area universities	no	no	no	yes		IDK	yes	no	IDK	IDK
local churches	no	no	no	yes		yes	no	yes	IDK	
restaurants	no	yes	no			IDK	yes	yes	yes	
COOP/Hub	located in Marianna,						located in an	no	Tsyunkh	yes
collent	yes	no	yes	yes	yes	no	yes	yes	no	yes
process	yes	yes	yes	yes	yes	yes	no	yes	yes	yes
packages	yes	yes	yes	IDK	yes	yes	no	yes	IDK	yes
# of paid employees	4	IDK	more than 200	35	4	40	9	6 full time, 23	Tsyunkh	
volunteers	Executive Director is	IDK	IDK	IDK	IDK	IDK	IDK	IDK	IDK	yes
store space (sq ft)	packing/processing	yes	5 stores	yes	IDK	IDK	1,700 (rented)	IDK	IDK	24000 sq
refrigerated? (sq ft)	try to package	no (want	1500 sq ft of	yes	yes	yes	330 sq	IDK	IDK	yes
non-refrigerated? (sq ft)	IDK	yes	over 4,000 sq	IDK		IDK	yes	IDK	IDK	
ADVANTAGES										
marketing help	yes	no	yes	yes	yes	yes	no	graphic	no	yes
training	yes	yes, food	no	yes	IDK	yes	yes nutrition	no	yes	yes
high-volume market	yes	no	yes	yes	yes	yes	no	no	yes	yes
crop planning	yes	no	IDK	yes	yes	yes	no	yes	IDK	IDK
post-harvest planning	yes	no	dk	yes	no	IDK	no	no	IDK	
youth entrepreneurship	yes	no	dk	no	no	IDK	yes	no	yes	
supplier network	yes	no	yes	yes	yes	yes	yes	yes	no	
year round growing	yes	yes	yes	IDK	yes	yes	yes	yes	IDK	
traceability	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
organic	no	yes	yes	yes	yes	yes	no	organically	yes	
sustainable?	IDK	yes, grow	yes	yes	IDK	yes	yes	yes	yes	
CHALLENGES										
distance	yes	no	no	no	no	no	no	no	no	
finding new clients	yes	maybe	no	no	no	no	no	no	no	
centralized kitchen	no (delivers to each	yes	no	no	IDK	IDK	no	yes	yes	
farmers not engaged	yes	no	no	no	No	no	IDK	no	no	
recruiting farmers	yes	IDK	no	yes		no	IDK	no	no	
financial viability	yes		no	yes		no	want to	yes	no	
managing buyers	yes		no	yes		no		yes	no	
\$			no				processing			
Overview of							90% of food			

New North Florida Cooperative

The New North Florida Cooperative was founded in 1995 by a small group of farms under The Florida Agricultural and Mechanical University's Research and Extension Center. Its focus is to develop marketing and training for local low-income minority farmers to help farmers gain access to markets. Today 100 farmers grow produce in Florida, Alabama, Georgia, Mississippi, and Arkansas. To set themselves apart, they sell collard greens to schools in low-income communities where a high percentage of students seek reduced or free lunches. They chose collard greens because they are budget friendly, meet school menu requirements, and are not commonly available. New North provides excellent

and responsive customer service and pride themselves on satisfying customer needs and concerns quickly. New North created a youth entrepreneurship training and mentoring program for local high school students. Youth are paid to learn how to process, produce, market and finance produce and work with farmers on crop planning, pricing, post-harvest handling, waging and improving efficiency. New North's main goal is to assist and bridge the gap between farmers and desirable markets.

The farmers are primarily low-income and minority landowners of between ½ and 5 acres of land. The biggest amount owned by one farmer is 15. They grow green beans, collard greens, sweet potatoes, grapes, turnip greens, strawberries, blackberries and watermelon. Although they sell a variety of items, to streamline services, they grow and sell mostly collard greens, sweet potatoes and green beans to schools, their biggest buyers. They have spread their sales to 50 school districts in many states. They serve 13 school districts in Florida, one of which is the 385,000 children Miami-Dade district. The co-op uses their eight refrigerated trucks to pick up produce at farms. Four employees with the help of machines wash, cut, chop and package produce which is then delivered to schools and grocery stores. By doing this they have simplified their storage, processing, and aggregation needs. They carefully estimate the product volume based on the previous year and to ensure that farmers grow what will sell (Barnham, 2012).

La Montanita Food Co-op

La Montanita is a retail-driven co-op, which provides business development, distribution, and marketing services for producers located within a regional foodshed encompassing the Rio Grande River Valley Rift and a 300-mile radius surrounding Albuquerque. It was established in 2007 to expand the purchasing of sustainably grown regional products from small and mid-scale producers by the co-op's four stores and to assist regional producers in accessing other wholesale market channels for their producers. To get off the ground, La Montanita partnered with an already existing group called the Beneficial Farm and Ranch Collaborative (BFRC). These farmers sold products under a regional eco-label that certified its members' sustainable production practices. This partnership was mutually beneficial as it helped expand BFRC's and La Montanita's networks. La Montanita sells and markets good under the BFRC label. The label helped certify their products as organic and consistent with sustainable farming practices which allowed them to command higher prices. La Montanita is not a small community food co-op; it stocks and sells more than 1,500 products which it purchased from nearly 900 growers and producers within its regional foodshed. It currently leases 1,500 sq. ft of frozen storage space and over 4,000 sq. ft. of dry storage space. To move its products, it leases two 36-foot refrigerated box trucks, which run five days a week and it delivers for additional cost (USDA, 2012; La Montanita Food Co-op website).

Oklahoma Food Cooperative

Oklahoma Food Cooperative (OFC) is producer-consumer owned online Food Hub initiated in November 2003. Approximately 200 member producers sell more than 6,000 items including meat, milk, and produce to the 3,800 co-op members using the OFC online purchasing portal. They built a database of farmers and ranchers using their "Made in Oklahoma" website. OFC's online portal provides traceability and helps build connections between consumers and producers. Members are acquainted with the farmers who produce their products and they have the opportunity to meet their farmers on delivery day. Members can document where their food comes from. Even though the process of purchasing produce begins through the OFC online portal, the producers and consumers meet at a central location where the produce is assembled and distributed. The OFC portal gives consumers flexibility to add or drop goods and change the number of products they are purchasing. Disabled members receive free home delivery; donations cover the cost of these deliveries. Farmers are not required to meet any threshold to sell through the co-op, so small business producers can sell their products. Producers have control over prices and they pay 10 percent commission to the cooperative. OFC also transports foods to disabled citizens who used the online portal to purchase produce (USDA, 2012; Oklahoma Food Cooperative Website).

Tao Food Center

Tao Food Center provides local, small-scale food incubations to more than 40 community food Hub, and it operates a mobile meat processing facility that has served more than 75 small ranchers. It also organizes business and financial training programs. TFC operates a 24,000 square foot business park and community center, which includes a 5,000 square foot commercial food processing facility, the Taos Food Center. It has a commercial Kitchen, which provides comprehensive equipment, services, and support to food industry entrepreneurs. The TFC “Mobile Matanza” is a mobile slaughterhouse unit and meat processing facility. The Center also initiated the “Oso Good Foods” logo with labels, and marketing material, for the Food Center’s cause marketing label. TFC provides nutrition classes to WIC recipients with over 200 WIC participants attending the child nutrition and food preparation demonstrations at the Taos Food Center. Other grant-subsidized programs include community gardening and food preservation classes. There are several ideas that we can learn from the Tao Food Center. In the Food Hub that would potentially be created in the New Brunswick area, we should utilize the idea of a finding grants that could help purchase small food incubators, operate a mobile meat processing facility to help small scale farmers and ranchers, initiate a local food logo, and provide nutrition classes to EBT recipients. (Richman, 2011; Tao Food Center website).

Appendix B. Using GIS to Facilitate Food Hub Planning

A major task for the studio team was to determine which elements of the New Jersey food network would be beneficial to map. Through class discussion and meetings with key informants, the GIS team chose to focus on the farming landscape and the existing distribution points within a forty-five minute driving radius of New Brunswick. This allows for a deeper spatial awareness of the challenges that small- to medium-scale farmers encounter in interfacing with the area's urban population. Advances in mapping technology, the increasing availability of geospatial data, and the ubiquitous use of social media have also opened up exciting new possibilities regarding the interactive use of mapping technology in real time. The GIS team has created a prototype interactive map utilizing land use and distribution data and researched its possible connection to a social media technology like Twitter. However, there are still many key limitations related to both the technology and data that must be considered.

Maps produced

Agricultural land use

Land Use data provides primary function of each parcel of land. We mapped agricultural land use to understand the location of farms. This was instrumental to develop a basic understanding of farming landscape in the State of New Jersey and also provided a strong spatial context with respect to New Brunswick. The most current GIS data available for mapping agricultural land use is the New Jersey Department of Environmental Protection's 2007 Land Use/Land Cover dataset. This data primarily consists of land use classifications like residential and commercial, with agricultural land use further divided into smaller sub groups. This information is available in shapefile format on NJ Department of Environmental Protection's website (<http://www.nj.gov/dep/gis/landscape.html>) and is divided into 20 different watershed areas. While the data itself was updated in 2010, the dataset is based on aerial photography captured in the spring of 2007. There is a dire need of updated land use data to map the agricultural lands. Another improvement required in the data set is that the metadata does not describe in detail the categories of the agricultural landuse which are (Source: Appendix III. NJDEP Land Use/ Land Cover Categories http://www.state.nj.us/dep/fgw/ensp/landscape/appendix_iii.pdf). Due to lack of clarity of what these types actually entail, the following categories were not depicted as individual land use within the map: cropland and Pastureland, Agricultural Wetlands (Modified), FORMER AGRICULTURAL WETLAND, ORCHARDS/VINEYARDS/NURSERIES/HORTICULTURAL AREAS, CONFINED FEEDING OPERATIONS, and OTHER AGRICULTURE.

Preserved farmland

Mapping preserved farmlands provided us with an opportunity to identify how many farms are listed under this program and where are they concentrated. Farmland Preservation is a program administered by the State Agriculture Development Committee. Its goals are to assist farmers in meeting their financial goals, to provide them with the capital to expand their existing operations, to eliminate or reduce their debt load, and to further their estate or retirement planning (Source:<http://www.nj.gov/agriculture/sadc/farmpreserve/#4>). The data used for the analysis is available at the website of Department of Agriculture (<http://www.nj.gov/agriculture/sadc/farmpreserve/resources/>). This is a very detailed dataset updated in June of 2012 with a little fewer than 6,000 farms listed. The dataset's attributes define under which specific program the Farm has been preserved.

Aggregation and distribution

Mapping the basic infrastructure that comprises a food hub can be helpful in facilitating linkages between different actors, identifying gaps within the distribution network, and determining priorities for addressing those gaps. The GIS team identified and mapped a wide range of sites that distribute produce directly from farmers to consumers, including: farmers markets, produce cooperatives, vegetable auctions, roadside markets, farms that offer gleaning and self-pick, and food banks. As there appears to be no centralized database containing this information, the various vendors and the

location of each site were identified using two methods: through correspondence with partner organizations that work in the agricultural sector and Internet searches. These methods were successful in producing the names of various vendors; however, determining correct addresses proved to be challenging. Very few vendor lists provided by our partners contained addresses. Much of the data found online was outdated, and different sites showed contradictory location information. One solution was to directly contact the vendor when a telephone number was provided; however, this can prove very time intensive when there are hundreds of sites to consider. The GIS team was able to identify addresses for nearly all sites despite these complications. Those addresses were then geocoded and mapped as point data in the ArcGIS mapping software, utilizing a 45-minute driving radius from New Brunswick.

The GIS team's decision to limit its mapping to those food distribution sites with a direct connection between producer and consumer was driven by the studio's focus on the challenges faced by small- to medium-scale New Jersey farmers. However, mapping software like ArcGIS can be used to map several other components of the food hub infrastructure. These include: wholesalers (i.e. general-line grocery, specialized produce, and general-line food service), cold storage facilities with freezer space appropriate for food items, food processing centers, retail stores, foodservice establishments, and non-profit food distributors. Obtaining this information may prove challenging; however, this spatial data would allow for a broad view of the various components of a food hub that identifies the weaknesses, redundancies, and potential challenges within the system.

Interactive mapping

The online interactive map is an effective tool for visualizing and disseminating geographic information in a format that can facilitate communication between farmers, distributors, and aggregators in real time. To demonstrate its uses, the GIS team created a prototype using Mapplerx, an online interactive mapping website/Mobile application (<http://www.mapplerx.com/map/agriculture/>). With this map, users can access geographic locations and check the information assigned to that location from a variety of data layers containing various land uses and distribution types. Users can also upload their own point data and add information. This interactivity between producer and user can facilitate communication and help to resolve immediate supply needs.

Interactive maps like Mapplerx can first, lead farmers to a quick decision-making for plans. The user can access information of other market actors and organize their plans to effectively communicate with agriculture networks. Users can contact other associations and market actors by clicking the points of geographic locations or the areas that contains the name of farms/markets/contacts/opening hours. In addition, a user can use the map to conduct a brief distance analysis. By overlaying multiple-layers, the user can make a decision based on geographical accessibility. For example, users can observe point locations of food banks and farms offering gleaning in comparison with New Jersey roads and driving distance. Based on this information, farmers/distributors/aggregators can strategically plan their trips and expand their network.

However, there are several challenges in using interactive maps; First, without the recognition of map among farmers / aggregators / distributors, the map cannot maximize its potential as a communication facilitator as its strength comes from sharing and updating its data through public engagement. Secondly, although Mapplerx operates with the user-friendly interface functions, the limited utilization of the technology by farmers / distributors / aggregators can be a limitation to publicize the map. Third, data reliability can be a problem when the data input function is open to the public. The next task is to overcome these constraints, and publicize the interactive map as a potential public sphere for communications, which will possibly contribute to a blueprint of the food hub in the future.

Future uses of interactive mapping technology and social media

As the GIS team's interactive map demonstrates, this technology can be used to produce more than just static maps representing a snapshot of a specific moment in time. The advent of social media allows the user to create interactive

displays that update information in real time using the in situ measurements or observations of its various members. For example, the GroupTweet service offered by Twitter enables up to 100,000+ individual users to post original content from either the group account or their personal Twitter account. The service's privacy settings allow for those updates to be viewed only by the group's members and a moderator can be established who can manage the flow of information. In the context of a food hub, this type of service can streamline the distribution process as farmers can provide both wholesalers and consumers with specific data regarding harvesting and crop yields. This data can then be inputted into open source mapping software such as Mappler to produce real-time maps that show the crops being harvested at specific locations at any moment in time. Additional maps can inform interested consumers of farms that are currently allowing gleaning and self-pick of various crops on their premises following the harvest. Similar research has recently been conducted by the Community Mapping Initiative that utilizes cellular phone data to map open gas stations in New Jersey following hurricane Sandy.

Challenges

Mapping Crop Variety

As a part of this research, spatial demonstration of crop variety was required to advance the applicability of the land use map. Having a sense of what grows where is required to evenly distribute the local produce and facilitate/optimize the aggregation and distribution of staple crops. This data would also facilitate the analysis of what food crop production that small and medium sized farm owners engage in the most. Acquiring data related to crop variety was a major challenge. This could not be done as the information is maintained only by USDA/NASS (National Agriculture Statistics Service) program and the data is not made available at the detailed level due some type of disclosure agreement with the farmers. Data that is made available is intentionally degraded to prevent anyone from identifying individual farms (Geographic Information Coordinator at NJDEP, Frederick A. Douthitt).