OCTOBER 2017 E.B 2017-13

CASE STUDIES OF SUPERMARKETS AND FOOD SUPPLY CHAINS IN LOW-INCOME AREAS OF THE NORTHEAST:

ONONDAGA STORE, NEW YORK

Kristen S. Park, Miguel Gómez, Kate Clancy

Food Industry Management Program
Charles H. Dyson School of Applied Economics and Management
College of Agriculture and Life Sciences
Cornell University, Ithaca, NY 14853

This research was supported by USDA-NIFA AFRI Grant #2011-68004-30057:
Enhancing Food Security in the Northeast through Regional Food Systems,
a joint project of 11 institutions led by the Northeast Regional Center for Rural Development.

Case Studies of Supermarkets and Food Supply Chains in Low-Income Areas of the Northeast: Onondaga Store, New York. By Kristen S. Park[1,4], Miguel Gómez[2], Kate Clancy[3], Extension Bulletin 2017-13. Charles H. Dyson School and Applied Economics and Management, College of Agriculture and Life Sciences, Cornell University, Ithaca, NY 14853.

Acknowledgements

This case study was conducted as part of a U.S. Department of Agriculture funded project titled "Enhancing Food Security in the Northeast through Regional Food Systems" (EFSNE). This seven-year research, education, and outreach project examines food production, distribution, and consumption in the Northeast U.S. (defined as 12 states from Maine to West Virginia and the District of Columbia) with the goal of understanding the potential for regional food systems to address food security challenges in the region. The project includes collaborators from 11 different universities and other institutions. As part of the project's distribution, consumption, and outreach objectives, five urban and four rural study locations in the Northeast have been identified for community- and store-level analysis.

The authors would like to acknowledge the enormous contributions of the store participants. In addition we would like to thank the EFSNE project investigators for their support to the case studies and to Elaine Hill, Bobbie Smith, III, Irin Nishi, Susan Parker, Derek Simmonds, and Dan Kane for their interviews and data collection efforts.

This work was supported by USDA grant #2011-68004-30057

[1] Extension Associate, Charles H. Dyson School of Applied Economics and Management, Cornell University

[2] Associate Professor, Charles H. Dyson School of Applied Economics and Management, Cornell University

[3] Food Systems Consultant

[4] Author Contact: 475C Warren Hall, Charles H. Dyson School of Applied Economics and Management, Cornell University, Ithaca, NY 14853-7801, ksp3@cornell.edu, +1-607-255-7215

Table of Contents

Introduction 1
Onondaga Store 3
Supply Chains 4
Product 1: Potatoes 4
Regional Comparisons 7
Prospects for Regional System Expansion 9
Product 2: Cabbage 12
Regional Comparisons 14
Prospects for Regional System Expansion 17
Key Lessons for Onondaga Store 19

Appendix 23
Potato Industry Profile 23
Cabbage Industry Profile 25

List of Tables

Table 1: Demographic and Food Environment Statistics for Onondaga Store 2
Table 2: Allocation of Retail Price in Onondaga Store's Potato Supply Chains 8
Table 3: Food Miles and Fuel Use in Onondaga Store's Potato Supply Chains 9
Table 4: Extent of Regional Value-Added Activity in the Onondaga Store Potato Supply Chain 11
Table 5: Allocation of Retail Price in Onondaga Store's Cabbage Supply Chains 15
Table 6: Food Miles and Fuel Use in Onondaga Store's Cabbage Supply Chains. 16
Table 7: Extent of Regional Value-Added Activity in the Onondaga Store's Cabbage Supply Chains 18

List of Figures

Figure 1: Potato Supply Chain for Onondaga Store 5
Figure 2: Cabbage Supply Chain for Onondaga Store 13

Onondaga Store, Onondaga County, NY

Introduction

As part of a collection of EFSNE projects that examined distribution systems, 11 store case studies were conducted to gain a better understanding of stores serving low-income areas and their role in the regional food system of the Northeast. The cases are an effort to record important characteristics of the participating stores and their supply chain partners. Fictitious names are used to maintain confidentiality of the case study participants. This case describes a convenience store and with it the supply chains of two of the eight foods in the EFSNE project's market basket, which served as a focal point for many of its research activities. Case study interviews were conducted from 2012-2013.

Place: Onondaga County, NY

Onondaga County is located in central New York State. Its largest urban area is the city of Syracuse which has a population of about 144,700. The population of Onondaga County in 2010 was 467,846 according to the U.S. Census (Table 1), with a population density of approximately 600 people per square mile. The zip code in which the store exists has a population of 7,506, which is predominantly white with 3.8 percent of the population either African American or Hispanic. The median household income of $68,021 is higher than the county median of $54,498.

The U.S. Census Bureau reports 123 grocery stores, excluding convenience stores, 187 convenience stores, and five warehouse clubs or supercenters in the county. The county thus has 2.6 grocery stores, 4.0 convenience stores and 0.1 warehouse clubs or supercenters per 10,000 residents for a total of 6.7 food retailers per 10,000. The concentration of food retailers is provided in Table 1 to compare more easily to the county and state metrics.

The neighborhood itself has only two convenience stores and no other foods stores. The nearest supermarket is a Walmart supercenter located about five miles away.

Supermarkets and other grocery stores primarily engage in retailing a general line of food, such as canned and frozen foods; fresh fruits and vegetables; and fresh and prepared meats, fish, and poultry. Supermarkets are traditionally defined in the food retail industry as a large grocery store having $2 million or more in annual sales. Convenience stores or food marts (except those with fuel pumps) primarily engage in retailing a limited line of goods that generally includes milk, bread, soda, and snacks.

TABLE 1: Demographic and Food Environment Statistics for Onondaga Store

	Zip code	Onondaga County	New York State
DEMOGRAPHICS			
Population and Age			
Population[1]	7,506	467,846	19,594,330
Median Age[1]	36.4	38.7	38.1
Less than 5 years of age[a,1]	7.8%	5.8%	6.0%
Average HH Size[1]	2.59	2.43	2.62
Education			
High school degree or higher[a,1]	93.5%	90.1%	85.4%
Bachelor's degree or higher[a,1]	24.5%	33.5%	33.7%
Race and Ethnicity			
African American or Black[a,b,1]	2.6%	12.7%	17.0%
Hispanic[a,c,1]	1.2%	4.3%	18.2%
Poverty and Program Participation			
Poverty rate[a,1]	9.0%	15.2%	15.6%
Food insecurity rate[a,2]	13.5%	13.5%	15.8%
Share SNAP recipients[a,d,1,3]	N/A[e]	15.8%	16.3%
Income			
Median HH Income[1]	$68,021	$54,498	$58,687
FOOD ENVIRONMENT			
Grocery Stores[f,4]	0.0	2.6	5.2
Convenience Stores[f,4]	2.7	4.0	1.8
Warehouse, club, and supercenters[f,4]	0.0	0.1	0.1

Notes:

[a] Percentage of entire population.
[b] Alone or in combination with other races.
[c] Of any race.
[d] Calculated by dividing the number of SNAP recipients by the population.
[e] Data not available at the zip code level.
[f] Number per 10,000 people.

Sources:

[1] American Community Survey 5-Year Estimate, 2010 - 2014, copied from http://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml on April 27, 2016.
[2] Food insecurity, 2013, FeedingAmerica.org, downloaded from http://www.feedingamerica.org/hunger-in-america/our-research/map-the-meal-gap/data-by-county-in-each-state.html on April 27, 2016.
[3] Small Area Income and Poverty Estimate, July 2013, downloaded from http://www.census.gov/did/www/saipe/data/model/tables.html on April 27, 2016.
[4] County Business Patterns Database, 2013, downloaded from https://www.census.gov/econ/cbp/download/13_data/ on April 29, 2016. Currently online at https://www.census.gov/data/datasets/2013/econ/cbp/2013-cbp.html.

> We choose to include this store because it provides a novel food solution to a community with limited access to a supermarket.

Onondaga Store

Onondaga Store is a gas station with a large convenience store.[1] Although all of the other stores participating in the project are supermarkets, we choose to include this store because it provides a novel food solution to a community with limited access to a supermarket. It is owned by a company that operates a chain of approximately 80 gas stations with convenience stores, about half of which are corporately owned and half of which are franchised. At the time of this study, Onondaga Store was one of the company's newest stores, with annual sales of roughly $3 million. Since our company interviews, it has been sold to a larger corporation. It continues to have a great deal of autonomy in its day-to-day operations.

The Onondaga Store serves the community by providing affordable and convenient fresh foods. The store has seven full-time and 24 part-time employees. It is between 6,000-7,000 total square feet in size, of which 1,500 square feet are for storage. Its overall operating gross margin is 34 percent, not including gas. Gross margin is the difference between the purchased price and selling price divided by the selling price and is an important measure of the margin available to pay for all operations above and beyond the cost of the product. The National Association for Convenience Stores reports the average convenience store gross margins are 27 percent for in-store merchandise and 56 percent for food service, and this store has a large food service department with hot and ready-to-eat foods. The 2015 median gross margin for supermarkets reported by the Food Marketing Institute is 28 percent[2].

Onondaga Store buys grocery products from three different grocery wholesalers that deliver product to the store. It also buys produce from one produce wholesaler.

The original owner considers this store format as the model for future stores. It offers the hot food preparation counter as well as freshly prepared cold foods, such as sandwiches and fresh-cut, grab-and-go fruits and vegetables, and expanded grocery selections beyond what is normally found in a convenience store. In addition, the store has some perishable foods departments, such as produce, fresh meat, and frozen foods.

---

[1] The store owner interview was conducted July 2012. Although this case study is written in present-tense, it is meant to provide a snapshot in time, and the authors make no claims that the data reflect anything other than the store's situation at that time.

[2] *The Food Retailing Industry Speaks* 2016. The Food Marketing Institute. Arlington, VA 22202.

The company is positive about its future overall and in the community. Sales are increasing and they expect to be in business in the community in the next 10 years. Management indicated two factors that are major limitations affecting their ability to stay in business: taxes and zoning.

When asked what factors limit its ability to sell healthy foods to consumers, "lack of suppliers" and "availability of products" were the only two that management ranked as being important limitations. When asked what factors limit its ability to procure products produced regionally in the Northeast, management identified no major limitations, although mentioned some factors as being somewhat limiting. These include, "lack of regional suppliers", "lack of quality products", "availability of products", and "variety of products available".

Market basket items – Potatoes and Cabbage

The produce department consists of a dry rack, a cooler case, and a separate fresh cut cooler case. Potatoes are sold on a dry rack which is a stand at ambient temperature next to the cooler case. The store sells five-pound bags of a variety of potatoes, including round white, red, and russet potatoes.

Cabbages are displayed in the cooler case. Whole heads are film wrapped with a sticker displaying the weight, price per pound and total price. The store sells about six heads of cabbage every two weeks.

Supply Chains

We trace the supply chains of two of our market basket products sold by Onondaga Store, potatoes and cabbage, to determine the sources of these foods and the extent of regional food system participation.

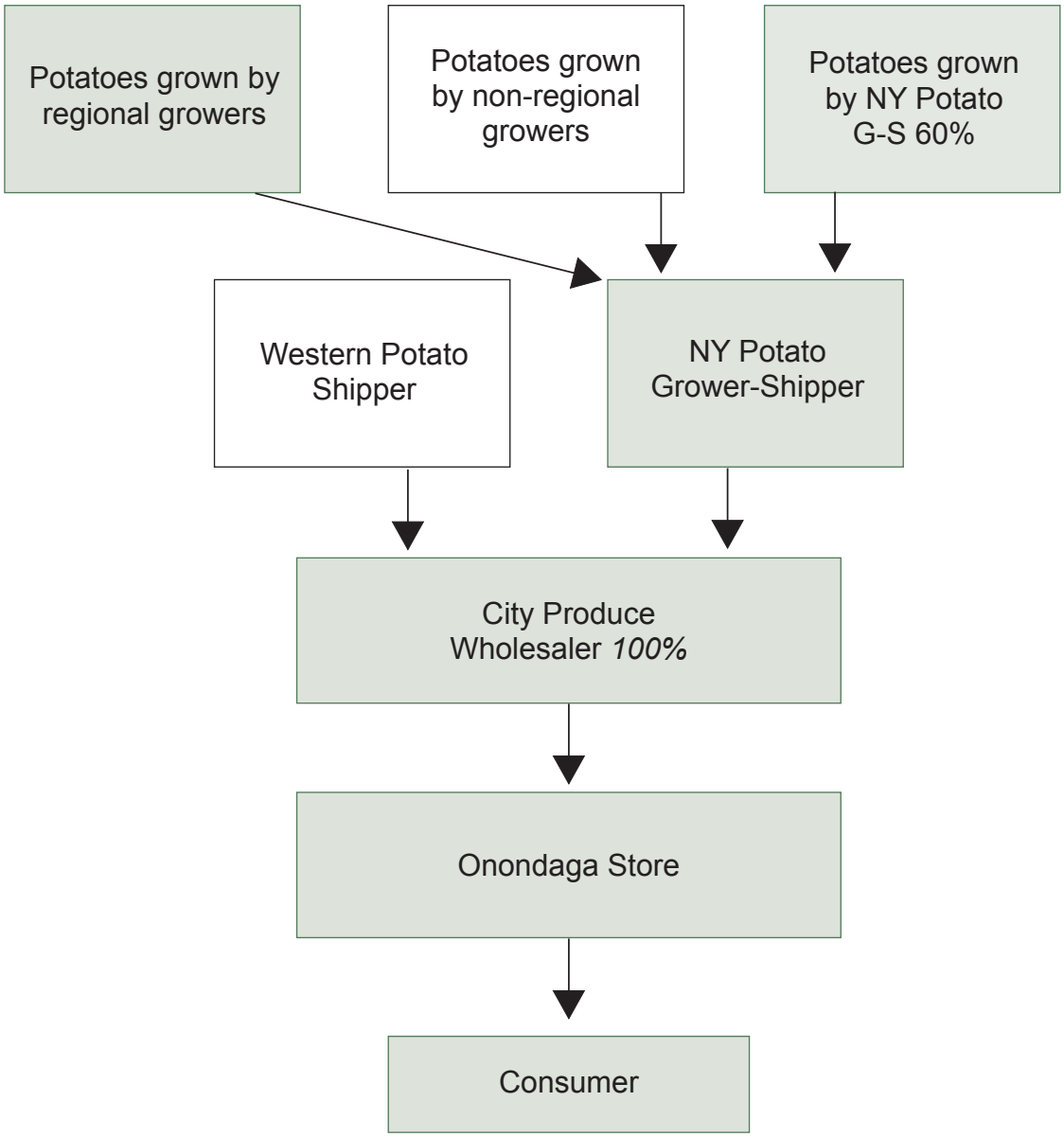
Product 1: Potatoes

Onondaga Store buys its potatoes from City Produce Wholesaler, a wholesaler that specializes in buying and selling produce. Over 90 percent of City Produce Wholesaler's sales are from fresh fruits and vegetables. Typical wholesale activities include buying produce directly from shippers, breaking apart truck loads, and selling mixed loads of produce to local customers, most often retailers, restaurants, and institutions. City Produce is located about 14 miles from Onondaga Store.

Figure 1 depicts the general supply chain for Onondaga Store's potatoes. Starting at the store and tracing back up the supply

chain, the boxes upstream indicate percent of potato purchases of the downstream member. For example, City Produce Wholesaler provides 100 percent of Onondaga Store's potatoes, while NY Potato Grower-Shipper provides 80 percent of City Produce Wholesaler's potatoes.

FIGURE 1: Potato Supply Chain for Onondaga Store, Onondaga County, NY



Note: Shaded boxes represent supply chain members located in the Northeast Region. Numbers in boxes represent the percent of the next member's supply.
Source: Authors' calculations based on case interviews.

City Produce Wholesaler

This wholesale business supplies potatoes to Onondaga Store. It buys its potatoes from NY Potato Grower-Shipper and Western Potato Shipper. It is over 100 years old, and employs 20-25 full-time and part-time employees. The company has sales of $5-10 million and virtually 100 percent of their sales are in produce. All of their potato sales (100 percent) are to customers within New York State.

Produce Wholesaler receives a potato order from Onondaga Store by phone every other week and delivers to the store about three to four days later from their warehouse that is about 14 miles away. Payment to Produce Wholesaler is made within 30 days. Produce Wholesaler considers Onondaga Store an excellent customer and is very satisfied with all its customer relationships.

Produce Wholesaler orders potatoes from NY Potato Grower-Shipper about twice per week by phone or fax. Potatoes are received 24-48 hours after orders are placed. Prices are set by the supplier but follow the USDA market price reports.

Although Produce Wholesaler typically picks up its orders at the farm, NY Potato Grower-Shipper occasionally delivers and charges freight separately.

Payment terms are 10-14 days and loads from NY Potato Grower-Shipper have never been rejected for quality issues. Produce Wholesaler is very satisfied with this supplier on all characteristics.

NY Potato Grower-Shipper

Approximately 48 percent of Onondaga Store's potatoes are grown by NY Potato Grower-Shipper, a potato grower and shipper in Upstate New York. The company has been in the family for four generations and employs 16 full-time, six part-time and 25 seasonal people. The business is certified as following USDA's Good Agricultural Practices (GAP) and Cornell University's Integrated Pest Management (IPM) program.

NY Potato Grower-Shipper farms roughly 700 acres, about 100 of which are rented. The farm grows and sells only potatoes. In general, New York's potatoes are harvested in the fall and can be stored through April or May, after which point their quality declines. Because of the seasonal nature of production and storage, the grower-shipper relies on potatoes grown elsewhere in order to meet customer demand when quality declines and/or when stored supplies are exhausted. NY Potato Grower-Shipper also buys and sells potatoes from other New York producers and from the following states outside the Northeast: Florida, North Carolina, Virginia, Maine, California, North Dakota, Idaho, and Canada. Most of these potatoes, except those from NY, are sourced through brokers. Forty percent of sales are from potatoes purchased from the other growers and resold.

NY Potato Grower-Shipper sells to a wide variety of customers, including wholesalers and distributors, retailers, food service, other packer-shippers and even some processors. Despite the many customer types, almost all of NY Potato Grower-Shipper's sales are made through brokers.

NY Potato Grower-Shipper sells less than 0.5 percent of its potatoes to City Produce Wholesaler. Orders from City Produce are received almost exclusively by phone (90%), although the grower-shipper prefers email. City Produce usually picks up orders from the farm.

NY Potato Grower-Shipper is somewhat satisfied with customer Produce Wholesaler for most activities, although it wants more lead time to fulfill the orders.

Western Potato Shipper

Western Potato Shipper sells russet potatoes to City Produce Wholesaler throughout year. It also supplies City Produce Wholesaler additional varieties when Northeast supplies run out. Orders are placed by phone or fax weekly or every other week.

Orders are delivered from Western Potato Shipper to City Produce by truck, arranged through a third party trucking agency, about three to seven days after orders are placed. Payment is expected in 14 days. Allowances are charged to cover any shrink and labor in case any loads of potatoes are rejected.

Regional Comparisons

In this section we examine how the regional potato supply chain compares with the national supply chain. NY Potato Grower-Shipper represents Onondaga Store's regional supply chain and Western Potato Shipper represents the national supply chain.

Table 2 shows the price margin[3] for a five-pound bag of potatoes received by each member of several of the store's individual potato supply chains. In addition, it shows the percent of total or proportion of the retail price received by each member, using the member's price margin. For example, the Northeast regional supply chain starts with NY Potato Grower-Shipper. Its price for a five-pound bag of round white potatoes, most of which were grown there, was $1.10. The price margin for City Produce Wholesaler in the same Northeast supply chain is $0.89. We note that the price margin is what is left to pay for all business expenses and profits beyond the cost of the good sold. It is not an indication of profitability.

The price received by Western Potato Shipper for round white potatoes ($1.35/five-pound bag or 45 percent of the total retail price) is greater than the price received by NY Potato Grower-

[1] Price margin is defined here as the sale price minus the purchase price.

Shipper which is $1.10/five-pound bag or 37 percent of the total retail price. The Western Potato Shipper receives a higher share than NY Potato Grower-Shipper, but its round white potatoes are more expensive, in turn, for City Produce Wholesaler; the wholesaler only buys round whites from them when New York supplies have run out.

For russets, the grower-shipper share is greater in the regional supply chain from NY Potato Grower-Shipper than the national supply chain. NY Potato Grower-Shipper does not grow russets but buys them from California, Idaho, and North Dakota and packages them to sell and expand their product line. The price received by NY Potato Grower-Shipper is $1.20/five-pound bag, or 53 percent of the total retail price, greater than the price received by Western Shipper of $1.00/five-pound bag or 44 percent of the total retail price.

In both supply chains, the retailer receives a greater share of the retail price for round white potatoes than for russets. This is due to Onondaga Store's higher retail price for round whites. Transportation costs in the national supply chain are greater than in the regional supply chain, as expected.

TABLE 2: Allocation of Retail Price in Onondaga Store's Potato Supply Chains

	Regional[1]				**National**[2]			
	NY Potato Grower-Shipper (russet)[3]		NY Potato Grower-Shipper (round white)		Western Shipper (russet)		Western Shipper (round white)	
Supply chain member	Price margin ($/5lb bag)	% of retail price	Price margin ($/5lb bag)	% of retail price	Price margin ($/5lb bag)	% of retail price	Price margin ($/5lb bag)	% of retail price
Potato Grower	1.20	52.6	1.10	36.9	1.00	43.9	1.35	45.3
Shipper Broker	na	na	na	na	0.03	1.1	1.03	0.8
Transportation	0.08	3.3	0.08	2.5	0.65	28.5	0.65	21.8
Produce Wholesaler	0.68	29.6	0.89	29.9	0.28	12.1	0.04	1.3
Onondaga Store	0.33	14.5	0.92	30.7	0.33	14.5	0.92	30.7
Total retail price	**2.28**	**100.0**	**2.98**	**100.0**	**2.28**	**100.0**	**2.98**	**100.0**

Notes

na indicates "not applicable"

[1] NY Potato Grower-Shipper grows potatoes in New York and ships potatoes produced from the farm and from elsewhere to customers throughout the Northeast.

[2] Western Potato Shipper grows potatoes in Western U.S. and ships potatoes throughout the U.S.

[3] NY Potato Grower-Shipper does not grow russet potatoes; these are grown by other producers.

Source: Authors' calculations based on case interviews.

The distance and fuel used to get potatoes from the producer to the retailer are displayed in Table 3. The potatoes supplied by Western Potato Shipper travel the most miles and potatoes in the regional supply chain travel the fewest miles. The regional supply chain uses less than a tenth of the fuel per hundredweight (cwt) than the national supply chain requires to transport potatoes from the farm to the retailer.

TABLE 3: Food Miles and Fuel Use in Onondaga Store's Potato Supply Chains

	Food Miles	Truck Miles[1]	Truck capacity	Fuel use	Fuel use per cwt shipped
	number		*cwt*	*gallons*	
Regional: NY Potato Grower-Shipper to Onondaga Store[1]					
NY Potato Grower-Shipper to City Produce Wholesaler	29	58	400	10	0.02
Wholesaler to Onondaga Store[1]	13	26	40	2	0.06
All segments	42	84		12	0.08
National: Western Potato Shipper to Onondaga Store[1]					
Western Potato Shipper's growers to packinghouse	7	14	100	1	0.01
Western Shipper to distribution center	75	150	400	25	0.06
Distribution to City Produce Wholesaler	2,160	2,160	400	360	0.90
Wholesaler to Onondaga Store[1]	13	26	40	2	0.06
All segments	2,255	2,350		389	1.04

1 Truck miles are equal to food miles when potatoes travel over 150 miles. We assume trucks on trips longer than 150 miles will return with a backhaul.

2 Miles per gallon (mpg) vary by type and size of truck used to transport potatoes. Trailer trucks have a capacity of 40,000 pounds and obtain 6 mpg; box trucks (16 ft) have a capacity of 4,000 pounds and obtain 11 mpg. Trucks used to transport potatoes from the producer to the packer-shipper's packing house have capacity of 10,000 pounds and obtain 10mpg.

Source: Authors' calculations based on mileage.

Prospects for Expansion of Regional Food System: Potatoes

In general, potato grower-shippers receive a high share of the retail price. This retail price share pays for the value-added activities conducted by the grower-shippers, which include the production or growing as well as the handling, storage, grading, packing, sales, and shipping as well as profits. Potatoes can be maintained in long-term storage in climate-controlled rooms and shrinkage for potatoes is usually small.

We define a regional supply chain as one where the product is produced, or grown, in the region. Therefore, we can say that the supply chain that starts with potatoes grown by NY Potato Grower-Shipper is a regional supply chain for Onondaga Store.

We use the supply chain members' retail price shares as a proxy for value-added. Table 4 presents estimates of the value-added activities by each member of the various supply chains. Members that are located in the Northeast are shaded gray. We weight the member price shares (see Table 2) by the proportion of Onondaga Store's potatoes that that supply chain provides (see Figure 1) to calculate the extent of total regional participation in the supply chains. Table 4 summarizes the extent of members' participation in the supply chains as well as the total extent of regional value-added activity in the potato supply chains.

The regional supply chains provide an estimated 64 percent of the value-added activity of Onondaga Store's total potato supply chains (Table 4). However, other members of Onondaga Store's potato supply chains are also located in the region and, therefore, contribute significantly to the value-added activities that are conducted in the region.

The regional supply chain stream that starts with potatoes grown and marketed by NY Potato Grower-Shipper include activities from production and shipping plus City Produce Wholesaler activities plus Onondaga Store activities. One of the streams marketed by NY Potato Grower-Shipper starts with potatoes produced by growers from outside the region (includes russet potatoes purchased and repacked) and contributes 8.2 percent to activities performed in the region. This includes the packing and shipping activities only from NY Potato Grower-Shipper plus City Produce Wholesaler plus Onondaga Store. The two streams that start with potatoes grown and marketed by Western Shipper (russets and round whites) contribute only the portion from Produce Wholesaler and Onondaga Store, which total 5.9 percent.

The sum of all regional activities from all supply chains is estimated at 78.0 percent, which means 78.0 percent of the value-added activities from Onondaga Store's potato supply chains are being conducted in the region.

TABLE 4: Extent of Regional Value-Added Activity in the Onondaga Store Potato Supply Chain

	Percent of retailer's potato supplies	Value-added[1]	Value-added retained by supply chain member	Extent of regional value-added activity[2]
Supply chain segment	*%*	*% of retail price*	*%*	*%*
Regional: NY Potato Grower-Shipper to Onondaga Store				
NY Potato Grower-Shipper -own potatoes (round whites)	48	36.9	17.7	
Transportation		2.5	1.2	
Wholesaler	100	29.9	14.4	
Onondaga Store retailer	100[3]	30.7	14.7	
All segments	48	100.0	48.0	48.0
Northeast potato growers (round whites)[4]	16	31.8	5.1	
Transportation		2.5	0.4	
NY Potato Grower-Shipper's other potatoes	32	2.6	0.4	
Transportation		2.5	0.4	
Wholesaler	100	29.9	4.8	
Onondaga Store retailer	100[3]	30.7	4.9	
All segments	16	100.0	16.0	16.0
Potatoes purchased from ID to NY Potato Grower-Shipper to Onondaga Store				
Other potato growers (russets)[4]	16	21.5	3.4	
Transportation		27.4	4.4	
NY Potato Grower-Shipper	32	3.7	0.6	
Transportation		3.3	0.5	
Wholesaler	100	29.6	4.7	
Onondaga Store retailer	100[3]	14.4	2.3	
All segments	16	100.0	16.0	8.2
National: Western Potato Shipper to Onondaga Store				
Western Shipper (russets)	10	43.9	4.4	
Broker		1.1	0.1	
Transportation		28.5	2.9	
Wholesaler	100	12.1	1.2	
Onondaga Store retailer	100[3]	14.5	1.5	
All segments	10	100.0	10.0	2.7
National: Western Potato Shipper to Onondaga Store				
Western Shipper (round whites)	10	45.3	4.5	
Broker		0.8	0.1	
Transportation		21.8	2.2	
Wholesaler	100	1.3	0.1	
Onondaga Store retailer	100[3]	30.7	3.1	
All segments	10	100.0	10.0	3.2
Added-value performed in region				**78.0**

[1] This column contains the % margins of retail revenue from Table 2 above.
[2] This column captures all regional activity in the NE within each supply chain (excludes supply chain activity outside of the Northeast).
[3] As default, the retailer percent is 100%.
[4] For this supply chain, we separate potatoes purchased by NY Potato Grower-Shipper by variety, see Figure 1 – Potato Supply Chain for Onondaga Store. We assume that half of the purchases are russets and half round whites; therefore, 16 percent of the store's potatoes are russet and 16percent are round white potatoes.

Note: Shaded rows indicate supply chain members located in the Northeast.
Source: Authors' calculations based on case interviews.

NY Potato Grower-Shipper believes opportunities exist in hiring sales people and selling directly to retail and foodservice customers. In addition, it believed it could increase its sales locally to New York State customers and provide them with a "home-grown product." Only 10 percent of its sales are in New York State with 70 percent in the rest of the Northeast and 20 percent to the remainder of the U. S.

Although NY Potato Grower-Shipper's prices are very competitive for round white potatoes in five-pound bags, they are less competitive for russet potatoes. New York does not produce many russets, although they do produce whites, golds, reds, fingerlings, and chipping potatoes. However, russets are the leading potato purchased in supermarkets and usually account for around 50 percent of fresh potato sales.

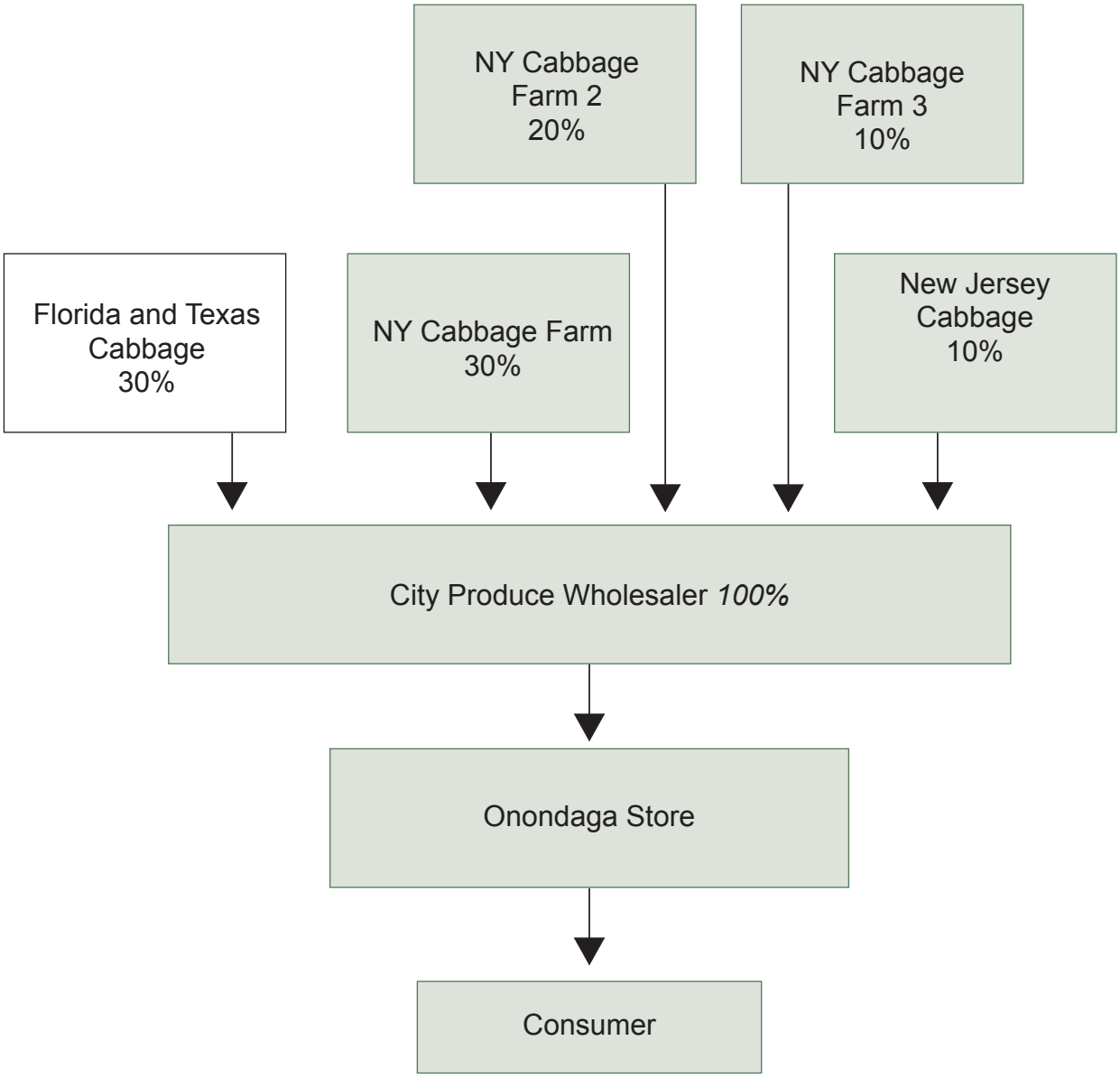
Prospects for expansion of regional production and consumption may need to rely on improving storage and quality. Another way to increase the extent of regional production is to expand consumer demand for the regional varieties and rely less on russets imported from outside the region.

Product 2: Cabbage

Onondaga Store purchases cabbage from City Produce Wholesaler as well as potatoes. The store sells about six heads of cabbage every other week.

Figure 2 depicts the general supply chain for Onondaga Store's cabbage. Starting at Onondaga Store and tracing back up the supply chain, the boxes upstream indicate the percent of cabbage purchases of the downstream member. For example, City Produce Wholesaler provided 100 percent of Onondaga Store's store cabbages, while NY Cabbage Farm provided 30 percent of City Produce Wholesaler's cabbages.

FIGURE 2: Cabbage Supply Chain for Onondaga Store, Onondaga County, NY



Note: Shaded boxes represent supply chain members located in the Northeast Region and Numbers in boxes represent the % of the next member's supply
Source: Authors' calculations based on case interviews.

City Produce Wholesaler
Cabbage sales, including green, red, and Savoy (a wrinkled, netted variety of cabbage), for City Produce Wholesaler is a very small portion of its annual sales. Indeed, only about half of the wholesaler's customers buy cabbage. The Onondaga Store accounts for less than 1 percent of Produce Wholesaler's cabbage sales.

The produce wholesaler buys from three different New York suppliers who provide about 60 percent of total cabbage supplies. These suppliers ship for about eight months out of the year, as long as good quality supplies last. City Produce then sources from other producing states, including New Jersey (10 percent of supplies) and Texas and Florida (30 percent of supplies).

Although City Produce buys from three New York growers, it purchases about 30 percent (or about half of their New York purchases) from one farm, NY Cabbage Farm. The wholesaler has purchased cabbage from this grower for many years — "since before me," according to the cabbage buyer. The other two growers produce a variety of other vegetables and if City Produce is going to be there with a truck it purchases cabbage from them as well.

City Produce Wholesaler's orders to NY Cabbage Farm are placed via phone weekly and delivered in 24 hours. Each order is about 5,000 pounds. Transportation is included in the price, and there are no contracts between the parties.

City Produce Wholesaler is very satisfied with most of the supplier characteristics. Even though NY Cabbage Farm sells only a limited number of commodities, one of which is cabbage, Produce Wholesaler likes to do business with the farm and believes that it has more success with farmers who understand their main product well.

Regional Comparisons

In this section we examine how the regional green head cabbage supply chain compares with the national supply chains. We use the grower NY Cabbage Farm, located within 16 miles of Onondaga Store, and one supplier in New Jersey to illustrate two regional supply chains. The national supply chains are made up of two locales, Florida and Texas. The numbers were collected in 2012 and do not necessarily represent current prices.

Table 5 shows the price margin[4] per pound received by each member of various supply chains. In addition, it shows the percent of total or proportion of the retail price received by each member, using the member's price margin. For example, the grower member in the New York regional supply chain is NY Cabbage Farm. Its price per pound was $0.22 which includes delivery. To compare NY Cabbage Farm's price per pound to other regions, an estimated transportation cost is deducted and the estimated grower price without transport is presented in Table 5. The price margin for City Produce Wholesaler in the same supply chain was $0.28. We note that the margin is what is left to pay for all other business expenses and profits. It is not an indication of profitability.

[4] Price margin is defined here as the sale price minus the purchase price.

The producer share of the retail price paid by the final consumer was greatest for cabbage that comes from NY Cabbage Farm. NY Cabbage Farm received $0.19/pound or 33 percent share of the retail price of $0.58 per pound after an estimate for transportation was deducted. The wholesaler, City Produce Wholesaler, received a margin of $0.31/pound for cabbage that comes from New Jersey (NJ); however, NJ producers received the lowest price ($0.15/ pound) across all supply chains for producers. The retailer, Onondaga Store, received the same share (14 percent) of the retail value across all supply chains and segments.

Transportation costs per pound were greater in the national supply chains than the regional supply chains. We note that cabbage was only purchased from Florida and Texas when Northeast supplies ran out.

TABLE 5: Allocation of Retail Price in Onondaga Store's Cabbage Supply Chains

	Regional				National[2]			
	NY Cabbage Farm		New Jersey		Florida		Texas	
Supply chain segment	Price margin ($/lb)	% of retail price	Price margin ($/lb)	% of retail price	Price margin ($/lb)	% of retail price	Price margin ($/lb)	% of retail price
Grower	0.19[2]	33	0.15[3]	26	0.16[3]	28	0.18[3]	32
Transport[4]	0.03	5	0.04	7	0.09	15	0.12	20
Produce Wholesaler	0.28	48	0.31	53	0.25	43	0.08	14
Onondaga Store retailer	0.08	14	0.08	14	0.08	14	0.08	14
Retail price	**0.58**	**100**	**0.58**	**100**	**0.58**	**100**	**0.58**	**100**

Notes

- indicates "not applicable"

[1] We note that cabbage purchased from FL and TX are during the off-season for the New York Cabbage Farm.

[2] Yearly average price paid to NY Cabbage Farm by the wholesaler adjusted for transportation cost using trucking rates reported by USDA, Agricultural Market News.

[3] Producer prices are the average for the period 2012 reported by USDA, Agricultural Market News (https://www.marketnews.usda.gov/mnp/fv-home).

[4] We use the following calculation to obtain the transportation supply chain segment: Trucks transporting cabbage from FL and TX have a capacity of 40,000 lbs. Trucks transporting cabbage from NY and NJ have a capacity of 10,000lbs. Freight cost/truck capacity = transport.

Source: Authors' calculations based on case interviews and USDA, Agricultural Marketing Service.

Table 6 shows the distance and fuel utilized to get green head cabbage from the producer to the retailer. Green head cabbage from Texas traveled the most miles and used the most total fuel per hundredweight compared to the other supply chains. In the regional supply chain, cabbage from NY Cabbage Farm traveled the fewest miles and used the least fuel across supply chain segments. The shortest supply chain, from NY Cabbage to City Produce Wholesaler then to Onondaga Store, traced 58 miles and used 0.09 gallons of full per hundredweight of green head cabbage.

TABLE 6: Food Miles and Fuel Use in Onondaga Store's Cabbage Supply Chains

	Food Miles	Truck Miles[1]	Truck capacity	Fuel use[2]	Fuel use per cwt shipped
	number		*cwt*	*gallons*	
Regional: NY Cabbage Farm (NY) to Onondaga Store[3]					
NY Cabbage Farm[4]	16	32	100	3.2	0.03
Wholesaler to Onondaga Store	13	26	40	2.4	0.06
All segments	41	58		5.6	0.09
Regional: New Jersey to Onondaga Store					
NJ to Wholesaler	298	298	100	29.8	0.30
Wholesaler to Onondaga Store 1	13	26	40	2.4	0.06
All segments	311	324		32.2	0.36
National: Florida to Onondaga Store 1[5]					
FL to Wholesaler	1,153	1,153	400	192.2	0.48
Wholesaler to Onondaga Store 1	13	26	40	2.4	0.06
All segments	1,166	1,179		194.6	0.54
National: Texas to Onondaga Store 1[6]					
TX to Wholesaler	2,053	2,053	400	342.2	0.86
Wholesaler to Onondaga Store 1	13	26	40	2.4	0.02
All segments	2,066	2,079		344.6	0.91

[1] Truck miles are equal to food miles when cabbage travels over 150 miles. Trucks on trips longer than 150 miles will return with a backhaul.
[2] Miles per gallon (mpg) vary by segment. Trailer trucks used for shipping cabbage from FL and TX to the wholesaler have a capacity of 40,000 pounds and obtain 6 mpg; trailer trucks used for shipping cabbage from NJ to the wholesaler have a capacity of 10,000 pounds and obtain 10 mpg; box trucks (16 ft) used to transport cabbage from the wholesaler to Onondaga Store 1 have a capacity of 4,000 pounds and obtain 11 mpg.
[3] Straight trucks used by NY Cabbage to transport cabbage to the wholesaler have a capacity of 10,000 pounds and obtain 10 mpg.
[4] Cabbages are 50 percent of the total weight of the straight truck from NY Cabbage farm to the wholesaler.
[5] We use the principal cabbage producing region of Florida which is Hastings.
[6] We use the principal cabbage producing region of Texas which is the Lower Valley.

Source: Authors' calculations based on case based interviews and USDA, Agricultural Marketing Service.

Prospects for Regional System Expansion

Cabbage producers in the Northeast are among the largest in the U.S. with efficient production systems. Expansion of the system may depend on expansion of consumer demand. Cabbage consumption per capita has been declining for the last five to six years, although total U.S. consumption has remained steady due to population increases (see Appendix). Some regional expansion may be possible if regional producers can improve storage conditions and develop a longer sales season. Longer storage along with finding and growing varieties that can be stored longer may reduce the need to buy cabbage from Texas and Florida.

We define regional supply chain as one where the product is produced, or grown, in the region. Therefore, we can say that the supply chain that starts with cabbage grown by New York cabbage farms and cabbage purchased from New Jersey are both regional supply chains for Onondaga Store. These regional supply chains provide about 70 percent of Onondaga Store's total cabbage supply (table 7).

Although the grower members of Onondaga Store's other cabbage supply chains are not located in the region, other members, City Produce and Onondaga Store are, and their value-added activities are conducted in the region. We weight the members' price shares (see Table 5) by the proportion of Onondaga Store's cabbages that they provided (see Figure 1) to calculate the extent of total regional participation in the supply chain. Table 7 summarizes the extent of members' participation in the supply chain as well as the total extent of regional value-added activity in the cabbage supply chain.

The supply chain stream that starts with cabbages grown and marketed by New York's cabbage farms contributes 60 percent of the total supply chain's value-added activity, while those purchased from New Jersey contributed an additional 10 percent. These activities include the farms' production and shipping activities plus City Produce Wholesaler Onondaga Store activities. The regional value-added activities from the supply chains that starts with cabbages grown and marketed in Texas and Florida are from City Produce and Onondaga Store. These regional activities represent 11 percent (Florida supply chain) and 10 percent (Texas supply chain) of all of the cabbage value-added activities from all of the supply chains.

The sum of the regional activities is 85.8 percent, which represents the participation of regional activities to Onondaga Store's cabbage supply chain.

At the store, origin information about the cabbages sold are largely lacking. Cabbages are whole or half, film wrapped, and labeled with price and weight but no information about where or by whom they were grown.

TABLE 7: Extent of Regional Value-Added Activity in the Onondaga Store's Cabbage Supply Chains

	Percent of retailer's Cabbage supplies	Value-added[1]	Value-added retained by supply chain member	Extent of regional value-added activity[2]
Supply chain segment	%	% of retail price	%	%
Regional: NYS Farms to Onondaga Store[3]				
New York Cabbage Farms	60	32.8	19.7	
Transportation		5.2	3.1	
Wholesaler	30	48.3	29.0	
Onondaga Store[4]	100	13.8	8.3	
All segments	60	100.0	60.0	**60.0**
Regional: Cabbage purchased from New Jersey to Onondaga Store				
New Jersey Cabbage	10	26.4	2.6	
Transportation		6.9	0.7	
Wholesaler	100	52.9	5.3	
Onondaga Store[4]	100	13.8	8.3	
All segments	60	100.0	10.0	**10.0**
National: Florida Cabbage to Onondaga Store[5]				
Florida Shipper	15	28.1	4.2	
Transportation		15.0	2.2	
Wholesaler	100	43.1	6.5	
Onondaga Store[4]	100	13.8	2.1	
All segments	15	100.0	15.0	**8.5**
National: Texas Cabbage to Onondaga Store[5]				
Texas Shipper	15	31.6	4.7	
Transportation		20.0	3.0	
Wholesaler	100	34.7	5.2	
Onondaga Store[4]	100	13.8	2.1	
All segments	15	100.0	15.0	**7.3**
Added-value performed in region				**85.8**

1 This column contains the % margins of retail revenue from Table 5 above.
2 This column captures all regional activity in the NE within each supply chain (excluding supply chain activity outside of the northeast).
3 For this regional supply chain, we combine all NYS cabbage (NY Cabbage farm and other NY farms, See Figure 2 – Cabbage Supply Chain for Onondaga Store, NY).
4 By default, the retailer percent is 100 percent.
5 For the national supply chain, 30 percent of city produces' cabbage is supplied from both Florida and Texas (see Figure 2 – Cabbage Supply Chain for Onondaga Store, Onondaga Co., NY). We assume that 15 percent was provided by Florida and 15 percent provided by Texas.w

Note: Shaded rows indicate supply chain members located in the Northeast.
Source: Authors' calculations based on case interviews.

Key Lessons for Onondaga Store

Onondaga Store is a gas station with a convenience store. It is larger than most convenience stores and offers hot foods, freshly prepared cold foods, such as sandwiches and fresh-cut fruit and vegetables, and grab-and-go fruits and vegetables. In addition to the prepared foods, it also has an expanded grocery and perishable foods sections in order to provide the community more access to healthy foods. The product supply chains described in this case are potatoes and cabbage.

The Store and Its Environment

Effect of size and economies of scale

- Onondaga Store is a large convenience store trying to expand its selection of products for sale to include more foods, specifically more perishable foods. But its small size hampers its ability to leverage some economies of scale that favor larger stores. Because it is small with fewer products, less selling space, and little storage space, it does not have the purchasing economies of scale that supermarket chains have. Larger companies buy from suppliers in full tractor trailer loads, in full cases, and have greater bargaining power. This means their purchase prices are generally lower. Smaller companies may have to order mixed loads which take more labor to load and unload, or less-than-full tractor trailer loads resulting in higher transportation costs per pound of product.
- In addition to procurement, operations such as delivery, replenishment, and labor are affected by economies of scale. Deliveries of small volumes are more costly and less efficient. Wholesalers and distributors charge more when they have to break apart full cases for small orders, and transportation is more expensive for small drop sizes, so stores may be charged an extra drop fee for small orders.
- Onondaga Store and City Produce Wholesaler try to balance the smaller delivery sizes and number of deliveries per week against cost and efficiencies while also trying to maintain high quality perishable products.
- In addition, the store has a very successful fresh-cut fruits and vegetables program. Sixty percent of all the produce sales are from fresh-cuts. The store cuts up product in-store to maintain high quality product. It uses produce from the store's produce department, increasing produce volume and turnover. The store also uses its fresh produce in its highly successful prepared foods counter, using product for hot and cold sandwiches, salads, and fruit and vegetable party trays.

Effect of ownership structure

- The store was corporately owned; however, the company was owned by an entrepreneur with an interest in expanding the stores to include more food and in bringing healthier foods to his stores. During the project and after the owner had passed away, the company was purchased by a larger convenience store chain.

Market Basket Supply Chains

Effect of regional production/industry

- The Northeast region is an important producer of both cabbage and potatoes. New York State generally ranks first nationally in cabbage production, and Maine ranks tenth in potato production. Many of the cabbage and potato growers in the Northeast grow, pack, and ship product and have the capacity to supply retail grocers. In addition, the Northeast is an important producer of a number of other fruits and vegetables. Even though Onondaga Store's potatoes and cabbages were largely grown by New York farms, the supply chains for each product are not direct. For example, the potato producer that is the primary, regional supplier for City Produce Wholesaler sells to retail accounts, but does not have a sales office and chooses to use brokers, wholesalers and distributors. The regional supply chains were the same length as the national supply chains, tracing back to the grower with the wholesaler intermediary between the store and the grower.
- Generally, having regional potato and cabbage production did not benefit the store. The store was too small to purchase directly from the potato and cabbage growers. It also did not receive any greater price margin benefit from regionally grown potatoes or cabbages. These benefits were attributed to City Produce Wholesaler.
- The potatoes and the cabbages in the Onondaga Store are not labeled prominently with information about where the product was grown. The potatoes from NY Potato Grower-Shipper are in a bag labeled with the farm name and town, but it is not a prominent feature of the bag. It looks very similar to other five-pound bags of potatoes. The cabbages are wrapped in film with only a sticker indicating the price and weight.
    - The food industry states the demand for local products is still strong and growing. Onondaga Store may be able to work with City Produce to harness the power of this demand and label and market the products that are grown in the state or region. For example, round white potatoes that are

grown locally have a higher retail price and a higher margin than the russet potatoes that are grown out of state. The wholesaler also receives a bigger margin from the round whites grown in-state than out of state.
    - Investments on the part of the grower, the wholesaler, and the store to help by labeling and promoting locally grown produce may increase sales volumes through the small store, benefiting members of the supply chain.
- Despite opportunities to label and sell potatoes and cabbages as New York-grown, the store may be too small to purchase directly from growers. For example, the delivery costs for such small volumes of potatoes may erode the larger margins the store receives. The store may find greater opportunity to work with City Produce to coordinate a New York grown program. In this case, labeling products at the farm-level is extremely important in order to maintain the identity of the product through the supply chain.
- City Produce Wholesaler had ready access to regional product grown very nearby. The wholesaler was able to backhaul produce from the farms if its truck was in the area. The cabbage producer was also able to send straight truck loads to the wholesaler. The wholesaler is extremely satisfied with the regional potato and cabbage producers it purchases from. He stated, "We like to stick with someone who know their product." When rating his experience with national potato suppliers, proximity and timeliness of delivery were only somewhat satisfactory.

Extent of regional value-added activity

- Onondaga Store's Northeast regional potato and cabbage growers contribute a sizeable 48 percent and 70 percent of Onondaga Store's potatoes and cabbages respectively. If we add this to the value-added activities that are conducted in the Northeast by City Produce and by Onondaga Store, the total value-added activities conducted in the region are estimated as 78 percent and 85.8 percent respectively.
- Being located in the same region as the retailer did not appear to increase the Northeast growers' share of retail price for these products.

Presence of relationships

- The presence of longstanding relationships between the supply chain members does not appear to be associated with distance or regional geography. The longest-running relationship is between City Produce and NY Cabbage Farm, which started "many years before me," according to the produce buyer. Conversely, the newest relationship, which is less than one year old, is between City Produce Wholesaler and NY Potato Grower-Shipper, and these members are only about 16 miles from each other.

Effect of geography/distance

- Transportation and distance to market have been and remain major competitive factors for Northeast farms. Transportation costs are less from NE suppliers, and, in addition, travel time is less. Orders placed by City Produce for potatoes and for cabbages grown in the NE can arrive within one day. Orders placed from Western potato growers can take three to seven days to arrive and from FL or TX cabbage growers about three days.

Appendix

Industry Profiles

Potato Industry Profile

According to the National Agricultural Statistics Service (NASS) Survey, in 2015 the U.S. produced 441,205 hundredweight (cwt) of potatoes for both fresh use and processing (Table A.1). Idaho produces approximately 30 percent of total U.S. production. Although potatoes can be grown year-round in parts of the U.S., potatoes harvested in the fall account for the majority, 92 percent, of production.

The Northeast region produced 23,759 cwt of potatoes, totaling 5.4 percent of U.S. production. The states in the Northeast that report production are Maine, Maryland, Massachusetts, New York, Pennsylvania, and Rhode Island.

Table A.1: 2015 Potato Production in the Northeast

State	Production	Value
	1000cwt	*thousands of dollars*
U.S.	441,205	3,865,538
Northeast Region	23,759	252,684
Maine	16,160	163,216
Maryland	792	8,316
Massachusetts	1,098	11,419
New York	4,144	50,557
Pennsylvania	1,484	18,253
Rhode Island	81	923

Source: USDA: NASS. "Potatoes: 2015 Summary," July 2016.
http://usda.mannlib.cornell.edu/usda/current/Pota/Pota-09-15-2016.pdf.

[5] USDA: NASS. "Potatoes: 2015 Summary," July 2016.
http://usda.mannlib.cornell.edu/usda/current/Pota/Pota-09-15-2016.pdf.

Although potato production yields in the Northeast are significantly lower than the U.S. average, higher potato prices help reduce the impact of the lower yields (Table A.2).

Table A.2: 2015 U.S. and Northeast Potato Statistics

Source	Variable	US	Northeast	Northeast, % of U.S.
1	Production 1000 cwt	441,205	23,759	5.39%
1	Value thousands	3,865,538	252,684	6.54%
1	Acres harvested (1000)	1,054	77	7.32%
1	Yield per acre (cwt)	418	275	65.79%
1	Value of production (1000)	4,237,284	252,684	5.96%
1	Price received ($ per cwt)	8.76	11.15	127.28%
2	Utilization per capita, fresh	34.0		
2	Utilization per capita processing	79.7		

Note: Northeast totals may be low because several states do not report.
Sources:
1 USDA: NASS. "Potatoes: 2015 Summary," July 2016. http://usda.mannlib.cornell.edu/usda/current/Pota/Pota-09-15-2016.pdf.
2 "USDA ERS - Food Availability (Per Capita) Data System." Accessed January 19, 2017. https://www.ers.usda.gov/data-products/food-availability-per-capita-data-system/.

In 2015, 25 percent of the U.S. potato crop was for fresh use while 62 percent was for the processing market. With respect to retail sales, potatoes were the third highest selling vegetable item in 2015 (Table A.3).

Table A.3: Top 5 Retail Vegetable Items, U.S. Retail Produce Sales for 52 weeks ending 12/26/2015

Item	Average $ per store per week
Packaged Salad	3,607
Tomatoes	3,005
Potatoes	2,656
Cooking vegetables	2,519
Value-Added Vegetables	2,519

Source: "FreshFacts on Retail: 2015." United Fresh Produce Association and Nielsen Perishables Group, January 2016.

[6] "USDA ERS - Food Availability (Per Capita) Data System." Accessed January 19, 2017. https://www.ers.usda.gov/data-products/food-availability-per-capita-data-system/.

Retailers keep potatoes in the store year round, stocking different varieties and selections of bagged and bulk (loose) potatoes. Potatoes can be stored, usually by the producer or packer, for most of the year, with most potatoes being harvested in the fall. In order to maintain stock, retailers will bring in potatoes grown in different regions. Purchasing from different growing regions provides risk insurance in case of regional crop failures. Having New York potato growers in the retailers' backyard lowers transportation costs. However, New York storage inventories run out usually by May and harvests of "new" potatoes do not occur until around August, creating a gap in sales that other states fill.

Cabbage Industry Profile

Cabbage is a cruciferous vegetable and is closely related to such items as broccoli, cauliflower, Brussels sprouts, and kale. Brussels sprouts and kale, in particular, are growing in popularity while cabbage consumption is declining . Although cabbage is a common produce item, estimated cabbage consumption is low compared to other vegetables. For examples, U.S. fresh cabbage consumption was estimated as 6.2 pounds per capita in 2014, while availability of fresh potatoes was 32.2 lbs. per capita .

According to the National Agricultural Statistics Service (NASS) Survey, New York and California are the leading cabbage producers. In 2015, California was the leading cabbage producer and New York the second-leading producer, although they commonly switch rankings in production (Table A.4).

Table A.4: Top Producing Cabbage States, 2015

State	Utilized Production
	1000 cwt
California	5,865
New York	3,240
Florida	2,706
Texas	1,815
Georgia	1,258

Source: USDA: NASS. "Vegetables: 2015 Summary," February 2016.

[7] USDA ERS - Food Availability (Per Capita) Data System." Accessed January 19, 2017. https://www.ers.usda.gov/data-products/food-availability-per-capita-data-system/.

[8] ibid.

Northeast Cabbage Industry

Major cabbage producing states in the Northeast other than New York include New Jersey and Pennsylvania. In total, the Northeast produced around 20 percent of the nation's cabbage in 2015 (Table A.5).

Table A.5: 2015 U.S. and Northeast Fresh Cabbage Statistics

Source	Variable	U.S.	Northeast	Northeast, % of US
1	Area planted, acres	59,530	11,030	18.5%
1	Yield per acre, cwt	360	1040	288.9%
1	Production, cwt	20,113,000	4,072,000	20.2%
1	Value of production, $ millions	386.09	75.5	19.6%
1	Grower price, Fresh, $ per cwt (packing house door)	$19.20	$20.80	108.3%
2	Fresh consumption per capita, lbs	6.2	na	na

Sources:
1 "USDA/NASS QuickStats Ad-Hoc Query Tool." Accessed January 19, 2017. https://quickstats.nass.usda.gov/results/8A77D22E-6DB0-3CD0-AFDD-B784E155BF5F.
2 USDA: NASS. "Vegetables: 2015 Summary," February 2016. http://usda.mannlib.cornell.edu/usda/current/VegeSumm/VegeSumm-02-04-2016.pdf.

Cabbage is harvested in the fall and then placed into storage. Cabbage is sold after harvest until storage runs out, usually around March the following year. Quality tends to deteriorate in storage and producers time their production and sales such that their storage runs out at the same time that quality runs out. Therefore, although the Northeast can, in theory, produce enough cabbage to meet its consumption needs, cabbage is still purchased from other growing regions in order to help fill the gap in Northeast supplies from March until the next harvest in the late summer. Procuring from other growing regions also keeps the supply chains open and acts as a hedge against local natural disasters, disease outbreaks, etc.

OTHER A.E.M. EXTENSION BULLETINS

EB No	Title	Fee (if applicable)	Author(s)
2017-13	Case studies of supermarkets and food supply chains in low-income areas of the Northeast: Onondaga County Store, New York		Park, K.S., Gomez, M. and K. Clancy
2017-12	Case studies of supermarkets and food supply chains in low-income areas of the Northeast: New York City Store, New York		Park, K.S., Gomez, M. and K. Clancy
2017-11	Case studies of supermarkets and food supply chains in low-income areas of the Northeast: Madison County Store, New York		Park, K.S., Gomez, M. and K. Clancy
2017-10	Case studies of supermarkets and food supply chains in low-income areas of the Northeast: Kent Store 2, Delaware		Park, K.S., Gomez, M. and K. Clancy
2017-09	Case studies of supermarkets and food supply chains in low-income areas of the Northeast: Kent Store 1, Delaware		Park, K.S., Gomez, M. and K. Clancy
2017-08	Case studies of supermarkets and food supply chains in low-income areas of the Northeast: Charleston Store, West Virginia		Park, K.S., Gomez, M. and K. Clancy
2017-07	Case studies of supermarkets and food supply chains in low-income areas of the Northeast: Baltimore Store 2, Maryland		Park, K.S., Gomez, M. and K. Clancy
2017-06	Case studies of supermarkets and food supply chains in low-income areas of the Northeast: Baltimore Store 1, Maryland		Park, K.S., Gomez, M. and K. Clancy
2017-05	Exploring the Feasibility of a Rural Broadband Cooperative in Northern New York		Schmit, T.M. & R.M. Severson
2017-04	Dairy Farm Business Summary, New York Large Herd Farms, 300 Cows or Larger, 2016	($20.00)	Karszes, J., Knoblauch, W.A. & Dymond, C.
2017-03	Workforce Issues and the New York Dairy Industry, Focus Group Report		Maloney, T.R. & Eiholzer, L.

Paper copies are being replaced by electronic Portable Document Files (PDFs). To request PDFs of AEM publications, write to (be sure to include your e-mail address): Publications, Department of Applied Economics and Management, Warren Hall, Cornell University, Ithaca, NY 14853-7801. If a fee is indicated, please include a check or money order made payable to Cornell University for the amount of your purchase. Visit our Web site (*http://dyson.cornell.edu/outreach/#bulletins)* for a more complete list of recent bulletins.