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

SYRACUSE STORE 2, NEW YORK

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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. This case describes a supermarket 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 2011-2015. Fictitious names are used to maintain confidentiality of the case study participants.

Place: Westside Neighborhood in Syracuse, NY

This case describes one retail grocery store in a neighborhood of Syracuse, New York and two of its product supply chains. The city of Syracuse is located in central New York and has a population of about 144,700. The neighborhood that this store serves has 19,984 residents (Table 1).[1] The median household income is about $27,609, substantially less than the median household income for New York State, $58,687. This neighborhood has a large African American population (32.4 percent) and a relatively large Latino population (16.4 percent). It also has a poverty rate of 38.2 percent.

The U.S. Census Bureau reports 13 grocery stores, excluding convenience stores, 14 convenience stores, and no warehouse clubs or supercenters in the neighborhood. The concentration of food retailers per 10,000 persons is included in Table 1 to illustrate how this compares to the county and state metrics.

Supermarkets and other grocery stores sell a variety of foods, 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 large grocery stores 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.

[1] The neighborhood is defined as the zip code that contains the store.

TABLE 1: Demographic and Food Environment Statistics for Syracuse Store 2

	Neighborhood zip code	Onondaga County	New York State
DEMOGRAPHICS			
Population and Age			
Population[1]	19,984	467,846	19,594,330
Median age[1]	30.5	38.7	38.1
Less than 5 years of age[a,1]	7.7%	5.8%	6.0%
Average household size[1]	2.41	2.43	2.62
Education			
High school degree or higher[a,1]	73.2%	90.1%	85.4%
Bachelor's degree or higher[a,1]	18.2%	33.5%	33.7%
Race and Ethnicity			
African American or Black[a,b,1]	32.4%	12.7%	17.0%
Hispanic[a,c,1]	16.4%	4.3%	18.2%
Poverty and Program Participation			
Poverty rate[a,1]	38.2%	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 household income[1]	$27,609	$54,498	$58,687
FOOD ENVIRONMENT			
Grocery stores[f,4]	6.5	2.6	5.2
Convenience stores[f,4]	7.0	4.0	1.8
Warehouse clubs and supercenters[f,4]	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.

Syracuse Store 2

The store is an independently owned supermarket that has been in the family for almost 100 years. The current owner, who is also the store manager, has owned the business since 1999.[2] The neighborhood has numerous small convenience stores that have a limited selection of mostly snack foods, soda and some prepared foods, but Syracuse Store 2 is its only supermarket. Annual sales for this store are approximately $8 million; sales in meat, fluid milk, and produce make up about 50 percent of sales. The store is approximately 21,000 square feet and employs 34 full-time and 38 part-time workers, with full-time workers receiving benefits.

TABLE 2: U.S. Store Operations versus Syracuse Store 2

	Syracuse Store 2	2011 U.S. average
Store size	21,000 sq ft	33,320 sq ft
Weekly sales	$154,000	$307,306
Weekly sales per sq ft of selling area	$9.22	$9.22
Weekly sales per full-time equivalent employee	$2,906 est.	$4,519

Source: Progressive Grocer, "79th Annual Report of the Grocery Industry." April 2012.

Its overall operating gross margin, the difference between the purchase price and selling price divided by the selling price, is 25 percent. Gross margin is an important measure of the margin available to pay for all operations above and beyond the cost of the product. The 2015 median gross margin for supermarkets reported by the Food Marketing Institute is 28 percent.[3]

This store has struggled to stay in business. Business for the last three years has been shrinking, and the store owner believes there is only a 50 percent chance the store will be in business in ten years. The owner has identified some external factors that impact the store's ability to stay in business. These include limited availability of funds for capital investments, taxes, and pricing discounts that manufacturers may offer to competing, large-volume buyers such as supercenters.

Other factors described by the owner as limiting his ability to stay in business included zoning, labor costs and a monthly fluctuation in demand. The store faces cyclical demand due to the high number of participants in the food stamp and Women, Infants, and Children (WIC) programs, but requires a steady

[2] The store interview was conducted in 2011. 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.

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

number of employees throughout the month to run the store. This fluctuation affects ordering and makes it difficult to forecast demand. The owner reports that 55 percent of store sales are Supplemental Nutrition Assistance Program (SNAP) sales.

The owner reported that the primary factor that affects his store's ability to sell more regionally produced foods is the lack of regional suppliers. As an example, the owner reported that other foods come through a large efficient distribution channel, but he stated that "local" is an exception, and it is hard for local producers to break into the distribution channel.

The store's ability to sell more healthy food is limited by a lack of demand, which the store owner defined as a major limitation. The owner believes that cost is a factor for items such as 100 percent whole wheat bread. He does believe that in some areas, healthy food costs are coming down to similar levels as non-healthy.

> "The owner reports that 55 percent of store sales are Supplemental Nutrition Assistance Program (SNAP) sales."

Market basket items – Apples and Cabbage

Syracuse Store 2 carries an assortment of apple varieties and prides itself on supplying apples grown within New York State. Most of Syracuse Store 2's apples are produced in the Northeast study region and supplied by its primary grocery wholesaler as well as directly from a local grower.

New York is a major cabbage producer and product is readily available in the state. The harvest season for cabbage grown within New York State begins around July and runs through November. Cabbage can be stored until about March after which time product quality deteriorates.

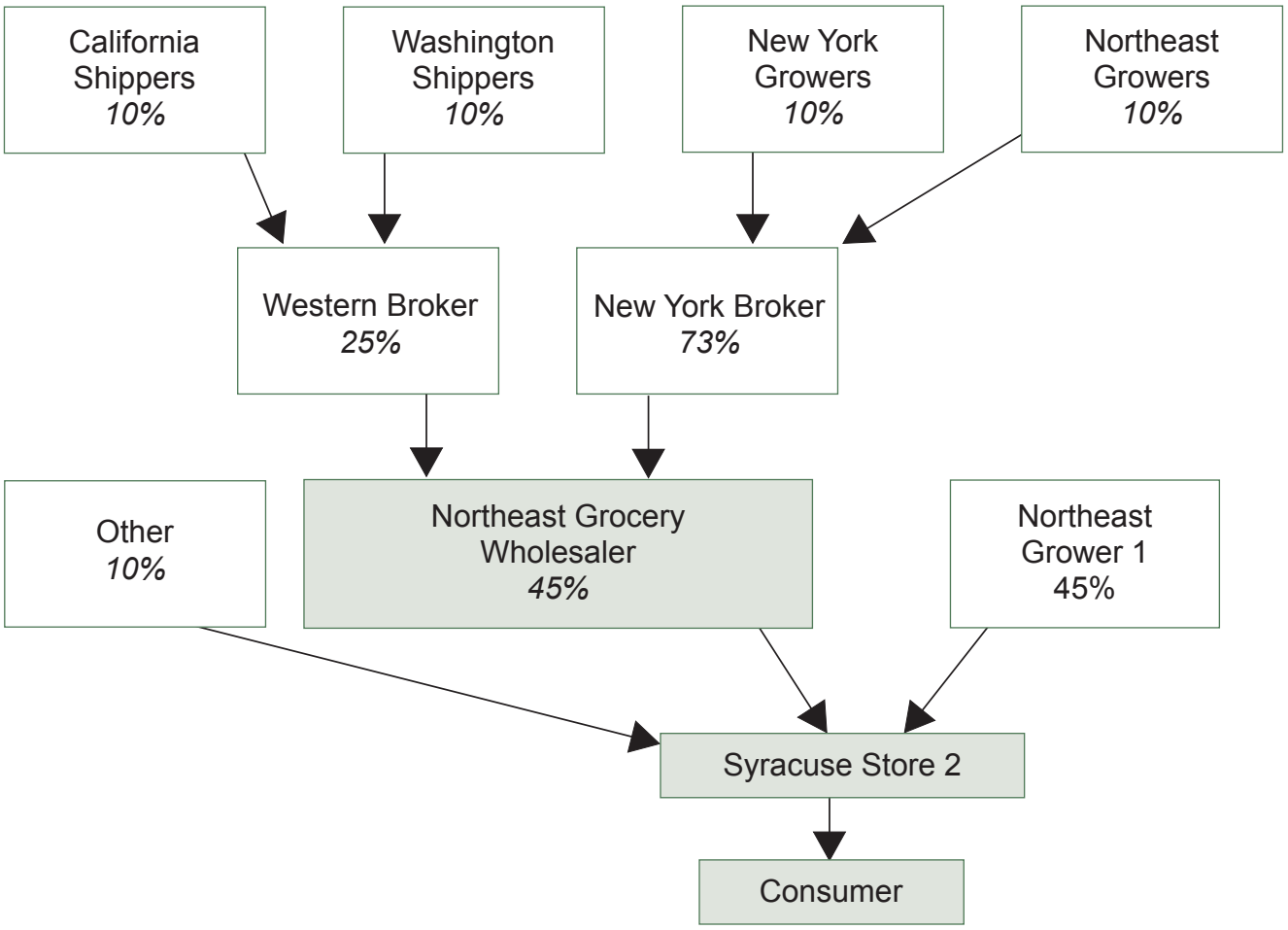
Supply Chains

We trace the supply chains of two products from our market basket sold by Syracuse Store 2 to determine the sources of these foods and the extent of regional food system participation.

Product 1: Apples

Figure 1 depicts the general supply chain for Syracuse Store 2 apples. Starting at the store and tracing back the supply chain, the boxes upstream indicate the percent of the downstream member's total purchases. For example, Northeast Grocery Wholesaler provides 45 percent of Syracuse Store 2's apples while Northeast Grower 1, a New York state apple grower, provides another 45 percent. The remaining ten percent are supplied by other produce wholesalers.

FIGURE 1: Apple Supply Chain for Syracuse Store 2



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: Author's calculations based on case interviews.

Suppliers

Northeast Grower 1

Northeast Grower 1 is located 11 miles from Syracuse Store 2 and has been in business for over one hundred years. Syracuse Store 2 has been buying apples from Northeast Grower 1 for almost 30 years. The grower employs around 150 seasonal workers and has 22 full-time workers available for packing and shipping. Total annual sales are $3.7 million and apples make up a little more than half of all sales.

Northeast Grower 1 sells 90 percent of its apples within NYS and the remaining 10 percent within the Northeast region. Approximately 90 percent of its sales are sold to four customers. Syracuse Store 2 is not one of the grower's largest customers.

Syracuse Store 2 buys about 45 percent of its apples from Northeast Grower 1. The store chooses not to order more due to the price and the limited number of deliveries per week. Currently, orders and deliveries are made only once per week.

Syracuse Store 2 places orders by phone and delivery is made in one day. Payment is expected within 10 days. Apples are delivered by Grower 1 using a 22 foot truck, with delivery costs included in the price paid to the supplier. There is no contract between Syracuse Store 2 and Northeast Grower 1, and prices are set by the grower.

Northeast Grocery Wholesaler

Northeast Grocery Wholesaler supplies the store with about 45 percent of its apples. The wholesaler has been in business for 90 years and is located in New York State. The wholesaler provides a broad line of grocery products to retail customers, primarily independent grocery stores. It has 144 customers that represent 300 store locations. Syracuse Store 2 is only one of these 144 customers, and apple sales to Syracuse Store 2 represent less than one percent of the wholesaler's total apple sales.

> "Syracuse Store 2 buys about 45 percent of its apples from Northeast Grower 1."

Northeast Grocery Wholesaler's produce sales represent about five percent of its annual sales and apples represent about ten percent of their produce business. Eighty percent of Northeast Grocery Wholesaler's apple sales are sold in-state and 19 percent are sold in the remaining Northeast. A very small percent, about one percent, are sold in Ohio. The apples are not sold with any certification although descriptions on the labels include suggested usages, including cooking apples, eating apples, flavor profiles, and texture.

Northeast Grocery Wholesaler buys most of its apples, 73 percent, using New York Produce Broker, a brokerage company. The remainder of Northeast Grocery Wholesaler's apples, about 25 percent, is supplied using a broker from outside the Northeast region, Western Broker.

Syracuse Store 2 orders apples from Northeast Grocery Wholesaler two to three times per week via telephone. Deliveries arrive on a tractor trailer one day after the order is placed and payment is expected within 5 days. There is a delivery fuel surcharge that can be rebated if Syracuse Store 2 purchases enough volume over the course of the year. There is no contract.

Syracuse Store 2 has been using Northeast Grocery Wholesaler

as its primary grocery wholesaler for 15 years. It also buys most of its produce from the wholesaler. Northeast Grocery Wholesaler is very satisfied with Syracuse Store 2 as a customer but is only somewhat satisfied with the retailer's proximity.

New York Produce Broker

The brokerage has been in business for over 40 years but has worked with produce for only five years. It finds most (75 percent) of its apples from within NY and the remaining 25 percent from within the Northeast. Their apple sales represent about 40 percent of their total produce business. They carry New York certified apples which is a New York-grown label managed by the New York Apple Association check-off program. In addition, some, although not all, of the apple shippers they purchase from carry the Pride of New York seal which is a promotion program run by the New York State Department of Agriculture and Markets.

Forty percent of the broker's business is to customers in New York with an additional five percent to the rest of the Northeast region and the remaining 55 percent elsewhere in the United States. It does not arrange any export business.

The broker is very satisfied with their customer Northeast Grocery Wholesaler.

Western Supply Chain

Western Broker was established in 2007 and specializes in fresh produce imported from Spain, Ecuador, Italy, Mexico and Chile, although it also sources from California and Washington. The most notable product it sources is bell peppers. The company primarily supplies smaller to mid-size chains and wholesalers. The average customer is a retail chain with two to four stores.

Western Broker finds apples from primarily Washington and California shippers. The remaining 2 percent is filled in from other produce suppliers. Ninety percent of its apples are sourced from three regions in Washington State: Wenatchee, Yakima, and Chelan. The remaining ten percent are sourced from Bakersfield, California. Apple sales are about $1 million per year and are one of the top four domestic products sourced by Western Broker. Other products sourced domestically are lettuce, citrus and cucumbers. It sells apples to wholesalers and packers/shippers in New York, Connecticut, Massachusetts, New Jersey, Ohio and Pennsylvania. Approximately 95 percent of its apple sales are to the Northeast, and primarily serve to "spot fill" for northeastern distributors when they run out of regionally-grown apples.

The broker has worked hard to build its network of grower and shipper suppliers. The broker does not own any warehouses or trucks, so has very little overhead.

Regional Comparisons

We define regional supply chain as one where the product is produced, or grown, in the region. In this section, we compare the performance of two regional apple supply chains to a non-regional supply chain. We trace the supply chain from Syracuse Store 2 to Grower 1, a regional supply chain, and from Syracuse Store 2 through Northeast Grocery Wholesaler to New York Growers, another regional supply chain. The supply chain from Washington Shipper is a non-regional supply chain.

Table 3 shows the price margin[4] per three-pound bag of apples received by each member of the supply chains. In addition, it indicates the percent of total or proportion of the retail price received by each member calculated from the member's price margin. For example, the regional grower-shipper member, Grower 1, received on average $2.22 per three-pound bag of apples. This is approximately 55.6 percent of the retail price paid to the grower. We note that the margin is what is left to pay for all other business expenses and profits; in this case including apple production, post-harvest handling, packaging, and storage. It is not an indication of profitability.

In the second regional supply chain, which starts with New York Growers, the producer share of the price paid by the final consumer is 48.1 percent. Northeast Grocery Wholesaler receives only 4.3 percent of the retail price. It pays a broker to source its apples, and the broker receives 1.9 percent of the retail price.

The retailer, Syracuse Store 2, receives the same share (44.4 percent) of the retail value across all supply chains and segments. It prices the apples the same regardless of which supply chain they come from, and costs are the same regardless of whether it is the local supply chain or that intermediated by the wholesaler.

Transportation costs per pound are greater in the non-regional supply chain than the regional supply chains, but the wholesaler margin under the national supply chain shrinks to accommodate the greater transportation cost in order to offer apples to its customers at the same rate as its regional apples.

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

TABLE 3: Allocation of Retail Price in Syracuse Store 2's Apple Supply Chains

	Regional				Non-regional	
	Grower 1 (Empire)		New York Growers		West Coast Shippers (Red Delicious)	
Supply chain member	Price margin ($/3lb. bag)	% of retail price	Price margin ($/3lb. bag)	% of retail price	Price margin ($/3lb. bag)	% of retail price
Grower-Shipper	2.22	55.6	1.92[1]	48.1	1.33[1]	33.3
Transport	NA	NA	0.05	1.3	0.43	10.8
Broker	NA	NA	0.08	1.9	0.07	1.7
Northeast Grocery Wholesaler	NA	NA	0.17	4.3	0.40	9.9
Syracuse Store 2	1.77	44.4	1.77	44.4	1.77	44.4
Total Retail Price	3.99	100.0	3.99	100.0	3.99	100.0

Notes: NA indicates "not applicable"
[1] Producer prices are the average for the marketing year 2012-2013 reported by USDA Market News (https://www.marketnews.usda.gov/mnp/fv-home).
Source: Author's calculations based on case interviews and USDA, Agricultural Marketing Service.

Table 4 depicts the distance and fuel used to get apples from the producer to the retailer. The apples supplied by Washington Shipper travel the most miles and apples in the regional supply chain travel the fewest miles. The regional supply chain from Grower 1 uses less fuel per hundredweight (cwt) than the regional or national supply chain to transport apples from the farm to the retailer. This is not surprising as reflected by the number of miles the apples have to travel in each supply chain.

TABLE 4: Food Miles and Fuel Use in Syracuse Store 2's Apple Supply Chains

Supply chain segment	Food miles	Truck miles[1]	Truck capacity	Fuel use[2]	Fuel use per cwt shipped
	number		*cwt*	*gallons*	
Regional: Grower 1 to Syracuse Store 2					
Grower 1 to Syracuse Store 2	11	22	100	2.2	0.02
All segments	11	22		2.2	0.02
Regional: NY Growers to Syracuse Store 2[3]					
NE Growers to Northeast Grocery Wholesaler	95	190	400	31.7	0.08
Northeast Grocery Wholesaler to Syracuse Store 2	169	169	400	28.2	0.07
All segments	264	359		59.9	0.15
Non-regional: Washington to Syracuse Store 2[4]					
WA to Northeast Grocery Wholesaler	2,457	2,457	400	409.5	1.02
Northeast Grocery Wholesaler to Syracuse Store 2	169	169	400	28.2	0.07
All segments	2,626	2,626		437.7	1.09

[1] Truck miles are equal to food miles when apples travel 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 apples from Washington to the wholesaler and from Northeast Growers to the wholesaler have a capacity of 40,000 pounds and obtain 6 mpg; trailer trucks used to transport goods from the wholesaler to Syracuse Store 2 have a capacity of 40,000 pounds and obtain 6 mpg. Straight trucks used by Grower 1 to transport apples to Syracuse Store 2 have a capacity of 10,000 pounds and obtain 10 mpg.
[3] NY growers are located primarily in the Brockport, NY area.
[4] Washington apples come from the Chelan, WA area.
Source: Author's calculations based on case based interviews and USDA, Agricultural Marketing Service.

Prospects for Expansion of Regional Food System: Apples
Syracuse Store 2 obtains an estimated 78 percent of its apples from the Northeast, 45 percent from Grower 1 and 33 percent from the Northeast. It receives 11 percent from Washington, California, and the remaining from other sources. Expanding the percent from the Northeast may be possible only if shippers in the Northeast have the varieties that consumers demand and availability in the summer when Northeast stocks are low and are not as high quality. Northeast Grocery Wholesaler may need apple suppliers from the West Coast or from overseas who can supply them with apples in the summer before the next harvest. Purchasing from different regions also provides some risk insurance in case Northeast products run short after a bad harvest.

Table 5 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's retail price share (see Table 3) by the proportion of the store's total apples that they provide (see Figure 1) to calculate the extent of total regional participation in the supply chain. Table 5 summarizes the extent of members' participation in the supply chains as well as the total extent of regional value-added activity in the apple supply chains.

Some additional value-added activity performed in the region includes wholesaling and retailing apples that are grown outside the Northeast. Apples from California and Washington are transported to Northeast Grocery Wholesaler who then assembles the store's apple order and transports apples to the store, where the store then prices, displays, and sells them to its customers. These contribute some additional 5.5 percent to the total value-added activities performed in the region. Out of the total value-added activities performed along all the apple supply chains, 83.3 percent are performed in the region.

Syracuse Store 2 has a seasonal local program for produce and prefers purchasing produce for direct store delivery from growers nearby. The owner believes that his role in the community is to maintain local supply and he goes out of his way to maintain relationships with local produce growers. In the case of apples, he has used Grower 1 for almost 30 years. Although the store owner felt that he might be able to expand his purchase of apples from Grower 1, he indicated that price and the limited number of deliveries per week limit this expansion.

TABLE 5: Extent of Regional Value-Added Activity in the Syracuse Store 2 Apple Supply Chains

	Percent of retailer's apple 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: Grower 1 (NY) to Syracuse Store 2				
Grower 1	45	55.6	25.0	
Syracuse Store 2	100[3]	44.4	20.0	
All segments	45	100.0	45.0	45.0
Regional: NE Growers to Syracuse Store 2				
NY and NE Growers combined	32.8	48.1	15.8	
New York Broker	32.9	1.9	0.6	
Transportation		1.3	0.4	
Northeast Grocery Wholesaler	45.0	4.3	1.4	
Syracuse Store 2	100[3]	44.4	14.6	
All segments	32.8	100.0	32.8	32.8
Non-regional: Washington Shippers to Syracuse Store 2				
Washington Shippers	10.1	33.3	3.4	
Western Broker	11.3	1.7	0.2	
Transportation		10.8	1.1	
Northeast Grocery Wholesaler	45	9.9	1.0	
Syracuse Store 2	100[3]	44.4	4.5	
All segments	10.1	100.0	10.1	5.5
Added-value performed in region				**83.3**

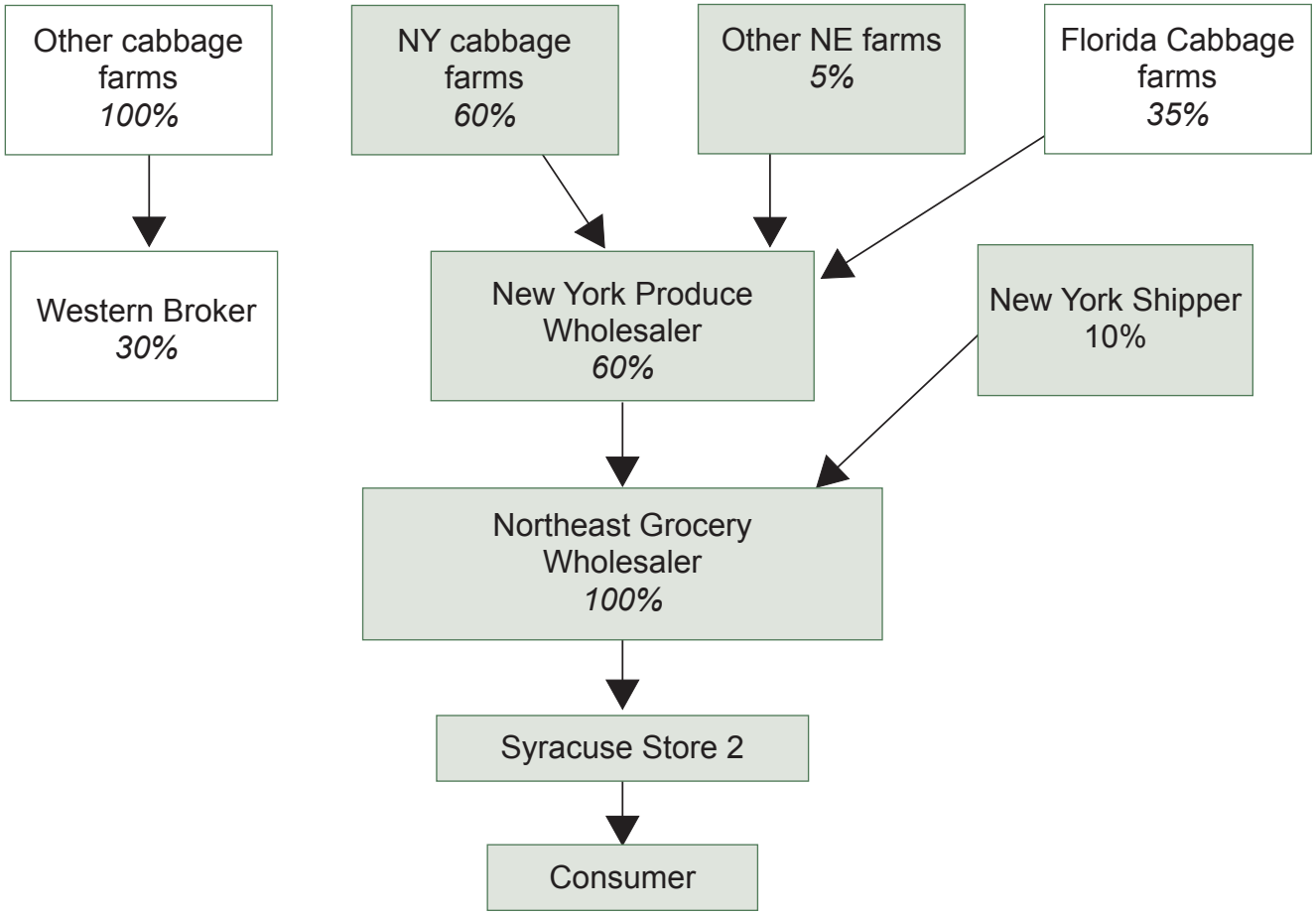
Note: Shaded rows indicate supply chain members located in the Northeast.
[1] This column contains the percent margins of retail revenue from Table 2 above.
[2] This column captures all regional activity in the Northeast within each supply chain (excludes value-added activity outside of the Northeast).
[3] As default, the retailer percent is 100 percent.
Source: Author's calculations based on case interviews.

Product 2: Cabbage

Figure 1 depicts the general supply chain for Syracuse Store 2's cabbage. Starting at the store and tracing back the supply chain, the boxes upstream indicate the percent of the downstream member's total purchases. For example, Northeast Grocery Wholesaler provides 100 percent of Syracuse Store 2's cabbage.

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 cabbage grown by NY cabbage farms is a regional supply chain for the store. This regional supply chain provides about 36 percent of the store's cabbage.

FIGURE 2: Cabbage Supply Chain for Syracuse Store 2, Syracuse, 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: Author's calculations based on case interviews.

Suppliers

Northeast Grocery Wholesaler
Northeast Grocery Wholesaler Wholesalers supplies 100 percent of Syracuse Store 2's cabbage as well as many of its apples. Cabbage sales to Syracuse Store 2 represent less than one percent of its total cabbage sales.

Sixty percent of Northeast Grocery Wholesaler's cabbage is purchased from New York Produce Wholesaler and 30 percent is supplied by Western Broker. The remaining 10 percent is filled in from a grower-shipper who acts as an agent for other growers in New York State.

New York Produce Wholesaler

New York Produce Wholesaler tries to support local growers and buys cabbage from New York growers until about St. Patrick's Day when the quality of storage cabbage from New York suppliers deteriorates. It then starts buying from southern growers. All growers have to have food safety certification, with a minimum of Good Agricultural Practices (GAP) food safety certification. Certification from other agencies with more stringent standards, such as Primus, is preferred. This also provides the wholesaler with the ability to trace back product origin in the case of a recall.

Produce Wholesaler buys about 60 percent of its cabbage from New York farms and another five percent from other farms in the Northeast. It buys the remainder, 35 percent, from two Florida farms. It buys in 50-pound cartons and will trim the cabbage when needed, but otherwise, does not provide any additional handling or services such as weighing, film wrapping, etc.

Western Broker

The brokerage has been in business for over 40 years but in produce for only five years. It sources produce for customers nationwide. Forty percent of its business is to customers in New York, an additional five percent to the rest of the Northeast region, and the remaining 55 percent elsewhere in the United States. It does not export.

In addition to sourcing cabbage for Northeast Grocery Wholesaler, Western Broker also sources some of its apples.

Regional Comparisons

In this section we examine how a regional cabbage supply chain compares to a national supply chain. NY Cabbage Farms represents the New York farms producing cabbage and selling to New York Produce Wholesaler. Florida Cabbage Farms represents the farms producing cabbage in Florida and selling to New York Produce Wholesaler. These two chains supply 60 percent of Syracuse Store 2's cabbage.

Table 6 depicts the price margin for each member of these supply chains and the allocation of retail revenues. The price received by NY Cabbage Farms is greater than the price received by Florida Cabbage Farms. New York Produce Wholesaler reported that higher farm prices for New York farms is not a given in every year and that often the price from Florida is higher.

In both supply chains, the retailer receives a greater share of the retail value for cabbage regardless of where it comes from. Transportation costs in the Southern supply chain are greater than the regional supply chain, as might be expected.

TABLE 6: Allocation of Retail Price in Syracuse Store 2's Cabbage Supply Chains

	Regional		Non-regional	
	NY Cabbage Farms		Florida Cabbage Farms	
Supply chain segment	Price margin ($/lb)	% of retail price	Price margin ($/lb)	% of retail price
Cabbage farms	0.18	20.2	0.16	18.0
Transport1	0.02	1.9	0.07	7.5
New York Produce Wholesaler	0.04[2]	4.8	0.01	1.5
Northeast Grocery Wholesaler	0.05	5.6	0.05	5.6
Retailer	0.60	67.4	0.60	67.4
Total Retail Price	0.89	100.0	0.89	100.0

[1] We use the following calculation to obtain the transportation supply chain segment: Trucks transporting cabbage from Florida have a capacity of 40,000 lbs. Trucks transporting cabbage from NY have a capacity of 10,000lbs. Freight cost/truck capacity = transport.
[2] Transportation to Northeast Grocery Wholesaler is included in the New York Produce Wholesaler price.
Source: Author's calculations based on case interviews and USDA, Agricultural Marketing Service.

Table 7 provides estimates of the distance and fuel used to get cabbage from the producers to the retailer. Total fuel use from the regional supply chain is estimated to be about one quarter of that used in Florida's supply chain. Transportation from the Florida supply chain consumes more than twice the fuel per hundredweight of product than the regional supply chain.

TABLE 7: Food Miles and Fuel Use in Syracuse Store 2 Cabbage Supply Chains

Supply chain segment	Food miles	Truck miles[1]	Truck capacity	Fuel use[2]	Fuel use per cwt shipped
	number		*cwt*	*gallons*	
Regional: New York Cabbage Growers to Syracuse Store 2[3]					
NY Growers to NY Produce Wholesaler	37	74	100	7.4	0.07
NY Produce Wholesaler to NE Grocery Wholesaler[4]	73	146	400	24.3	0.06
NE Grocery Wholesaler to Syracuse Store 2	169	169	400	28.2	0.07
All Segments	279	389		59.9	0.21
Non-regional: Florida to Syracuse Store 2[5]					
FL to NY Produce Wholesaler	1,088	1,088	400	181.3	0.45
NY Produce Wholesaler to NE Grocery Wholesaler	73	146	400	24.3	0.06
NE Grocery Wholesaler to Syracuse Store 2	169	169	400	28.2	0.07
All Segments	1,330	1,403		233.8	0.58

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 Florida to the wholesaler have a capacity of 40,000 pounds and obtain 6 mpg; trucks used for shipping cabbage from NE Cabbage Farms to the produce wholesaler have a capacity of 10,000 pounds and obtain 10 mpg; trailer trucks used for transporting cabbage from the produce wholesaler to NE Grocery Wholesaler to Syracuse Store 2 have a capacity of 40,000 and obtain 6 mpg.
3 For mileage calculations, we use the principal cabbage producing region of New York which is Niagara County.
4 We use the principal cabbage-producing region of Florida which is Hastings.
Source: Author's calculations based on case based interviews and USDA, Agricultural Marketing Service.

Prospects for Regional System Expansion: Cabbage

Store cabbage sales are very small and cabbage is not a major commodity for any of the intermediary companies. On the other hand, cabbage is a large crop in the NE with a number of solid, experienced growers. Cabbage producers in the Northeast are among the largest in the U.S. with efficient production systems, and New York is more often than not the leading cabbage producer in the U.S.

We examine the value-added activities of the two supply chains presented above in Tables 6 and 7. We lack sufficient information regarding the store's other supply chains through Western Broker or New York Shipper to calculate their price margins or value-added activities.

We assume that the price margin of a supply chain member is a proxy for the amount of value-added activity it produces. We weight the member price margin shares (see Table 6) by the proportion of Syracuse Store 2's cabbage that the supply chain provides (see Figure 2) to calculate the value-added activities of each member in each supply chain. Table 8 summarizes the extent of members' value-added activities, as well as the regional value-added activity, in two supply chains.

In the regional supply chain that starts with cabbage grown on New York cabbage farms and sold through NY Produce Wholesaler, all the supply chain activities are performed in the region. Since this supply chain provides 36 percent of all the store's cabbage, this means the supply chain provides 36 percent of all of the value-added activities of all the cabbage supply chains.

In the national supply chain starting with growers in Florida, only the value-added activities performed by the two wholesalers and the store are performed in the region. This supply chain provides 21 percent of all the store's cabbage. After we weight the regional members' value-added activities by the proportion of cabbages provided to the store we determine that these regional members of the Florida supply chain provide 15.6 percent of the value-added activities within the region.

The sum of the value-added activities performed in the region just from these two chains alone is 51.6 percent.

Not enough data were gathered to calculate the value-added activities from every supply chain.

TABLE 8: Description of Regional Value-Added Activity in Two Cabbage Supply Chains, Syracuse Store 2

	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: NY Farms[3]				
NY Cabbage Farms	36.0	20.2	7.3	
Transportation		1.9	0.7	
NY Produce Wholesaler	60.0	4.8	1.7	
NE Grocery Wholesaler	100.0	5.6	2.0	
Syracuse Store 2	100.0[4]	67.4	24.3	
All segments	36.0		36.0	36.0
Non-regional: Florida Cabbage Farms[5]				
Florida Farms	21.0	18.0	3.8	
Transportation		7.5	1.6	
NY Produce Wholesaler	60.0	1.5	0.3	
NE Grocery Wholesaler	100.0	5.6	1.2	
Syracuse Store 2	100.0[4]	67.4	14.2	
All segments	21.0		21.0	15.6
Added-value contained in region				**51.6**

Note: Shaded rows indicate supply chain members located in the Northeast.

[1] This column contains the percent 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, NE cabbage farms represent farms selling to Produce Wholesaler, (See Figure 2 – Cabbage Supply Chain for Syracuse Store 2, Syracuse, NY).

[4] By default, the retailer percent is 100 percent.

[5] For the national supply chain, Florida Growers represents the Florida growers selling cabbage to NY Produce Wholesaler.

Source: Author's calculations based on case interviews.

The store sells whole or half cabbages, film wrapped, and labeled with price and weight but no information about where or by whom they were grown. In addition, packaged shredded cabbage is also available in the store as a coleslaw packaged salad which may compete with sales of the whole cabbages.

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. Some regional expansion may be possible if regional producers can provide cabbage in more user-friendly or convenient forms, such as precut, shredded, or individual-sized packaging. In addition, finding and growing varieties that may be able to be stored longer may reduce the need to buy as much cabbage from outside the region.

Key Lessons for Syracuse Store 2

This case study provides some lessons regarding the independent supermarket, its supply chains for apples and cabbage and its relationship with regional food systems.

A grocery store benefits a community by assembling many different foods from around the world and making them available to the community to purchase. In this neighborhood where access to fresh foods is limited, Syracuse Store 2 provides more variety and more access to fresher and healthier foods than provided at the small convenience stores in the neighborhood.

The owner reports that the lack of a customer base and competition from other retailers are significant factors affecting his ability to stay in business. The concentration of food retailers per 10,000 persons is much higher in the neighborhood than in the county or state. He is challenged by new competition located within two-to-five miles of Syracuse Store 2.

The Store and Its Environment

Effect of size and economies of scale

- Syracuse Store 2 is a small supermarket, about half the size of the average U.S. supermarket. Although, its sales per week are correspondingly half the average, efficiency metrics including sales per square foot and sales per full-time employee are on par with the average supermarket store.
- Like most independent stores, it purchases most of its products from wholesalers rather than direct from the manufacturer. Independent stores are often smaller companies that procure primarily from wholesalers, which are intermediaries between manufacturers and the store. In comparison, self-distributing supermarket companies are large enough and

have enough stores that they are able to purchase directly from manufacturers and bypass a wholesale intermediary. This also allows larger companies to buy "in bulk" and achieve discounts provided by the manufacturer.

Market Basket Supply Chains

Effect of ownership structure on the supply chains

- In this case, the owner is active in all roles and all aspects of business, including direct control over where the store purchases its products. He believes that it allows him to understand the store's business first hand.
- One of the apple suppliers is a local apple farm. The owner wants to provide local products for his customers. He would buy exclusively from the wholesaler; however, he purchases from this local source because it matters to his customers.

Extent of regional value-added activity

- Most of the apple supply chains are regional, and almost 78 percent of the apples sold in Syracuse Store 2 are grown in the region. In addition, most of the business entities in the supply chain are Northeast companies, including several NY growers, a regional wholesaler and a regional broker.
- We estimate at least 83.3 percent of the value-added activities from all the apple supply chains are performed within the Northeast region. The producers and the store perform most of the value-added activities in these supply chains.
- Although the Northeast, specifically New York, is a major producer of cabbage, only about 49 percent of the store's cabbage comes from the Northeast. These chains are illustrated in Figure 2. Two chains, one regional and one national, provide 57 percent of the store's cabbages. Using data collected about these supply chains, we estimate that 51.6 percent of the value-added activities of all the cabbage supply chains are derived from these two chains.

Effect of regional production/industry

- The large regional apple and cabbage industries have helped the supply chains source and move product from the region into the store.
- In this case, the regional chains for apples and cabbages are not any shorter than the national chains. Also, we do not see any margin advantage from regional apples at the retail level over apples from the West Coast. This is because of the pricing policies of the Northeast Grocery Wholesaler who sells apples from the West Coast at the same price as apples from the Northeast and the selling policy of the store who sells bagged apples from each region at the same prices.

Effect of geography/distance

- Regional supply chains used substantially less fuel than those from outside the region. The total fuel use in the apple supply chain starting with Grower 1, the closest supply chain, is estimated as 0.02 gallons per hundredweight. The fuel use for the 10 percent of the store's apples from Washington shippers, the farthest supply chain, is estimated as 1.09 gallons per hundredweight. In the regional supply chain for cabbage, fuel use per hundredweight was estimated as less than half that of the Florida supply chain.
- Price margins estimated for growers in the regional supply chains were always greater than for growers from outside the region. Although margins were greater, we did not have enough information to estimate grower costs or profit margins. Grower costs can vary greatly by regional growing conditions.
- The store owner believes that the benefits to regional sourcing include reduced transportation cost, freshness, shorter travel time for fresh products. He sees no barriers to sourcing local/regional foods.

Appendix

Apple Industry Profile

According to the 2015 National Agricultural Statistics Service (NASS) Survey, the Northeast region (from Maine south to West Virginia and Maryland) contains two out of the top five apple producing states. That same year the two leading production states were Washington and New York (Table A.1.).

TABLE A.1: Top Producing Apple States

State	Utilized production
	million pounds
Washington	5,910
New York	1,350
Michigan	990
Pennsylvania	515
Virginia	195
California	145

Source: USDA, NASS. *Noncitrus Fruits and Nuts: 2015 Summary*. July 2016. http://usda.mannlib.cornell.edu/usda/current/NoncFruiNu/NoncFruiNu-07-06-2016.pdf.

Apples are the third leading item in sales in the retail produce department and are an important contributor to generating customer traffic and store profits (Table A.2). Therefore, retailers generally strive to keep fresh apples in the store year round with different varieties and selections of bagged and bulk apples. In order to do this they use apples supplied from different growing regions.

TABLE A.2: Top 5 Retail Produce Items

U.S. Retail Fruit Sales for 52 weeks ending December 26, 2015

	Average sales per store per week
Berries	$4,250
Citrus	$3,016
Apples	$2,961
Grapes	$2,881
Bananas	$2,690

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

Different growing regions sometimes specialize in different varieties that retailers wish to have available, such as Washington Red Delicious apples. In addition, different growing regions provide retailers some risk insurance in case of regional crop failures. For instance, in 2012 Michigan produced only 10 percent of its average apple crop due to bad weather, but Washington production was normal and could provide retailers supplemental apples.[5] Other regions may have better growing conditions for producing organic apples than others, such as New York. In addition, apple inventories run low in July and August in most states, and retailers often need to purchase imported apples to supplement domestic supplies.

Northeast apple production accounts for 22 percent of utilized production in the U.S. (Table A.3.). Per-acre yields are lower than national averages, but Northeast apple producers receive a higher per pound price for fresh apples than the U.S. average.

TABLE A3: 2015 U.S. and Northeast U.S. Apple Statistics

Source	Variable	U.S.	Northeast	Northeast, % of U.S.
1	Bearing age acres, *acres*	315,180	78,730	25.0%
1	Yield per acre, *pounds*	31,700	19,309	60.9%
1	Utilized production, total, *million lbs*	9,924.40	2,192	22.1%
1	Value of utilized production, total *$ thousands*	$3,394,185	$510,099	15.0%
1	Utilized production, fresh, *million lbs**	6,855.70	1,073	15.6%
1	Value of production, fresh, *$ millions**	$3,085,971	$380,573	12.3%
1	Grower price, fresh, *$ per lb* (packing house door)*	$0.45	$0.56	124.4%
2	Retail price, *$ per lb*†	$1.36	na	na
2	Fresh consumption per capita, *lbs*	17.2	na	na

*Numbers may be slightly higher since some Northeast states do not report these statistics to protect producer privacy.
†Retail prices are for Red Delicious apples. Grower price for marketing season 2014-2015.
Sources:
[1] USDA, NASS. *Noncitrus Fruits and Nuts: 2015 Summary.* July 2016. http://usda.mannlib.cornell.edu/usda/current/NoncFruiNu/NoncFruiNu-07-06-2016.pdf.
[2] USDA, ERS, "Fruit and Nut 2015 Yearbook Table." Accessed January 19, 2017. https://www.ers.usda.gov/data-products/fruit-and-tree-nut-data/yearbook-tables/#Noncitrus Fruit.

Overall, the Northeast U.S. apple industry is dominated by New York growers. According to the New York Apple Association,[6] the New York apple industry comprises approximately 690 growers. Apples are washed, graded, sized, packed, sold, and transported either by the growers themselves or

[5] Michigan Apple Committee. "Michigan Apple Industry Ready for Comeback," May 31, 2013. http://www.michiganapples.com/Press-Room/Archive/ID/403/Michigan-apple-industry-ready-for-comeback.

[6] New York Apple Association, http://www.nyapplecountry.com/about.

by packer-shippers. Companies purchasing apples include a large number of wholesalers, retailers, foodservice distributors, and foodservice establishments.

While apple growers and shippers in New York are smaller on average than those in Washington State, the industry in New York is sufficiently large and integrated to employ state-of-the-art production and post-harvest practices and cutting-edge technologies. In addition, they are large enough to be important suppliers of the largest supermarket chains in the country.

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.[7] 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 fresh potatoes was 32.2 lbs. per capita.[8]

According to the 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
	1,000 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 U.S.
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)
2017-16	Case studies of supermarkets and food supply chains in low-income areas of the Northeast: Syracuse Store 2, New York		Park, K.S., Gomez, M. and K. Clancy
2017-15	Case studies of supermarkets and food supply chains in low-income areas of the Northeast: Syracuse Store 1, New York		Park, K.S., Gomez, M. and K. Clancy
2017-14	Case studies of supermarkets and food supply chains in low-income areas of the Northeast: Pittsburgh Store, Pennsylvania		Park, K.S., Gomez, M. and K. Clancy
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
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