

PURDUE UNIVERSITY

FOOD AND AGRIBUSINESS
EXECUTIVE SUMMIT

**MightyVine: Root for your
Local Tomato**

R. Brent Ross

Associate Professor, Agricultural, Food, and Resource Economics
Michigan State University

William G. Secor

Clinical Assistant Professor, Center for Food and Agricultural Business
Purdue University

This case was prepared by R. Brent Ross, associate professor, Agricultural, Food, and Resource Economics, Michigan State University; and William G. Secor, clinical assistant professor, Center for Food and Agricultural Business, Purdue University. The authors would like to thank MightyVine, particularly Jim Murphy, chairman, and Gary Lazarski, chief executive officer. This case is a basis for class discussion and represents the views of the authors, not of Purdue University. No part of this publication may be reproduced or transmitted in any form without written permission from Purdue University.

“People in the food industry know nothing about health, and people in the health industry know nothing about food.”

-from a poster hanging in Jim Murphy’s Chicago office

In the summer of 2016, MightyVine Chairman Jim Murphy surveyed the kitchens of HandCut Foods and walked the floors of Local Foods. Both businesses were early investments he had made into the local food market in Chicago and were colocated in the same downtown Chicago facility. The businesses had flourished since their inception. As Jim observed them, his mind naturally wandered to his newest project, MightyVine.

MightyVine, under the direction of CEO Gary Lazarski, produced glasshouse tomatoes for the Chicago market. Jim knew that the product was superior to anything else in the market; it was local, fresh, nutritious, and full of great taste. MightyVine had even secured contracts with large retailers to take its local product. Jim's confidence in the business encouraged him to make back-to-back investments in two 7.5-acre glasshouse production facilities in 2015 and 2016.

However, as the next crop of tomatoes was scheduled for production in summer 2016, a heat wave hit Chicago. Yields and tomato quality were adversely affected, and it quickly became apparent that MightyVine was going to have an undersupply of tomatoes, putting its contracts with its most important customers in jeopardy. To add to the problems, MightyVine had quickly gained the attention of other large competitors in the marketplace, and they were equally quick to try capitalizing on MightyVine's production issues.

Jim looked at a pallet of some of the latest MightyVine tomatoes sitting in storage at HandCut Foods, and questions bounced around in this mind. Was his bet on local foods a good one? Had MightyVine designed a business model that was going to be sustainable into the future? Would it follow the early success of his other investments?

Background

Jim and Gary share a passion for Chicago. Both grew up there and have roots in the community through extensive business engagements and charitable work. While Gary's background is as an attorney, Jim worked for the better part of two-and-a-half decades on the Chicago Board Options Exchange. This experience helped Jim raise capital and manage the risks of starting several new startup agri-food ventures in recent years. His goal for this food empire isn't just financial gain; it's to get Chicago fresh, flavorful, and nutritious food year-round.

Chicago is a great place to sell tasty, nutritious food, according to Jim and Gary, whose passion for the city perhaps biases them: "I happen to believe Chicago's unique," Jim says. Despite their leanings, Chicago does have a mix of demographic and cultural characteristics advantageous

to selling local glasshouse tomatoes. It is the third-largest U.S. metropolitan area, and Jim suggests that a significant segment of its population is younger with high education and income levels, especially in the downtown area. It is also a “food town” trailing only to New York and San Francisco. This combination of factors makes it a unique place in which people are willing to pay for high-quality tomatoes.

However, Jim and Gary did not take a direct path into the food and agribusiness industry. “My road to agriculture and food was through ethanol,” Jim explains. In 2009, he was president of Carbon Green BioEnergy when it purchased an ethanol plant in Lake Odessa, Michigan. After making a series of strategic improvements in the plant and the plant’s processes, Carbon Green Bioenergy increased its production capacity to 70 million gallons annually (from 40 million gallons in 2005) and improved productivity from 2.75 (non-denatured) gallon yield of ethanol per bushel to 2.85 (non-denatured) gallons per bushel. These improvements resulted in 25 percent and 15 percent reductions in water and energy consumption, respectively. During this time, Carbon Green BioEnergy also became the first biofuels production facility in the U.S. to create its own brand, YellowHose.com.

At about that time Jim began researching glasshouse production of vegetables. He went to the best for glasshouse production — the Netherlands, a country with nearly 4,500 acres of vegetable production in glasshouses in 2014.¹ During these visits, Jim developed a relationship with Royal Pride Holland, a Dutch producer of glasshouse tomatoes. This partnership has helped MightyVine learn about glasshouse production and use exclusive tomato varieties not grown by any other grower.

The initial idea was to colocate a glasshouse with the ethanol plant to take advantage of carbon dioxide and waste heat that were the by-products of ethanol production. However, after doing their due diligence, and because of changing market conditions, Jim found this would not be a good situation. From a financial and engineering perspective, it would be expensive. Oil and gas markets also dropped precipitously at the time (Exhibit 1). From 2008 to 2013, average U.S. commercial, natural gas prices dropped by over a third (from \$12.23/ thousand cubic feet in 2008 to \$8.08/thousand cubic feet in 2013). Jim and Gary were able to lock in prices 50 percent lower than what they originally paid for natural gas.

Exhibit 1: U.S. Commercial Natural Gas Prices, 2000-2016.



Source: Economic Research Service, U.S. Department of Agriculture
https://www.eia.gov/dnav/ng/ng_pri_sum_dcu_nus_m.htm

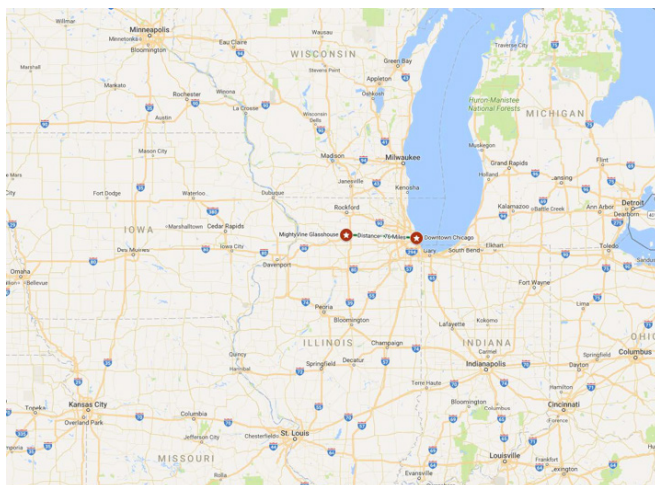
Moreover, this colocation would not be advantageous from a branding perspective. A glasshouse producing tomatoes in Michigan next to an ethanol plant does not scream local, green, or fresh. Jim thought a site closer to Chicago made more sense: “Chicago just has more sun than Michigan.”

MightyVine

After several site and business plan changes, MightyVine was created in 2015. Located 70 miles from Chicago in Rochelle, Illinois (Exhibit 2), MightyVine produces premium, fresh tomatoes for the local Chicagoland market using the latest hydroponic glasshouse technology and sustainability practices.

MightyVine built the first of two glasshouse production facilities in 2015, with the first harvest occurring in October of that year. Because of the uncertainty of the marketplace and how long

Exhibit 2: Location of MightyVine



Source: Google Maps

it would take to fine-tune the production process, MightyVine decided to err on the side of caution in the early days. Instead of building a large-scale glasshouse in the beginning — plans were originally for 30 acres of glasshouse — MightyVine raised \$11 million to build a 7.5-acre glasshouse operation to test the market. This smaller glasshouse had capacity to grow 100,000 tomato plants and produce 3.5 million pounds of tomatoes per cycle.

However, soon after the first harvest was completed, the management team at MightyVine began to seriously debate the possibility of expansion. Several factors influenced this debate. The first was that MightyVine had established a first-mover position in the Chicagoland marketplace for premium, locally grown tomatoes. As Gary recalls:

“We were pleased by the enthusiastic response of the market for our tomatoes, and we were well aware that we had a first-mover advantage in Chicago. But we also recognized that we needed to keep moving (growing) to stay ahead of the competition that we knew was coming.”

The second factor in this decision was Chicago’s weather. “The weather dictates that you can only start breaking ground in the spring [in Chicago],” Gary explains. With a construction period of approximately six months and another two months to complete a production cycle from planting to harvest, the lead time needed to build out new production is almost one year. Furthermore, the demand for Dutch glasshouses had increased rapidly in the U.S. since the first glasshouse was built. This meant that not only was there no guarantee of feasibility for MightyVine to build a second glasshouse, but it might be difficult even to get on their Dutch glasshouse contractor’s schedule in the future.

As a result, MightyVine decided at the beginning of 2016 to invest an additional \$6 million to build a second 7.5-acre glasshouse and double the capacity of tomato production. This expansion was expected to be completed in late fall 2016. By the end of the year, sales were expected to reach \$10 million for the year as profits, though highly variable, were trending upward.

The Dutch Way

MightyVine produces its high-value tomatoes using the latest Dutch production methods. During their initial exploration of glasshouse technology in 2010, Jim and Gary were introduced to Royal Pride Holland, a market-leading Dutch company with over 140 acres of state-of-the-art glasshouse tomato production and the patent holder for some of the most valued and flavorful glasshouse tomato cultivars (see videos Introduction and Taste Royal Pride).

The two companies quickly hit it off, recognizing their shared desire to produce high-quality food that tastes good, has high nutritional value, and is produced from sustainable business practices. As a result, MightyVine was an early adopter of the Dutch hydroponic glasshouse production model. MightyVine and Royal Pride Holland have since entered into a strategic research and development partnership instrumental to MightyVine's development as it relied on Royal Pride Holland's expertise and knowledge of the industry. In particular, Royal Pride Holland provided assistance with site selection, glasshouse design, growing operations, and training MightyVine employees.

Hydroponic Glasshouse Technology (see video MightyVine Taste Perfection)

Hydroponic glasshouse technology is a method of growing plants under glass and without soil. While this technology has evolved rapidly over the past decade, hydroponic plants are grown in a water-based, nutrient rich solution in which the root system is supported using an inert medium such as rockwool (Exhibit 3).

With guidance and advice from Royal Pride Holland, MightyVine has built two phases of its state-of-the-art hydroponic glasshouse production facilities. Each phase has been optimally designed for the Chicago location. This is particularly important given Chicago's highly variable climate. As Gary explains,

Exhibit 3: MightyVine Hydroponic Design



“Ideally, glasshouses would be designed to be all glass. Every extra mm of steel means less glass and that translates into less tomato yield. However, given the snow load and wind conditions in Rochelle, you’ve got to engineer the glasshouse to handle this, which means more steel is needed. You need to look for the optimal build.”

To handle Chicago's climate conditions, MightyVine incorporates two innovations into its glasshouse design. The first is that each glasshouse was built with rooflines 3 to 4 feet higher than traditional glasshouse structures. This extra space increases MightyVine's ability to control the climate within the glasshouse and to mitigate the weather conditions outside.

Each glasshouse also uses diffused glass, a specific type of glass originally designed for the solar industry. Although this glass was not well known five years ago, the rise of the solar industry in China has made it more feasible for glasshouses. The major advantage of diffused glass is that it incorporates a coating that allows sunrays to spread out more uniformly throughout the glasshouse. This results in significant efficiency gains, both in improved yields and higher quality.

Finally, MightyVine has worked hard to incorporate sustainable practices into its production process. These include using natural light, collecting rainwater and snow melt, incorporating natural pest control and fertilizers, and more recently, exploring ways to recycle and compost clippings from the vines. Overall, these practices have had significant impact on reducing MightyVine's resource needs.

Limited Tomato Varieties

Unlike other tomato producers that might offer as many as 25 (or more) SKUs to the market, MightyVine prefers to focus on just a few. As part of the partnership with Royal Pride Holland, MightyVine is the exclusive U.S. grower and marketer of two of its top patented varieties — a tomato-on-the-vine (TOV) variety and a cherry-on-the-vine tomato variety (Exhibits 4 and 5). Royal Pride Holland selected both varieties for their taste and nutrition profile.

With respect to taste, MightyVine tomatoes are selected for superior flavor and “mouth feel.” This latter attribute is characterized by a combination of skin quality and juice content, and represents whether the tomato eats well. This combination contrasts to most varieties grown by commodity producers, which are generally selected for their “shipability”; that is, maintaining a level of quality during transportation and on store shelves. This also typically means that commodity tomatoes have a tougher skin, which can have a negative effect on both flavor and “mouth feel.”

With respect to nutrition, MightyVine tomatoes are selected for high levels of lycopene, the naturally occurring chemical that gives many fruits and vegetables their red color. It is also known for its health benefits, including prevention of heart disease and various cancers.

Top Down Marketing Strategy

MightyVine serves the Chicagoland marketplace with a limited offering of the highest quality, most nutritious, and freshest TOV and cherry on the vine tomatoes. For MightyVine, the goal is to become “Chicago’s local tomato,” and that means flavor comes first. As Gary explains:

“Other commodity producers select varieties and growing methods focused on maximizing yields and that are the most able to be shipped great distances in cold storage, but the flavor is not there. That’s not a tradeoff we are willing to make.”

Building connections with customers is also central to MightyVine’s product offering, as it provides credence attributes that customers can’t find elsewhere in the marketplace. Credence attributes are product characteristics that aren’t evident from experiencing the product in and of itself. MightyVine targets customers who want to know where their food comes from, whether it supports jobs in the area, and if it keeps their money in the community — all credence attributes found in MightyVine tomatoes. Sourcing all products from the single location in Rochelle allows MightyVine to meet these consumer needs. It is one of the company’s most important distinguishing characteristics.

Exhibit 4: MightyVine Tomato on the Vine (TOV)



TOMATO ON THE VINE (TOV)

Source: MightyVine website, www.mightyvine.com

PRODUCT DESCRIPTION

The MightyVine TOV is a great tasting slicing tomato used for burgers, sandwiches, and salads. Picked at peak ripeness, this tomato is full of vibrant flavor and color. Sweet with mild acidity.

TOMATO SPECS

Fruit Weight: 120-135 grams per tomato
Average Fruit per truss: 4-6
Brix Level: 4.5 - 5.5
Availability: Year-round

Exhibit 5: MightyVine Cherry on the Vine Tomato



CHERRY ON THE VINE TOMATO

ROBINIO VARIETY

Source: MightyVine website, www.mightyvine.com

PRODUCT DESCRIPTION

The Robinio is the perfect pop in your mouth tomato with incredibly sweet flavor and ideal for snacking. Also great in salads, sandwiches and cooking. This delicious tomato delivers on taste.

TOMATO SPECS

Fruit Weight: 15-22 grams per tomato
Average Fruit per truss: 10
Brix Level: 8-9
Availability: Year-round

This focus on delivering top-quality tomatoes with credence attributes such as local and sustainable production for a premium price forms the basis for MightyVine's top-down marketing strategy. It also is the foundation for its brand. As Gary explains,

“Our strategy is to build up a brand. We want consumers to ask for MightyVine tomatoes in restaurants and retailers. It's up to us to make sure that our product can consistently live up to the brand.”

It's a unique strategy in a marketplace dominated by commodity producers. Until recently, few companies have been able to make a brand stick in the U.S. produce industry. Instead, most tomatoes available to consumers have been commodity tomatoes. They are a standard size and color and, to ensure a year-round supply, are typically sourced from multiple locations and growers. So it's not unusual for producers of commodity tomatoes to offer a large number of SKUs. Some commodity producers provide as many as 25 different SKUs ranging from TOVs to heirloom tomatoes, and tomatoes packed in pint containers to bulk tomatoes. For these producers, cost is the biggest driver of performance, so economies of scale and scope as well as “shipability” are the most important attributes.

Because MightyVine tomatoes have greater flavor and are single source-identified, consumers are willing to pay a \$1-2 premium per pound, roughly equivalent to the price of organic tomatoes from Mexico. This price does not fluctuate like that of commodity tomatoes sold on the spot market. Instead, MightyVine enters into a gentlemen's agreement with each of its retailer and offers only two prices: a winter price and a summer price. The difference between them reflects the economics of the tomato market during those two periods, with a typical price differential of \$0.30-\$0.40 per pound. As Jim explains, this strategy also means that MightyVine needs to have a tight coordination strategy between its production and marketing strategies:

“We don't want to get into an oversupply situation. If we do err, it needs to be in having an undersupply so that we can keep our prices high and aren't forced to provide discounts.”

Distribution

In the early days, as Jim and Gary were analyzing the feasibility of entering the glasshouse tomato business, they knew they were going to have a distribution problem. Produce buyers

at grocery stores and supermarkets around Chicago did not “get” the value of a local tomato, nor did they understand how fresh the tomatoes were. Jim recalls, “A lot of produce buyers said, ‘Oh, no. We can’t buy those tomatoes. They’re too red. They’re going to be bad in two days.’ In fact, the tomatoes were picked yesterday, and they would be great for two weeks.”

Grocery stores also didn’t initially understand the premium they would be able to charge for better quality, taste, and nutrition. So before Jim and Gary started MightyVine, Jim made key strategic investments by starting two other related, but separate, businesses: Local Foods and HandCut Foods. (See Exhibits 6, 7, and 8 for more information on both companies.)

Through these earlier investments, Jim and Gary were able to gather new information about the Chicago demand for local produce. Moreover, they knew going forward that both would offer a captive market channel for future local glasshouse tomatoes. Today, MightyVine uses both Local Foods and HandCut Foods as important distributors/buyers as well as educators of the value of MightyVine’s superior fresh tomatoes. (See Exhibit 9 for a diagram of the distribution channels for MightyVine tomatoes.) “There’s no way we could make it work viably, reaching into restaurants, if it weren’t for Local [Foods]. And it works for Local Foods to have a year-round locally grown tomato to offer to their customers,” Gary says.²

However, MightyVine currently distributes the vast majority of its two tomato varieties directly to other retail outlets such as Midwest Whole Foods Markets and Jewel-Osco, and to over

Exhibit 6: Local Foods

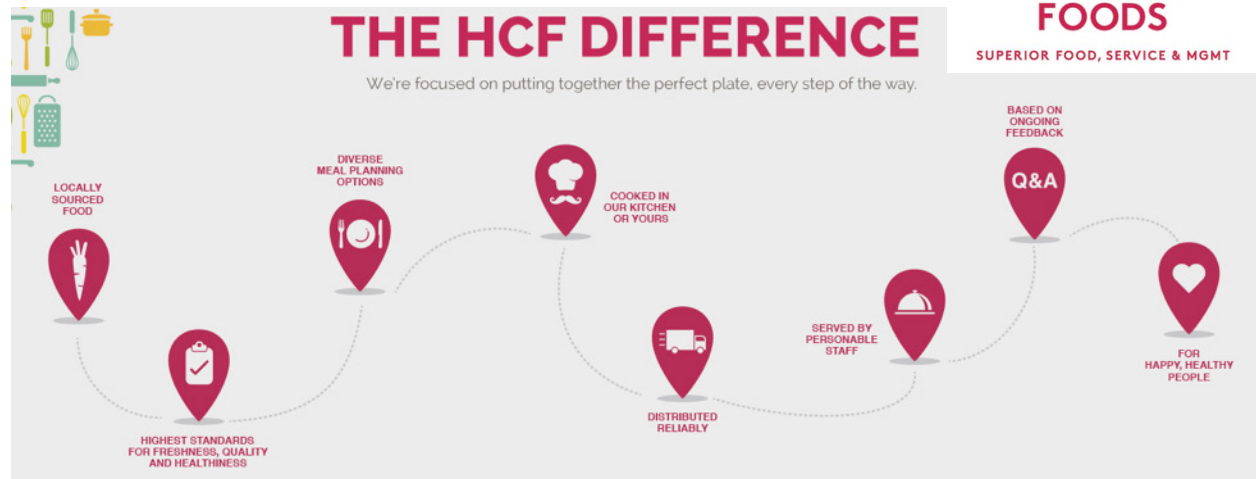
LOCAL FOODS USES THREE SIMPLE CRITERIA TO SOURCE PRODUCTS. EVERY PRODUCT'S ORIGIN IS CLEARLY DISPLAYED ON THE SALES FLOOR SO CUSTOMERS CAN MAKE EDUCATED CHOICES.

- 1**
LOCALLY-SOURCED
Products created or grown within 350 miles of Chicago which can be trucked to the city in a single day
- 2**
LOCALLY-PROCESSED
Products created from ingredients which don't grow in our area (like coffee) but are processed here
- 3**
BEYOND LOCAL
Products from outside our region (like avocados) which are sourced from single suppliers and ethical producers

LOCAL FOODS' DISTRIBUTION CRITERIA IS EVEN SIMPLER: IF A PRODUCT CAN BE TRUCKED TO OR FROM CHICAGO IN A SINGLE DAY, WE DISTRIBUTE IT. IF YOU PRODUCE A PRODUCT AND ARE LOOKING FOR A DISTRIBUTOR LIKE US, WE'D LOVE TO TALK.

Source: Local Foods website, www.localfoods.com

Exhibit 7: HandCut Foods



Source: HandCut Foods website, www.handcutfoods.com

Exhibit 8: Jim's Family of Chicago Food Business

LOCAL FOODS SITS AT THE CENTER OF A FAMILY OF INTERCONNECTED BUSINESSES BUILT TO INCREASE RESPONSIBLE FOOD PROCESSES.



SUSTAINABLE FOOD PROGRAM MANAGEMENT
HandCut Foods specializes in meals for larger institutions with delicious & nutritious menus built with sustainability in mind.



GROCERY & DISTRIBUTION
Local Foods helps bring farm-to-table to life by connecting small providers with shoppers all across Chicago.



GLASSHOUSE TOMATOES
Picked fresh and to the market in hours, not weeks—grown for flavor, not shipping.

INSIDE OUR WILLOW AVENUE STORE



FARM-TO-TABLE CAFÉ
Stock Café feeds the neighborhood with a daily-changing menu of Midwestern plates sourced from our local vendors.



LOCALLY-SOURCED WHOLE ANIMAL MEAT SHOP
Custom-cut meat from animals that are responsibly raised on small, Midwestern family farms

Source: Local Foods website, www.localfoods.com

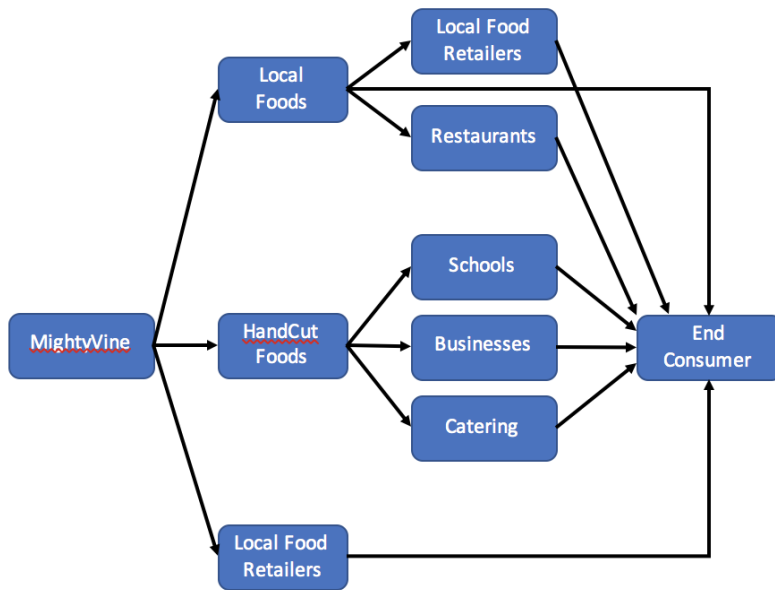


Exhibit 9: MightyVine Distribution Chain to the End Customer

100 foodservice institutions in the Chicagoland marketplace.³ (See Exhibit 10 for key retailers.) By total volume, 75-80 percent goes to retail partners, while 20-25 percent goes to foodservice. As Gary explains, “Retail will always do more volume, but you get great branding out of foodservice. When a Chicago chef puts us on his menu, it does a lot for us.”

For MightyVine, distribution is all about building relationships, particularly with those that share their mission for locally sourced products. One of the first retailers to carry MightyVine tomatoes, and now its largest buyer, is Whole Foods Markets. As Gary explains, Local Foods was key to developing this relationship:

“Local Foods was set up to source and distribute local foods throughout the Chicago area. This meant that we naturally went to a lot of similar events as the leadership for Whole Foods in the Midwest. In spring 2015 (before MightyVine opened), the regional president of Whole

Exhibit 10: Midwest U.S. Retailers for MightyVine Tomatoes



Source: MightyVine website, www.mightyvine.com

Foods for the Midwest Region was speaking at an event, and I stood up and said ‘Hi, I’m Gary Lazarski. I just wanted to let you know that we are funded, we’ve got a site under construction for a glasshouse just outside Chicago, and we’ll have fresh, local tomatoes available year-round.’ As I recall, his immediate response was ‘Hooray!’ We’d clearly identified a need.”

Promotion

Building relationships with chefs and getting MightyVine’s product into the mouths of potential customers are critically important to its marketing strategy. One early supporter of MightyVine tomatoes was Chef Rick Bayless, a highly influential American chef specializing in Mexican cuisine and the owner of Frontera Restaurants in Chicago. “We allow Chef Bayless to have a tomato salad on his menu in the middle of winter in Chicago and it’s still locally sourced,” Gary says.

Other restaurants have followed suit and have even included MightyVine branding on their menus such as: “MightyVine® Summer Salad” and “MightyVine® Winter Salad.” The product’s superior flavor and freshness earned these endorsements with no financial cost to MightyVine. In addition to this word-of-mouth advertising, MightyVine spends about 10 percent of its revenues on in-store demonstrations and a digital marketing campaign (i.e., Facebook, Twitter, Instagram, etc.) to establish its presence in the retail market. “Once you put a MightyVine tomato in someone’s mouth, they go, ‘Wow, that tastes great.’ It’s then easier to convince them they are worth the extra \$1,” Gary explains.

The U.S. Tomato Industry

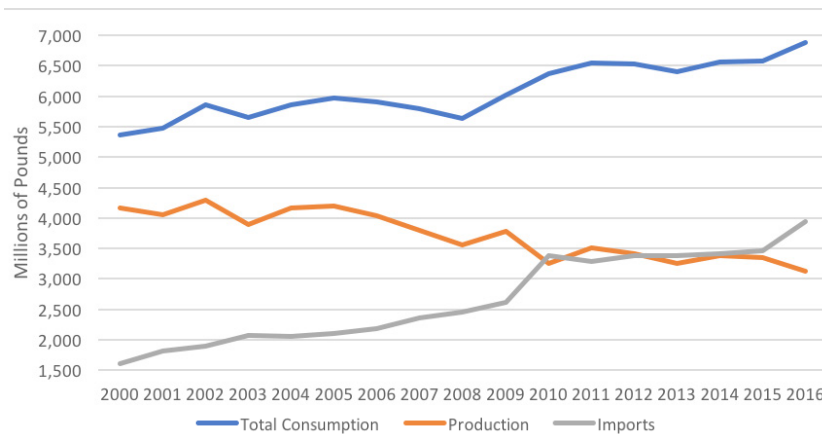
Fresh vegetable consumption per capita in the U.S. has remained flat since 2000, at around 145 pounds per person per year.⁴ Given population growth, total fresh vegetable consumption has therefore been increasing. Fresh tomato consumption in the U.S. has followed this trend with around 19-20 pounds per person per year, ranking the tomato as the third most popular fresh vegetable behind lettuce and potatoes in 2015.⁵

On the supply side, fresh vegetable and fresh tomato production in the U.S. has decreased. U.S. fresh vegetable production declined from 40.6 billion pounds in 2000 to 36.5 billion pounds in 2016. U.S. fresh tomato production declined from 4.2 billion pounds to 3.1 billion pounds during this same period.⁶ In 2013, approximately 603 million pounds of tomatoes

were grown in glasshouses in the U.S., or 18.5 percent of U.S. production.⁷ To maintain the flat level of consumption, imports from other countries have made up for this decline in supply. Imported fresh tomatoes currently make up 52.5 percent of U.S. consumption.⁸ (Exhibit 11 summarizes these fresh tomato consumption, production, and import trends.)

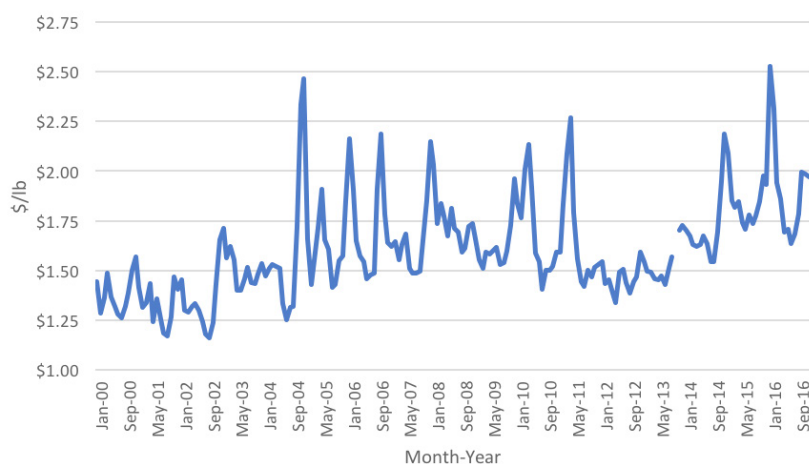
With flat per-capita consumption and an increase in imports, real, farm-gate prices for fresh tomatoes have remained flat with year-to-year variation. The average, real, farm-gate price for 2000–2016 was approximately \$0.40/lb, ranging from a low of \$0.29/lb in 2012 to a high of just over \$0.47/lb in 2010.⁹ Nominal retail prices for field-grown tomatoes averaged \$1.61/lb in 2000–2016 with a low of \$1.16/lb in September 2002 to a high of \$2.53/lb in January

Exhibit 11: Total U.S. Fresh Tomato Consumption, Production, and Imports, 2000-2016



Source: Economic Research Service, U.S. Department of Agriculture

Exhibit 12: U.S. Retail Prices for Field-Grown Tomatoes



Source: Economic Research Service, U.S. Department of Agriculture

2016.¹⁰ Exhibit 12 shows the slight upward trend in prices over the past seven years and the seasonality of retail prices, with prices in the winter months higher than during the summer.

Another produce trend especially important to MightyVine is the growth in branded fresh produce. Cuties, Halos, Chiquita bananas, and avocados “from Mexico” are all examples of branded produce. According to Nielsen, branded produce grew at a compound annual growth rate of 12 percent from 2010 to 2014, compared to a 10 percent growth rate for private-label produce and just 2 percent for unbranded produce. As a share of produce sales (in dollars), branded produce has grown from a 27 percent share

in 2010 to a 34 percent share in 2014.¹¹ This growth creates an opportunity for MightyVine to capitalize on consumers searching for branded tomatoes. However, it also creates a more competitive landscape in which MightyVine must now differentiate itself from other branded tomato varieties like Sunset (Mastronardi Produce) and NatureSweet. More competition may enter from other branded fruit companies like Driscoll's or Naturipe.

Consumer trends

For food in general, the characteristics most important to consumers are taste, safety, price, and nutrition.¹² Since the beginning of the FooDS study in February 2013, taste and safety have been first and second, respectively. Price has typically been third, with some exceptions that switch nutrition and price as the third most important characteristic. Research in 2015 by Mintel supports the FooDS research, showing that taste is most important, followed by nutrition and price.¹³ A 2015 Deloitte study found that approximately half of customers surveyed base their decisions on taste, price, and convenience. However, this same study identified "evolving drivers" that include health, safety, social impact, and experience as increasingly important and driving the other half of customers' decisions.¹⁴

Demand for nutritional, healthy, and safe food characteristics is a growing trend with blurry and overlapping definitions. Health and wellness from food overlaps with safety to encompass immediate and long-run safety and nutritional benefits from food.¹⁵ Other studies have also found these results. In North America, 71 percent of people are "concerned about the long-term health impact of artificial ingredients."¹⁶

Consumers of fresh vegetables seek out nutrition more than other attributes.¹⁷ Other research shows that tomato consumers in the U.S. focus more on the quality and taste of tomatoes today than they have in the past.¹⁸ The concern around artificial ingredients, including additives and pesticide residue, is also present in vegetable purchasing behavior.¹⁹ An important food attribute consumers care about, often categorized as nutritional (and sustainable), is the certified organic characteristic.²⁰ U.S. organic sales increased for the year ending July 30, 2016, by over 13 percent.²¹ Consumers often cite health/nutrition and environmental/ethical reasons for buying organic.²²

The Local Food Debate

One food characteristic — local — brings all of these attributes together. Local foods may mean fresh and high quality to some, nutritious to others, sustainable or natural to another group, and supportive of the community to yet another set of customers. Local can even mean some or all of these to some customers. More than the other factors, local is associated with freshness and supporting the local economy.²³

MightyVine's tomatoes (like all hydroponic products) cannot be called organic, but they are certainly local by most definitions of the term, grown only 70 miles from Chicago. And this raises an interesting point. Many food attributes after taste, safety, price, and nutrition are credence attributes. Organic, local, natural, and sustainable are all credence attributes. Consumers must often trade off between these when selecting products. For example, if you want local tomatoes in Chicago during the winter, they are highly unlikely to be organic. A recent survey of local residents by researchers at the University of Illinois at Urbana-Champaign found that glasshouse lettuce was perceived to be significantly less natural than field-farmed lettuce. Moreover, consumers' willingness to buy was lower for glasshouse lettuce than field-grown lettuce.²⁴ This study, however, did not account for a tradeoff between local and naturalness.

Perhaps consumers prioritize these different credence attributes, and seek certain ones, for particular reasons. A Mintel report on the "Perimeter of the Store" found that shoppers prioritize the localness of fruits and vegetables over concerns about chemical and pesticide use and GMOs.²⁵ Mintel also analyzed how sustainability claims impacted purchases, and local was found to be more important than organic.²⁶ However, posing local and organic as claims about sustainability makes these results difficult to interpret. Local and organic may or may not be more sustainable compared to other alternatives. These results further point to the perception entanglement of different credence attributes. Generationally, organic is relatively more important with millennials compared to other generations.²⁷

A final tradeoff exists in this area related to nutrition. Local food can be more nutritious because less nutrient loss occurs due to the decreased time from picking to consumption.²⁸

According to Jim:

“I don’t think you can talk about local without the quality in the produce, because technology is proving that produce that travels shorter distances is way more nutritious ... nutrition is going to be how the future changes ... [furthermore] there are a large number of new startups with apps that allow retailers to make nutritional data available to the consumer, and eventually [all] retailers are going to need to be concerned about it because they are used to selling the look of their produce and not the nutrition of their produce.”

Because consumers seek out nutrition when purchasing vegetables, the nutritional benefits of short transit times is an important differentiation for local produce growers like MightyVine. Moreover, consumers seek out local in and of itself, a plus for MightyVine. However, MightyVine faces headwinds from a natural perspective because it cannot be certified organic and relies heavily on technology.

Crisis in Summer 2016

In the summer of 2016, MightyVine faced its first serious challenge. This one was weather related. Gary explains:

“It got hot early and stayed hot in summer 2016. This was an early lesson for us. Most people assume that the most difficult time to grow tomatoes is in the winter. However, it’s not hard to grow in the winter because you can easily heat the glasshouse and regulate the climate and temperature. The real question is how to grow when it is really hot and stays hot.”

Ideal conditions for growing tomatoes are hot days and cool nights that allow the plants to rest and recuperate. Tomato plants that are exposed to prolonged heat experience a great deal of stress. The impact of this stress can be a significant decline in tomato production, both in yield and quality. For MightyVine, yields dropped by 25 percent during this time, and quality suffered as well.

This problem was exacerbated by the market legitimacy challenges that MightyVine was already facing with retailers, restaurants, and other foodservice providers. As a young company that had only been delivering tomatoes for six months, MightyVine was still proving itself as a quality and reliable supplier for retailers. How could MightyVine communicate its ability to be a reliable supplier when it had to cut back on scheduled deliveries by 25 percent? This created a significant messaging problem for the young company.

As Gary explains:

”Retailers don’t like to work with proration; they want a steady supply. If they order 600 cases, they want 600 cases because it’s hard for them to make adjustments. Retailers want to ‘turn it on and let it go’. If they are going to vary order size, retailers want it to be at their discretion. For example, they may decide to order 10 percent more for promotions, or less if inventory builds up.”

Moving Forward

MightyVine had been successful in a short period of time, doubling in size and securing several key accounts in the Chicagoland food market. The leadership team believed that at least part of this success was due to the changing nature of consumer perceptions about food. A growing segment of the population, and millennials in particular, were demanding food that was fresh, nutritious, great tasting, and locally sourced. Consumers were increasingly linking the food they consumed to actively managing their health and communicating their values.

MightyVine was positioned well to fill this current demand in Chicagoland. But Jim and Gary still had questions about whether this demand was sustainable. Since the creation of MightyVine, the U.S. had been in the midst of a moderate economic growth cycle. Would consumers still be willing to pay premium prices in periods of economic downturn? Was the local food movement a fad, or was it here to stay? Many consumers also saw the increasing use of technology to produce food as inconsistent with the local food movement and therefore a negative attribute. Would consumer willingness to accept technology in food production change going forward? What should MightyVine’s role be in promoting the use of the technology?

The leadership at MightyVine also believed they had developed a successful niche business model to deliver locally produced tomatoes to the premium markets in Chicago. They were confident in the high-quality taste and nutrition of their products and were attempting to provide scientific evidence to support their claims of being the best on both attributes. Yet their success and the size of the Chicagoland market had attracted significant competition. Was scientific evidence on health and taste claims going to be enough to protect their niche? What more did MightyVine need to do to protect its niche in the Chicagoland market?

Finally, the leadership at MightyVine was considering next steps in growing the business. The strategy of being first to market has been successful in the past and was a major reason they had decided to expand so rapidly after the first glasshouse. If MightyVine was going to continue to keep ahead of the competition, what was next? Should MightyVine consider adding new products to its portfolio of glasshouse produce? If so, what should they be? MightyVine also believed that its business model was scalable and could possibly be replicated in other cities. Was this something they should consider to diversify the risk associated with focusing on one market?

Jim considered these questions as he bit into a MightyVine cherry tomato, and then another, and another. "Boy that's a good tomato!"

Discussion Questions

The leadership at MightyVine is considering next steps in growing the business. The strategy of being first to market has been successful in the past and a major reason they decided to expand so rapidly after the first glasshouse.

1. If MightyVine is going to continue to keep ahead of the competition, what is next?
2. Should MightyVine consider adding new products to its portfolio of glasshouse produce? If so, what should they be?
3. MightyVine also believes that it has a business model that is scalable and could possibly be replicated in other cities. Is this something leadership should consider to diversify the risk associated with focusing on one market?
4. Is MightyVine's 'bet' on the sustainability of the local food movement likely to be a winner?
5. What role will technology and nutrition continue to play in the future food system?

Videos on MightyVine

MightyVine Taste Perfection

www.youtube.com/watch?v=LgZ7z0R4RZA

The Lempert Report: Want Fresh Summertime Tomatoes All Year Round?

www.youtube.com/watch?v=fkf-hSzqzBl

Chef Rick Bayless on MightyVine Tomatoes

www.youtube.com/watch?v=GpBl0sncHMU

Royal Pride Holland

Introduction: www.youtube.com/watch?v=TioP6xOk-A0

Taste Royal Pride: www.youtube.com/watch?v=eK2zeZrWOTg

Production System (in Dutch): www.youtube.com/watch?v=l3gUqxdS3ZE

Endnotes

1. Hortidaily. (2015). Netherlands: Record harvest greenhouse vegetables in crisis year 2014. Retrieved August 9, 2017, from www.hortidaily.com/article/16668/Netherlands-Record-harvest-greenhouse-vegetables-in-crisis-year-2014
2. Trotter, G. (2016, February 5). How tasty winter tomatoes are helping Local Foods grow. Chicago Tribune. Chicago.
3. Trotter, G. (2016, March 23). MightyVine to double tomato operation. Chicago Tribune. Chicago.
4. United States Department of Agriculture Economic Research Service. (2017). U.S. per capita use of fresh and processing vegetables, dry pulse crops, and potatoes; cash receipts; U.S. vegetable trade. Vegetables and Pulses Data: Yearbook Tables.
5. United States Department of Agriculture Economic Research Service. (2017). U.S. per capita use of fresh and processing vegetables, dry pulse crops, and potatoes; cash receipts; U.S. vegetable trade. Vegetables and Pulses Data: Yearbook Tables.
6. United States Department of Agriculture Economic Research Service. (2017). U.S. fresh market vegetables, mushrooms, potatoes, and sweet potatoes: supply utilization and price. Vegetables and Pulses Data: Yearbook Tables.
7. Cook, R. (2015). Fresh Tomato Production and Marketing Trends in the N. American Market. Roberta Cook - Articles and Presentations, April 2015.
8. United States Department of Agriculture Economic Research Service. (2017). U.S. per capita use of fresh and processing vegetables, dry pulse crops, and potatoes; cash receipts; U.S. vegetable trade. Vegetables and Pulses Data: Yearbook Tables.
9. United States Department of Agriculture Economic Research Service. (2017). U.S. fresh market vegetables, mushrooms, potatoes, and sweet potatoes: supply utilization and price. Vegetables and Pulses Data: Yearbook Tables.
10. United States Department of Agriculture Economic Research Service. (2017). U.S. monthly average retail prices: Tomatoes, field grown. Vegetables and Pulses Data: Yearbook - U.S. Average Retail Prices.
11. Nielsen Perishables Group. (2015). Fresh Produce Industry Overview. Prepared for the Produce Marketing Association, (September). Retrieved from www.pma.com/~media/pma-files/research-and-development/fresh-produce-industry-overview-2015.pdf?la=en&la=en
12. Oklahoma State University Department of Agricultural Economics. (2017). FooDS: Food Demand Survey, 5(1).
13. Mintel. (2015). The Millennial Impact: Food Shopping Decisions - US - September 2015.
14. Deloitte. (2016). Capitalizing on the shifting consumer food value equation. Prepared with the Food Marketing Institute and the Grocery Manufacturers Association.
15. Deloitte. (2016). Capitalizing on the shifting consumer food value equation. Prepared with the Food Marketing Institute and the Grocery Manufacturers Association.
16. Nielsen. (2016). What's in Our Food and on Our Mind: Ingredient and Dining-Out Trends Around the World.
17. Mintel. (2017). Vegetables - US - May 2017.

18. Cook, R. (2015). Fresh Tomato Production and Marketing Trends in the N. American Market. Roberta Cook - Articles and Presentations, April 2015.
19. Mintel. (2016). Grocery Retailing - US - November 2016.
20. Deloitte. (2016). Capitalizing on the shifting consumer food value equation. Prepared with the Food Marketing Institute and the Grocery Manufacturers Association.
21. Nielsen. (2016). What's in Our Food and on Our Mind: Ingredient and Dining-Out Trends Around the World.
22. Mintel. (2015). Organic Food and Beverage Shoppers - US - March 2015.
23. Mintel. (2014). The Locavore: Attitudes Toward Locally-Sourced Foods - US - February 2014.
24. Coyle D., B., & Ellison, B. (2017). Will Consumers Find Vertically Farmed Produce "Out of Reach"? Choices, 32(1).
25. Mintel. (2014). Perimeter of the Store - US - June 2014.
26. Mintel. (2010). Sustainable Food and Drink - US - August 2010.
27. Mintel. (2010). Sustainable Food and Drink - US - August 2010.
28. Barrett, D. M. (2007). Maximizing the Nutritional Value of Fruits and Vegetables. Food Technology, 61(4), 40-44.