

Developing a Sustainable Pricing Strategy for the Worcester Regional Food Hub

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Abstract

The Worcester Regional Food Hub's (Food Hub) mission is to promote healthy, local agriculture by making locally grown food accessible to all members of the Worcester Community. However, the Food Hub's current pricing strategy does not cover their operational costs. For the Food Hub to remain sustainable for the long-term, we worked with them to develop a pricing strategy. We assessed the Food Hub's current operations and pricing strategy and compared it to other food hubs. We interviewed five food hubs, the Food Hub's farmers, and their institutional customers. We compiled their responses in a comparative matrix and used this to develop recommendations for the Food Hub. We also created two promotional videos, one targeting Food Hub customers and the other targeting potential Food Hub suppliers.

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Executive Summary

Introduction

The Worcester Regional Food Hub (Food Hub) is a partnership between the Worcester Regional Chamber of Commerce and the Regional Environmental Council Inc. These two organizations, with funding from the Health Foundation of Central Massachusetts, have joined to form the Food Hub. The Food Hub is a nonprofit organization whose goal is to strengthen the regional food system by providing local small-to-mid-sized farms and food producers access to institutional buyers to increase the amount of locally grown food in the Worcester region. The Food Hub carries out this goal by aggregating produce from individual farmers and producers throughout Massachusetts, and distributing it to local institutions such as the College of the Holy Cross, Worcester Public Schools, and the Regional Environmental Council's Mobile Farmers Markets (S. Hinman, personal communication, October 25, 2017).

Currently, the Food Hub's operation costs are covered by sales revenue and grants from the Health Foundation of Central Massachusetts. However, the Food Hub would like to lessen its dependence on grants and increase its ability to rely on sales revenue. The purpose of our project was to research and suggest possible options for a new pricing strategy to help the Food Hub reach this goal.

Food insecurity refers to the lack of access to enough food for an active, healthy life (Berkowitz, Berkowitz, Meigs, & Wexler, 2017). Being food insecure leads to a multitude of health-related issues: children experience health-related problems during their development and adults are more at risk for a number of diseases (Gunderson & Ziliak, 2015; Kimbro & Denney, 2015). Food hubs supplement basic nutritional means by providing access to the healthy food needed for a well-rounded diet that will prevent these health impacts. Food hubs benefit the

environment by reducing the food supply chain, which lowers the amount of greenhouse gas emissions caused by long-distance transportation. This reduced supply chain has the added effect of cutting down on food waste from the moving, handling, and storing of produce. Also, the food hubs work with and promote farmers that operate in a more environmentally friendly manner, allowing farms to grow and expand their operations and mission (Kummu et al., 2012). Furthermore, food hubs help to improve local economies by increasing the profits of local farmers, increasing local spending, and strengthening the bond between consumer and producer. By replacing imported produce and labor with local equivalents, food hubs help circulate money through the local system, allowing local businesses to benefit from commerce (Jablonski, Schmidt, & Kay, 2016).

Methodology

In order to assist the Food Hub in becoming more self-sustaining, we created two goals. The first was to develop a more sustainable pricing strategy for the Food Hub. Our second goal was to create two promotional videos: one to educate farmers about the benefits of working with the Food Hub and one to inform institutions about the quality, community, and economic benefits of purchasing food from the Food Hub.

We achieved these goals by creating two sets of objectives that aligned with each one of our goals. Before focusing on each goal, we had to accomplish our first objective, which was to investigate the purpose and targeted demographic of the Food Hub. This first objective gave us a better sense of the internal operations of the Food Hub and a detailed understanding on which to build the rest of our research.

Develop a Pricing Structure

1. Evaluate Current Pricing Strategy of Food Hub

2. Identify and Evaluate Pricing Strategies of Other Food Distributors
3. Analyze Trends in Food Pricing in Local Food Entities to Assess the Food Hub's Price Competitiveness
4. Analyze and Compare Findings from Previous Objectives and Develop Possible Pricing Strategies for Food Hub

Create Two Promotional Videos

1. Assess the Food Hub's Current Outreach Strategy
2. Identify the Strengths and Weakness of the Food Hub's Current Operations
3. Develop Marketing Videos for Food Hub Directed Towards Farmers and Institutions

To accomplish the objectives related to the operations and outreach strategy of the Worcester Regional Food Hub, we first interviewed Brian Monteverd and Stuart Loosemore, the two directors of the Food Hub, as well as their sales manager, Susannah Hinman. We also performed content analysis on the business plan, sales records, and order invoices of the Food Hub from 2016. To get a better sense of the outreach strategy, we analyzed the content on local news sources pertaining to the Food Hub, as well as the Food Hub's social media pages and website. One of our group members also sat in on a marketing meeting to understand their outreach plan moving forward.

The next step was to interview other food distributors and stakeholders of the Food Hub. We interviewed and performed content analysis on documentation from seven food hubs and other Community Supported Agriculture (CSA) programs across New England, Virginia, and Pennsylvania to evaluate their pricing strategies and assess their potential use at the Food Hub. When possible, we conducted content analysis of feasibility studies, sales reports, business plans, and benchmark studies of other food hubs. We also interviewed three institutions that currently buy from the Food Hub and five farmers that supply produce to the Food Hub. These interviews gave us footage that not only served as

testimonials for the promotional videos, but also gave us another perspective on Food Hub daily operations and pricing. To analyze the data, we collected, we developed a comparative matrix. We then coded responses for common themes, condensed the matrices, and created a Strength, Weakness, Opportunity, and Threat (SWOT) chart to simplify and organize potential options for the Food Hub.

Findings

After analyzing our data, we found that there were many different components of a pricing strategy to consider. The components are based on the operation of food hubs themselves and their interactions with the farmers or producers, from which they receive produce, and customers buying the produce. We found that **a good benchmark for success in terms of covering operational costs was aiming for a profit margin higher than 10%.** Of all the food hubs we interviewed that strive for a 10% profit margin, none of them were covering their operational costs (S. Hinman, personal communication, October 25, 2017 & L. Edwards-Orr, personal communication, November 3, 2017). We found that to get a specific margin, a food hub could apply a constant price markup to all items or have different markups based on cost, seasonality, or other selected factors such as volume purchased. **Additionally, transportation constituted a substantial part of the cost of acquiring produce.** The Food Hub currently has an order minimum of \$150 for this reason. Through our research we found that there were different strategies of transportation that could be used to minimize costs such as hiring independent trucking companies, having farmers deliver to food hubs, or coordinating farmers to aggregate produce among themselves so food hubs could pick up a lot of produce at once (L. Edwards-Orr, personal communication, November 3, 2017). **Additionally, we found that food hubs benefit from strong communication and relationships with farmers and customers.** Food hubs offer fair pricing and timely payments to farmers, and maintain a consistent line of communication with

customers to determine demand of produce, opportunities for new produce, and what farmers should plan on growing.

Lastly, we found that there are alternative revenue sources outside of wholesale food distribution. One such example would be programs such as Community Supported Agriculture (CSA), in which individuals commit to purchasing their own produce for a growing season, as well as direct delivery of produce, in addition to wholesale aggregation (K. Webb, personal communication, November 17, 2017).

Recommendations

In order to help create a sustainable pricing strategy for the Food Hub, **we recommend using a Microsoft Excel spreadsheet, like the one we developed, to determine price markups on produce to be sold to institutional customers.** The spreadsheet determines markups based on factors that the user determines to be the most relevant. The user sets the importance of each factor by assigning a value that modifies the final markup. **We recommend determining the markup on a farm-by-farm basis and considering factors such as the Food Hub's target profit margin, transportation cost, volume, seasonality, supply, and demand for a given time in the season.** Furthermore, **we recommend that the Food Hub consider other strategies of transportation such as arranging for one pickup of multiple farms' produce instead of going from farm to farm every time.** We also **recommend the Food Hub investigate the interest of a potential CSA program, as well as more uses of the incubator kitchen for the purpose of aggregation, as to provide another outlet for produce bought by the Food Hub.** For more of our recommendations, see Chapter 5 for all recommendations.

Conclusion

As more food hubs begin to open around the country, they will face the same challenges as the Worcester Regional Food Hub. We hope that the Food Hub's potential new pricing strategy will provide a roadmap that guides these new hubs towards sustainable operations, and that our videos will inspire a similar approach to bring more produce to local communities in new food hubs. For the Worcester Regional Food Hub, we believe that our recommendations, Excel pricing spreadsheet, and videos will be a strong first step towards sustainable operations and future growth.

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Chapter 1: Introduction

According to a 2016 report by the American Heart Association, nearly 70% of adult Americans are obese or overweight, a factor that increases risk of heart disease, diabetes, or stroke (Obesity Information, 2016). People having limited access to healthy foods partly causes this reality. The United States Department of Agriculture (USDA) refers to areas with limited access to fruits, vegetables, or healthy foods as food deserts (American Nutrition Association, 2010). These areas become food deserts because of poverty, lack of public transportation, or a lack of supermarkets in a given region (Food Desert Locator, USDA, June 2, 2017). One solution to making healthy foods more accessible is the creation of food hubs (Know Your Farmer Know Your Food, USDA, 2013). Food hubs work to aggregate and distribute local produce. The produce is sourced from small, local farms and distributed to local stores, institutions, and people who do not typically have access to healthy foods (Barham et al., 2012). In addition to benefiting residents in these communities, food hubs help local economies. A local food hub promotes local farmers and their business, provides jobs to community residents, and brings money into the area (Jablonski, Schmidt, & Kay, 2016).

According to the Food Desert Locator Map created by the USDA, Worcester, Massachusetts, the second largest city in New England, has two low-income areas with limited access to food. Furthermore, in 2012, four students from Worcester Polytechnic Institute conducted a social science research project on food security in Worcester and found that 1 in 3 children live with families that cannot provide basic nutritional requirements. These children are considered food insecure (Allen, Filice, Patel, & Warner, 2012). The Worcester Regional Food Hub (Food Hub) was developed through a partnership between the Regional Environmental

Council Inc. of Central Massachusetts and the Worcester Regional Chamber of Commerce. One of the Food Hub's goals is to help supply healthy, locally grown produce to Worcester food deserts and Worcester residents who are food insecure. We worked with the Food Hub to develop a more sustainable pricing strategy and created videos intended to recruit new purchasers and farmers.

The Food Hub wanted a pricing strategy that was sustainable, meaning it covered operational costs and stayed within market prices of similar food products. It was important for the Food Hub to have a sustainable pricing strategy so that it could continue the successful operation and achievement of its organizational goals once its grant funding ends. The continuing success of the Food Hub is important because food hubs help small farms grow and find markets for previously unmarketable products. Without the Food Hub, small-scale, local farmers would lose a valuable market for their produce, making it harder for them to sell to large institutions. The Food Hub acts as a wholesale distributor to institutions and markets for the farmers, taking the pressure of juggling multiple larger-scale customers off of local farms (Matson & Thayer, 2016).

In a 2014 report from the Wallace Center at Winrock International, a national nonprofit organization that does research to help small scale entrepreneurs in the United States, researchers compared the average profitability of food hubs in the United States. Graphs in the report compare the different costs per sales dollar of food hubs, looking at a variety of factors such as seasonality and size (Fisk & Matteson, 2014). The Wallace Center report shows how both external and internal factors contribute to the success of a food hub. In a similar vein, in 2015, a group of researchers from Michigan State University explored what it means for a food hub to be financially viable. These researchers looked at successful and unsuccessful food hubs in order to identify trends in their operating costs and annual gross sales. The researchers made suggestions on how much a food hub should spend on operating costs and how much a food hub should look to earn through

gross sales. However, the researchers made no specific findings on pricing strategies that would help a food hub reach the suggested operating costs and gross sales (Fischer, Pirog, and Hamm, 2015). Both of these studies investigate how food hubs' prices are affected by their size, market, and operational costs, but omit how an organization should devise those prices. These reports put the struggle of the Food Hub into perspective by informing readers of the multitude of external factors that can still affect a food hub.

This project added to the knowledge base for how to create a financially sustainable food hub. We developed a plan to identify possible pricing strategies that food hubs could apply depending on their local food environment and existing organization. The main goal of this project was to work with the Food Hub to develop a pricing strategy to help them cover their operational costs. This would allow the Food Hub to continue helping the Worcester community and local economy. In order to accomplish this, we investigated other successful food hubs in a case study format through a series of interviews and applied the results to the Food Hub.

This report contains six chapters. This introduction is the first chapter. The next chapter is the Background chapter where we discuss the overarching problem the Food Hub was trying to solve, the effects of food hubs on society, the environment, and the economy, while also investigating examples of successful food hubs. By giving context to the purpose and effect of the Food Hub, we show where the goal of this project lies in relation to the past research. The third chapter contains our Methodology for this project. In this chapter, we describe our goals in greater detail along with the eight objectives we completed to accomplish them. The fourth chapter contains our research findings. We discuss our findings in the context of how the food hub relates to its own operations, its producers, and its institutional customers. Finally, in our last chapters, we offer our recommendations and conclusion. These recommendations are based off our findings

and experience working with the Food Hub, and are aimed at creating a more sustainable pricing strategy.

Chapter 2: Background

In this chapter, we investigate the issue of food security, how it relates to Worcester, and how food hubs can be a solution. In section 1, we explain what food security is and how it is a problem facing the residents of Worcester, Massachusetts. In section 2, we discuss the health-related risks of food insecurity. Next, we look at the environmental impacts of the food supply system and how food hubs help diminish negative environmental impacts. In the fourth section, we explore how the economy and pricing of food impacts the pricing and sale of our sponsor's products. Lastly, we examine other food hubs from across the nation to see what policies work and do not work.

Section 1: Food Security

The United States Department of Agriculture (USDA) defines food security as “access by all members at all times to enough food for an active, healthy life.” Food insecurity affects one in seven households each year (Franklin et al., 2011). In this section, we define food security and food insecurity. Next, we explain why food insecurity is a problem in the United States. Lastly, we describe the Worcester Regional Food Hub and their efforts to combat food insecurity in Worcester, Massachusetts.

1.1: What is Food Security?

Food Security, according to a 2014 study conducted by researchers from Curtin University in Western Australia, is the ability to consistently purchase nutritious food on a regular and reliable basis (Pollard et al., 2014). Food security is impacted by proximity to and affordability of food sources (USDA, 2013). While “87.7 percent of American households were food secure throughout

the entire year in 2016,” a full 12.3% of Americans were food insecure at some point that year (Coleman-Jensen, Rabbitt, Gregory, & Singh, 2017). Food insecurity is an issue linked to disease and health disorders. Diet modification is one of the major preventative measures for cardiometabolic diseases such as diabetes, congestive heart failure, and coronary heart disease. People who do not have access to nutritious foods can increase their risk of these diseases. For people who have these diseases, food insecurity can be deadly (Berkowitz, Berkowitz, Meigs, & Wexler, 2017).

Similar effects are evident in children. A child without access to healthy foods, may have lower levels of academic achievement, behavioral problems, or health problems (Gunderson & Ziliak, 2015; Kimbro & Denney, 2015). Access to healthy food is essential to maintaining good health.

Moreover, food insecurity is a crucial issue to low income communities in Worcester, Massachusetts. Four Worcester Polytechnic Institute students conducted a social science research project in 2012 and found that overall income of a neighborhood and its ethnic makeup correlates to access to grocery stores in the city of Worcester. The student researchers used a Geographic mapping program to collect data and analyze locations of food sources by type, access to healthy food, access to transportation, and socio-economic factors of Worcester residents. They concluded that medium-income and Hispanic/ethnically-mixed areas were the least likely to have access to supermarkets and other grocery stores (Allen, Filice, Patel, & Warner, 2012).

Section 2: Health Impacts

As of 2015, there were almost fifty million food insecure people in the United States, “making food insecurity one of the nation’s leading health and nutrition issues,” (Gunderson and

Ziliak, 2015). In this section, we explore the impacts of food insecurity on health through a variety of case studies and literature reviews. In the first section, we introduce the possible health issues that are associated with food insecurity. Next, we analyze the impact of health services and government programs on food insecure people. In the last section, we examine the current problems between health and food; namely, the perception and reality of being food insecure as well as the difficulty of accessing healthy foods for certain households.

2.1: Possible Health Issues

Food insecurity can lead to a multitude of health-related issues. In children, these issues may manifest as emotional health problems, such as depression or anxiety, or as physical health problems like asthma or anemia (Gunderson and Ziliak, 2015). A study published in 2015 by Kimbro and Denney, two sociology professors researching health and the many social aspects that may influence it, details these health impacts. This study showed that children may also experience mental health problems in the form of lower levels of academic achievement in the classroom (Kimbro and Denney, 2015). A proper diet is essential to the healthy development of a child. Research on the health effects of food insecurity on children has yielded a laundry list of negative health impacts. In addition to the previously mentioned health impacts, children are also at a greater risk for certain birth defects, problems with aggression, lower nutrient intakes, and worse oral health (Gunderson and Ziliak, 2015).

Food insecure adults are at a higher risk for cardiovascular complications as well as mental health issues (Gunderson and Ziliak, 2015; Seligman, Laraia, and Kushel, 2010). Adults need healthy foods to provide their bodies with the nutrients they need to function. Food insecure adults are at higher risk of being diagnosed with hypertension and diabetes, and those already suffering

from diabetes are less likely to be able to control it, due to lack of an adequate diet (Kimbrow and Denney, 2015). A proper healthy diet is crucial to maintaining a healthy life.

2.2: Health Services' Impact

Some research suggests that there is a correlation between participation in the Food Stamp Program (FSP) and an increase in obesity. Researchers are beginning to explore the “potential impact of food stamp program participation on the food insecurity-obesity relationship,” (Franklin et al., 2011). Researchers argue that as participation in the FSP began to rise, obesity levels rose with it.

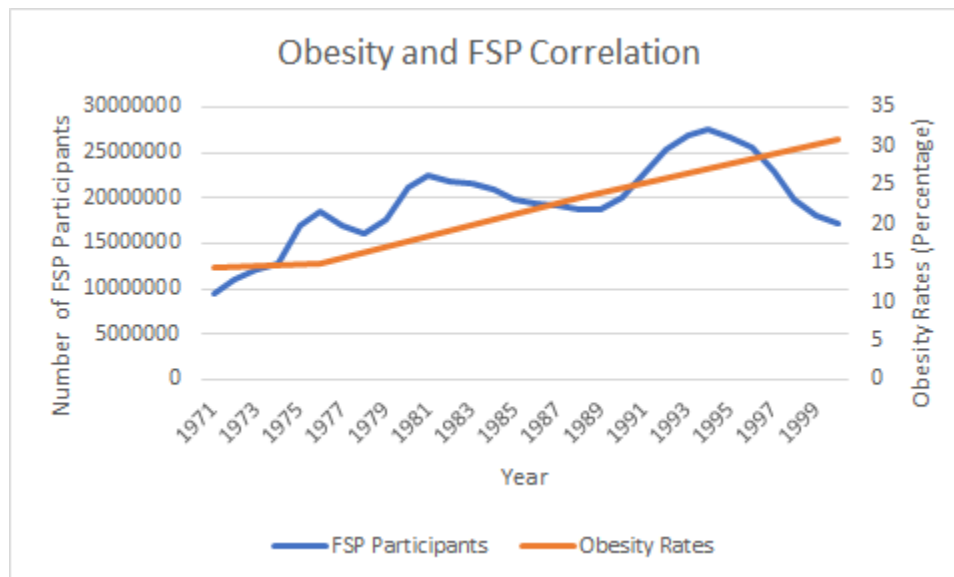


Figure 1 - Obesity Rates and FSP Participation Correlation

Figure 1, above, shows that when there were approximately 9.3-12.8 million participants in the FSP in the early 1970s, obesity rates in the United States were 14.5%. These figures doubled in 2005, yielding 25.7 million FSP participants and obesity rates of over 30% (Baum, 2011). This does not demonstrate a causal relationship but suggests a possible connection between these variables.

The FSP has the potential to increase food consumption among participants (Baum, 2011). This is the point of the program – to help individuals that cannot afford enough food, to get the food they need. The problem is that food stamp recipients tend to purchase and consume more sugar- and fat-filled foods as opposed to other healthier food options (Baum, 2011). Participants in the program now have the means to purchase enough food for a healthy lifestyle through the FSP, but do not have the means to physically access local sources of healthy food. Food insecurity in the United States is not just a matter of not having access to food in general, but not having access to nutritious foods that would promote a healthy lifestyle.

2.3: Current Problems with Health and Food

The lack of access to healthy food options is a current problem between health and food. In 2009, a study was conducted to gauge people’s perspectives on food insecurity and to compare this data with the reality of their food environment. The study showed that most people had an accurate perception of their access to healthy food (Freedman and Bell, 2009). The same study showed that it was significantly easier for individuals to access unhealthy products, such as alcohol and tobacco than they had perceived (Freedman and Bell, 2009). These results reflect the access that food secure and insecure individuals have to various types of stores. Those who perceived that they did not have access to healthy foods in their local food environments had corner stores or convenience stores as their primary means of purchasing food (Freedman and Bell, 2009). Typically, these types of stores do not sell healthy foods, but instead, quick snacks meant to be eaten on the go, cigarettes, and other unhealthy products. In a review of local and national studies, evidence shows that low-income, minority, and rural neighborhoods often have poor access to supermarkets but greater access to fast-food restaurants and sources of unhealthy food (Larson, Story, and Nelson, 2008). For low-income families, energy-dense, but nutrition-lacking foods are

an inexpensive and filling option for a meal. However, the convenience and cost-effective nature of these foods comes at the sacrifice of their nutritional value. If convenience stores and fast-food are the only local source of food it becomes increasingly more difficult to find healthy foods and much easier to find unhealthy options.

Section 3: Environmental Impacts of Food Systems

Improving food security is an important aspect of improving people's health. Improving the methods in which food gets to people is a necessary aspect of improving the environmental impacts of food production and distribution. Food hubs help in both areas. In this section we define the food supply chain at the global and local level and compare the environmental impacts of both through the use of reports and food hub case studies. Finally, we highlight the problem that arises in food hub organization and management: staying financially viable while prioritizing environmental objectives.

3.1: Environmental Impacts of Large-Scale versus Local Food Systems

Large scale food production has harmful effects on the environment due to large amounts of transportation, resource usage, and food losses along the food supply chain. Conversely, local food systems with food hubs operate in a more environmentally friendly manner because of shorter food supply chains, methods to reduce waste, and close partnerships with farmers.

Despite initiatives to increase viability of locally grown food, 97% of food travels through the conventional food system comprised of large-scale food supply chains (Berti & Mulligan, 2016). The Food Supply Chain (Supply Chain) is the complex web of business, logistics, and markets that moves food from producers to buyers and then to consumers (Manzini & Accorsi, 2013). Within the Supply Chain, food hubs collect locally or regionally grown produce, and

facilitate their sale to other food entities (Matson & Thayer). Local food systems operate in a shortened version of this chain and practice environmentally sustainable techniques in their distribution and production.

In 2012, the Water & Development Research Group (WDRG) from Aalto University in Finland performed a globally scaled study examining food loss within the food supply chain. The WDRG found that 24% of food is lost within the different steps of the food supply chain. Furthermore, the WDRG found that 23 to 24% of water and crop fertilizers are used to grow wasted or lost food. (Kummu et al., 2012). In 2014, Cleveland et al. published a case study on the Farmer Direct Produce (FDP), a food hub in Santa Barbara, California. In it, Cleveland et al. describe how farmers and the FDP work together to decide exact amounts of food needed to fulfill orders and try to execute them accordingly to minimize food waste and uncertainty in the distribution process (Cleveland et al., 2014).

Additionally, the production and distribution stages of the supply chain produce large amounts of greenhouse gas emissions. Food miles is the term for how far food must travel to get to the consumer. In 2008, two researchers from the civil and environmental engineering department at Carnegie Mellon University investigated food miles and what types of food produce the most greenhouse gas emissions. In their report, they state that if consumers made dietary choices away from red meat and dairy, the amount of greenhouse gas emissions produced in the food supply chain would decrease (Weber & Matthews, 2008). In 2003, two researchers from the Leopold Center for Sustainable Agriculture at Iowa State University calculated the Weight-Average Source Distance (WASD) of 16 different produce items. They calculated the WASD, or food miles, for locally grown food and conventionally grown food sold to Iowa institutions. The total food miles for locally grown produce was 675 miles versus 23,496 miles for conventionally

grown produce (Pirog & Benjamin, 2003). Food hubs reduce greenhouse gas emissions and waste by minimizing the amount of transportation needed to get food from the production phase to the consumer, as well as using less packaging and strategically planning food supply.

Section 4: The Economics of Food

Food is inexorably linked with economics and public policy. What we want as consumers, how much money we make, and the prices we are willing to pay for food influence the demand for produce (Unnevehr et al, 2010). How much is grown, where it can be grown, and regulations on quality affect its supply (Gomez, McLaughlin, & Hardesty, 2014; Lee & Marsden, 2009; Covert & Morales, 2014). In this section, we analyze food pricing through an economic lens. Firstly, we discuss how and where food hubs fit into the overarching food supply chain. Then we examine the effect of food hubs on local economies. Lastly, we look at how pricing affects one's diet. In this section, we attempt to provide a holistic, economic analysis on food hubs and their pricing strategies.

4.1: The Food Supply Chain and Food Hubs

Food hubs act as a mid-to-low level middleman for local food systems (Matson & Thayer, 2013). These organizations fulfill an important role in the local Food Supply Chain. Food hubs can operate under a variety of business models such as: producer and retailer cooperatives, small businesses, buying clubs, etc. (USDA, 2013). As cooperatives though, food hubs serve as a member-owned organization that primarily aggregates, or consolidates, produce, stores it, and then distributes it to consumers (Gomez, Hardesty, & McLaughlin, 2014).

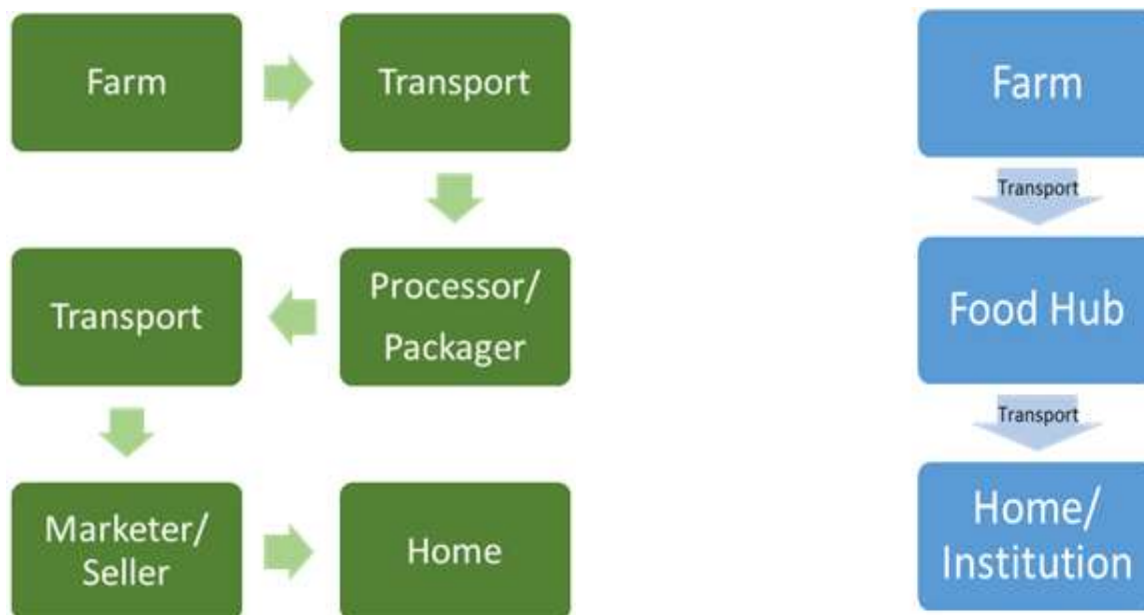


Figure 2 - (Left) Typical Food Supply Chains – Not Including Food Hubs

Figure 3 - (Right) Simplified Food Supply Chain via Food Hub

As shown in Figure 2, above left, food normally goes through several stages from farm to consumer. It must be processed, packaged, and then shipped off to a distributor before the consumer ever sees it. However, food hubs operating as cooperatives cut out some of the steps. As shown in Figure 3, above right, these cooperatives can shape themselves into food hubs, which serve a much-reduced Supply Chain. Food hubs allow for a Supply Chain to be comprised of only the producer, the food hub, and the consumer. This makes travel time from farm to table shorter than in conventional Supply Chain's (Low et al., 2015).

4.2: The Food Hub's Impact on the Local Economy

Food hubs have a positive impact on local economies and communities. In a 2016 study, a group of researchers used data from a successful food hub to model the economic benefits that food hubs can have on local economies. They showed that the presence of the food hub created a significant increase in the profits of participant farms and thus an overall increase in local spending (Jablonski, Schmidt, & Kay, 2016). Food hubs not only support local farms and businesses, but

also facilitate local food system growth by strengthening the bonds between producer and consumer (Matson & Thayer, 2013). Food hubs have a direct impact on local economies by substituting imports with local products and labor (Martinez et al., 2010). This means that as food hubs grow the local food system, local business and employment opportunities also expand because they are meeting an existing demand for products through local, rather than imported channels.

4.3: Pricing and Diet

On a personal level, the prices we pay greatly impact our food choices. There is a correlation between decreasing costs of healthy food and healthier diets (Afshin et al., 2017; Bond, Williams, Crammond, & Loff, 2010). A 1994 study conducted by a team from the University of Minnesota School of Public Health, found that increasing the variety of fruits and vegetables and decreasing cost by 50% correlated with a three-fold increase in consumption (Jeffery, French, Raether, & Baxter, 1994). This study was conducted within a single corporate cafeteria over the span of six weeks. The subjects involved were primarily adult office workers and executives who worked in the building the cafe was located in. A 1997 study conducted by some of the same people, primarily targeting high schoolers this time, found similar results (French et al, 1997). A decrease in fruit price in two participating high school cafeterias led to a four-fold increase in consumption. A 2017 study corroborated the above findings. In it, the researchers discovered that, “each 10% decrease in price [of healthy foods] increased consumption of healthful foods by 12%” (Afshin et al., 2017). There is a clear connection between the price of healthy food and its consumption. People want to eat healthy. By making it more affordable to do so, you give people more incentive to eat healthier.

Section 5: Studying Other Food Hubs Experiences

In this section, we focus on understanding the scalability and financial viability of small farms and how their growth could help food hubs expand their market. Specifically, we look at the long-term value that food hubs provide without exhausting their limited resources. Food hubs across the United States have had varying levels of success, all highlighting the importance of sustainable pricing. In the first section, we identify factors that lead to an unsuccessful food hub, and in the second section, we discuss successful food hubs as well as what led to their success. Finally, we explore food hubs in different areas of the United States in order to identify important decisions and potential compromises that must be made in order to accomplish their overarching goals (Shewchuk, Okray, Mahoney, and Frankia, 2013).

5.1: Unsuccessful Food Hubs

There is little peer-reviewed literature regarding food hubs because they are a fairly new movement in the United States. Food hub operations face numerous challenges, including: sustainable pricing; variability of available food; adequate storage; and transportation distance. Unsuccessful food hubs are unable to pay for the full operational costs without support from outside organizations (Barham et al., 2012). One of the main causes of food hub failure is the inability to maintain production levels stable with consumer demand. Additional barriers to success include: finding the financial and human capital to cover production, and ensuring quality of the delivered product (Michigan State University Center for Regional Food Systems & The Wallace Center at Winrock International. 2016).

5.2: Successful Food Hubs

While insufficient human and financial capital can make a food hub fail, a food hub needs more than capital alone to be successful. There are three factors that impact the success of food hubs: 1) understanding of the consumers' needs; 2) building strong relationships between the producers and food hub; and 3) growing both the consumer and producer base (LeBlanc, Conner, McRae and Darby, 2014).

Most studies of successful food hubs focus on the strategies those hubs used to be financially viable while fulfilling consumers' need for healthy food. In 2013, researchers from the USDA and the Wallace Center at Winrock International found that economically viable food hubs have sufficient sales revenue to cover their core operational costs. They also found that these food hubs have an understanding of consumer demands, so they offer other products besides fresh produce, such as eggs or dairy, and investigate the possibilities of selling processed food and value-added products (Barham et al., 2012).

At the same time, a successful food hub is built by developing good working partnerships that are able to provide the necessary infrastructure to aggregate and distribute produce. Strong partnerships between producers and food hubs strengthen business plans, efficiency of food production, and distribution in the local market. Tuscarora Organic Growers Cooperative, Inc., a 25-year-old food hub in Washington, DC employed this idea for its yearly operation. The Tuscarora Growers worked with farmers before the growing season to plan which products may be in high demand and to determine target pricing. The Tuscarora Growers also pre-order their produce so that farmers can schedule planting and estimate their sales, which strengthens the Tuscarora Growers' business plans for the given growing season (Barham et al., 2012)

Lastly, the growth of food hub' producer and consumer base is crucial to their success. Food price, accessibility, and variety influence consumer behavior. Therefore, in growing the consumer base, food hubs strive to identify the food products in high demand, the ones in low demand, and their price elasticity. Food hubs must recognize the limiting factors that determine consumer preferences and behavior (Senauer, 2001). To increase the producer base, food hubs grow themselves, so they are able to reach more producers in a region. They strengthen relationships with producers by offering technical assistance, assuring farmers are getting a good price, and helping them adapt to the wholesale market. In this way, food hubs are able to build trust among producers and attract others to work with them (Barham et al., 2012). These factors are crucial in food hubs achieving financial viability and sustainability for the future.

5.3: Questions Regarding Scaling and Financial Viability

Food hubs are fairly new to the United States and little peer-reviewed literature exists on the subject (Matson & Thayer, 2016). However, food hubs offer a more environmentally friendly approach to food distribution and can improve food security throughout different parts of the United States (Berti & Mulligan, 2016). Distribution methods can vary based on different business decisions, each with different implications on the environment, the community, and the food hub itself (O'Hara, 2015).

One of Food Hub's missions is to increase the access of local, fresh, and healthy food throughout Worcester with its aggregation and distribution program. The purpose of our project was to create a sustainable pricing structure for the Food Hub, so the aggregation and distribution program can be sustainable for the future. Our research into pricing strategies lead us to transportation costs. One thing to consider for the Food Hub is expanding its transportation radius

or investigate other opportunities pertaining to transportation strategy. For example, a food hub named Farmer Direct Produce (FDP), in Santa Barbara, California had to consider expanding its transportation radius with respect to the order amount in order to increase financial opportunity (Cleveland et al., 2014). Food hubs must pursue opportunities that would benefit them financially or allow them to reduce costs, even if they may not be in perfect accordance with their original plans or mission.

The Food Hub is in a similar situation as FDP in Santa Barbara in that it must make important decisions to remain financially viable and maintain its goals. In the case of the FDP, its goal is to operate as environmentally friendly as possible, and for the Food Hub, it is to provide Worcester residents with access to healthy food while strengthening the market for local farmers. Researchers from the USDA concluded that the biggest challenges facing the growth of regional food hubs are balancing supply and demand, pricing sensitivity, and managing potential growth (Cleveland et al., 2014). The Food Hub is currently navigating the challenge of pricing sensitivity. The Food Hub reached out to the Worcester Community Project Center for collaboration on this research. As a result, the goal of our project was to provide an in-depth study on how to sustainably price Food Hub products. In our next chapter, we discuss our objectives and the methods we used to accomplish them.

Chapter 3: Methodology

Section 1: Introduction

The goal of our project was to create a more sustainable pricing structure for the Worcester Regional Food Hub (Food Hub) by identifying various approaches to pricing strategies used by other food hubs, a pricing strategy, and creating two promotional videos. The first video highlighted the advantages of working with the Food Hub for farmers. The second video informed potential institutional buyers about the benefits of purchasing food with the Food Hub. Many institutions currently rely on the Food Hub for affordable, fresh produce. Thus, the Food Hub must remain viable for those organizations. To complete this goal, we broke our project into eight objectives, as shown in Figure 4, below. Our objectives were separated into those that involve the pricing strategy and those that involved the videos. The first three dealt with the goals of the food hub, its current pricing and outreach strategy, and target customer. The next objective dealt with interviewing farmers and institutions that frequently work with the Food Hub and identifying the positive and negative aspects of their relationships. The next three involved analyzing other food distributors' pricing strategies and determining what might work for the Food Hub. The last objectives were to analyze our findings and compile them into a comprehensive solution for the Food Hub.

Section 2: Objectives

Objectives	Methods	Source
Investigate Purpose and Targeted Demographic of the Worcester Regional Food Hub	Interview With Sponsors and Investigate Past Sales History and Current Clientele	Sponsors and WRFH Records
Assess Current Pricing Strategy of WRFH Including Shortcomings of Strategies and Costs of the WRFH	Interview With Sponsors and WRFH Staff to Obtain Personal Statements and Company Records	Sponsors and WRFH Records
Assess Current Outreach Strategy of Food Hub	Interview With Sponsors and Attend Marketing Meeting	Sponsors, WRFH Meeting
Identify Strengths and Weakness of the Food Hub's Current Operations	Interviews with Farmers and institutions	Farmers and Institutions that frequently work with the Food Hub
Identify and Evaluate Pricing Strategies of Other Food Distributors	Define "Food Distributors", and Interview Representatives of Those Organizations	Sponsors (For Contacts), Participant Farmers (For Contacts), and Food Distributor Representatives
Analyze Trends in Food Pricing in Local Food Entities to Assess WRFH's Price Competitiveness	Survey Terminal Produce Pricing from USDA and Compare Against Food Hub's Pricing	Market Research on USDA Terminal Pricing Website
Analyze and Compare Findings from Previous Objectives to Assess Possible Pricing Strategies for WRFH	Synthesize Findings of Like Objectives to Create Comprehensive Suggestions for WRFH	Own Data and Interview Results
Develop Marketing Videos for WRFH Directed Towards Farmers and Institutions	Use Footage of Interviews and of Immersion Events to Create Videos for Farmers and Potential Customers	Interviews, Own Experience, Other Food Distributors (For Ideas)

Table 1 - Visual representation of our objectives and the methods we will use to complete them

Objective 1: Investigate the Purpose and Targeted Demographic of the WRFH

Our first objective was to determine how the Regional Chamber of Commerce and Regional Environmental Council Inc. viewed the main purpose and target audience of the Food

Hub. In order to achieve this objective, we conducted in-person interviews with Food Hub staff and analyzed the content of the Food Hub's sales history.

First, we interviewed our sponsors, Brian Monteverd, Project Coordinator of the Food Hub, and Stuart Loosemoore, Director of Government Affairs and Public Policy at the Worcester Regional Chamber of Commerce. Secondly, we interviewed Susannah Hinman, the sales manager for the Food Hub (see interview questions in Appendices A1 and A2). From their responses, we were able to piece together the main goal of the Food Hub. Knowing this information allowed us to better formulate a pricing strategy for the Food Hub's main mission.

Furthermore, we analyzed the Food Hub's past sales history. We obtained copies of the Food Hub's past sales to find out to whom and what they sold in the past. We analyzed these records to find the Food Hub's customer base. These findings helped us keep our response in line with the Food Hub's intended customer.

Objective 2: Assess Current Pricing Strategy of WRFH Including Shortcomings of Strategies and Costs of the WRFH

Our next objective was to analyze the Food Hub's current pricing strategy. Specifically, we investigated how the Food Hub was pricing the produce that they bought from farmers and identified potential factors that affect pricing. Potential factors include the distance traveled to collect and distribute food, wear and tear on the delivery vehicles, and the employee/volunteer hours needed to function on a day-to-day basis. Knowledge of the internal and external workings of the Food Hub allowed us to develop a more complete pricing strategy that accounted for these factors in addition to market demand and supply.

To complete this objective, we used the information we gathered from the interviews described in Objective 1. In addition to asking about the Food Hub’s goal, we asked about their current pricing strategy and who they were selling to (see interview questions in Appendices A1 and A2). Their answers helped us identify what was or was not working, as well as where to focus our case studies. This was the most direct way to determine the Food Hub’s current situation.

Through our interview with Susannah Hinman, the Sales Manager at the Food Hub, we gained access to the Food Hub’s sales records, product availability, and transportation costs. This was important because past records gave insight into past market trends, opportunities for better profit margins, and shortcomings of the previous strategy. We analyzed these records with a Strength, Weakness, Opportunity, and Threats (SWOT) analysis, which is a strategic analysis of an organization based on its internal strengths/weakness vs external opportunities/threats to the organization. See Table 2, below for a summary of the layout of a SWOT analysis.

<p><u>Strengths:</u> What does the organization do well now? How does this organization stand out?</p>	<p><u>Weaknesses:</u> What can the organization do better at? What areas of growth can this organization look into?</p>
<p><u>Opportunities:</u> What external forces can work with the organization? What new sources of growth can you apply for?</p>	<p><u>Threats:</u> What external forces compete with the organization? What possible issues can come about from these opportunities?</p>

Table 2 - Example of a SWOT Analysis Table

First, we looked for trends in how the Food Hub priced their products based on the price the Food Hub paid to farmers and what the Food Hub’s operational costs were. Then we identified

the strengths and weaknesses of the Food Hub's current operations. We also looked at the operations of other food hubs for potential opportunities for improvement, however this process will be explained in more detail in Objective 5.

Objective 3: Assess Current Outreach Strategy of Food Hub

The creation of two videos that market the Food Hub to potential purchasers and farmers coincided with the goal of developing a profitable pricing strategy. Both goals worked towards making the Food Hub sustainable in the long term. In addition to the pricing strategy, these videos were meant to bring in more food and to create a larger market for Food Hub produce. We needed to interview the same farmers, institutions, and other food hubs for both of our goals. To start the process of creating the videos, we first examined the ways in which the Food Hub marketed themselves to institutions and farmers. This helped us understand how the Food Hub would be marketing itself going forward.

We completed this objective by first talking with the Food Hubs directors, Brian Monteverd and Stuart Loosemore, to understand what they were looking for in the area of outreach compared to what they did before (See "Interview Questions for Our Sponsors" in Appendix A1). This helped us determine how to approach the videos and the aspects of marketing that worked in the past. Additionally, one of our group members sat in on a marketing meeting for the Food Hub's Incubator Kitchen. While the focus of the meeting was on the Incubator Kitchen and not the Aggregation and Distribution side of the Food Hub, we were able to utilize a similar approach in creating our marketing videos. We identified and analyzed the main goals and messages the Food Hub wanted to emphasize. Particularly, we focused on the goals and messages that are shared

between their Incubator Kitchen and the Aggregation and Distribution. These shared goals include an emphasis on supporting local food, local business, and helping these businesses to grow.

Objective 4: Identify Strengths and Weaknesses of the Food Hub's Current Operations

Every food hub is in a different situation, a different environment, and works with different people. We wanted to identify what was currently working for the Food Hub, and what was not. Our videos focused on highlighting the strengths of their current operations and the weaknesses served as starting points for potential recommendations.

We completed this objective by conducting interviews with many of the farmers and institutions that the Food Hub regularly worked with. These interviews focused on identifying what the farmers and institutions liked about working with the Food Hub, where they saw room for improvement, and highlighting how their relationship with the Food Hub has been beneficial (see Interview Questions for Farmers in Appendix B1 and Interview Questions for Local Institutions in Appendix C1). We coded and organized these interviews in order to identify similar themes in answers between the farmers and institutions (see Farmer Response Chart in Appendix B2 and Local Institution Response Chart in Appendix C2). This approach gave us the perspective of the farmers and institution as to what they thought was most important in working with a food hub.

With the interviewee's permission, we filmed each interview to use as footage for our videos. We planned to have the videos to be primarily testimonial based, with the testimonials coming from the interviews that we conducted. We used footage from our interviews with farmers as testimonials in our video aimed at bringing more farmers into the Food Hub. We felt that having a farmer talk about why working with the Food Hub has been beneficial for them would be the

most impactful for the intended audience of the video. We followed a similar approach in using footage from the interviews with institutions in our video aimed at bringing in more institutional buyers to the Food Hub.

Objective 5: Identify and Evaluate Pricing Strategies of Other Food Distributors

A food distributor is an organization that sells food. There are two subdivisions: the first type is made up of companies and food banks that gather fresh and processed foods to sell to local businesses, and the other are food hubs, which are “businesses or organizations that actively coordinate the aggregation, storage, distribution, and/or marketing of locally or regionally produced food” (USDA, 2013). In order to achieve the fourth objective, we broadened our research and looked to the pricing strategies of other food distributors in New England and New York. We conducted interviews with employees of other food hubs to see what worked in their pricing strategies and what did not work. Some strategies served as a model that the Food Hub could follow.

We first used interviews with Brian Monteverd, Stuart Loosemore, and Susannah Hinman to complete this objective (see interview questions in Appendices A1 and A2). During the interviews described in Objective 1, we sought information about other people who may have insight on successful pricing strategies. We also asked them what other food hubs to investigate. This is a useful research method called, “snowball sampling.” This practice involves interviewing one person, and then asking them for additional people to interview. Once you interview those other people you ask the same question, in essence, “snowballing” the number of interviews you have. It was useful because one source gave additional sources to research, and we used it in most of our interviews.

We also conducted case studies on other food hubs or food distributors using interviews and, when possible, analysis of financial data to assess what pricing strategies others food hubs use that could be an opportunity for the Worcester Regional Food Hub. We looked at profit margins, operational costs, and cost to consumers. We interviewed employees of other food hubs such as Red Tomato in Plainville, Massachusetts, Farm Fresh RI in Pawtucket, RI, and Capital Roots in Troy, New York to identify what their pricing strategies are and their profitability (See Other Food Hubs Interview Questions in Appendix D1). We used an interview response chart to record and compare responses from the food distributors. We then coded similar responses to find common approaches and data (See Other Food Hubs Interview Response Chart in Appendix D2). We chose these food hubs per a recommendation from the Food Hub directors. We used profitability as the benchmark because the Food Hub needed a pricing strategy that would generate a larger profit margin to cover its operating costs.

Objective 6: Analyze Trends in Food Pricing in Local Food Entities to Assess WRFH's Price Competitiveness

In order to achieve the sixth objective, we compared the prices of certain products across multiple distributors that operate around Massachusetts. By doing so, we were able to identify a current average and appropriate price for these produce items in this area. After an appropriate price was determined, we assessed how well the Food Hub was pricing their produce. We wanted to find out: was the Food Hub charging a market rate in relation to their local competition?

First, we interviewed the local institutions that the Food Hub frequently works with. In these interviews, we looked for information as to why that institution had chosen to buy from a certain distributor and if price was a factor in that decision. We also looked for information as to

where the Food Hub's prices stood in relation to some of the other distributors that these institutions considered purchasing their produce from (see interview questions in Appendix C1).

Secondly, we used terminal market pricing data from the USDA to determine the prices at which produce was being sold. Agricultural terminal markets are hubs, usually in major metropolitan areas, that serve as centers for trading and transportation. Pricing of produce at these terminal markets can be used as a benchmark for what price produce from farms are bought at (Market News, USDA). As part of this objective, we compared the prices at which the Food Hub bought produce from farms to the terminal market prices of the same items to determine if they were in comparable ranges.

Objective 7: Analyze and Compare Findings from Previous Objectives to Assess Possible Pricing Strategies for WRFH

Once we finished gathering data and completed our field research, we compiled this information into a comprehensive pricing strategy for our sponsors. We did this by keeping the sponsor's desired outcomes in mind while also creating a strategy that will be sustainable in the long run for the Food Hub.

First, we presented our pricing strategy recommendations to Mr. Monteverd, Mr. Loosemore, and Ms. Hinman and asked for feedback as to what they believed was the most beneficial and most relevant to the Food Hub's current situation. This helped us to narrow down the amount of data we had and led us to the information that was most relevant to the Food Hub's situation.

We then evaluated our data using a SWOT Analysis in order to identify strengths and weaknesses of the Food Hub's operations, as well as opportunities and threats to the Food Hub

based on data from other food hubs. We then compiled the interview data into the food hub comparison matrix, in order to easily identify the positive and negative aspects of each strategy for our sponsors (See Food Hub Comparison Matrix in Appendix D3).

Objective 8: Develop Marketing Videos for WRFH Directed Towards Farmers and Institutions

We created two videos to help market the Food Hub. The first video was directed towards farmers with the intent of illustrating the benefits of working with the Food Hub. We developed the second video with a focus on institutions looking to buy affordable, fresh food, from an easy to work with, and reliable supplier. We created a single storyboard for the videos as we wanted both of these videos to be created using a similar format. We researched other food hubs' advertisements and drew inspiration for the video from them. The initial storyboard grew as time went on and as we took footage of interviews, institutions, and farms. However, each video still started and progressed in the same style as the other. Both videos were primarily focused around testimonials from farmers and institutional representatives who currently work with the Food Hub. We combined footage from our sponsors and from farmers and institutions to create a cohesive, fact-based, narrative, centered around a series of questions that the interviewees answered.

When we interviewed both farmers and food distributors, we sought their permission to film their responses. With their written consent, we included some of their responses in the video. We primarily looked for footage with good sound bites that would speak to the target audience. From farmers, we used footage of them talking about the benefits of working with the Food Hub. From the institutions, we used footage of them explaining why they chose to buy from the Food Hub. Additionally, we used footage and pictures taken during our immersion experiences with the Food Hub to highlight the services the Food Hub provides. We used Camtasia editing software

and went through the same iterative process, seeking regular feedback from our project advisor, Corey Dehner, assistant project director, Laura Roberts, our two sponsors, Brian Monteverd and Stuart Loosemore, as well as fellow students at the Worcester Community Project Center, as we did when developing our storyboard. In the next chapter, we summarize and synthesize the results of completing the objectives laid out in this chapter using interviews, participant observation, and content analysis of business plans and studies of food hubs.

Chapter 4: Findings

The goal of the Worcester Regional Food Hub (Food Hub) is to strengthen the regional food system by bolstering the market for locally grown produce, as well as provide local produce to the Worcester community. In order to carry out this mission, the Food Hub must remain a financially viable organization, and to do so, it must have a pricing strategy that helps it remain viable. We collected data from multiple food hubs, farmers, and institutions in order to understand what makes a good pricing strategy and to gather operational ideas for the Food Hub. In this chapter, we discuss and analyze the results of the interviews with and content analysis of other food hubs. In the first section, we discuss how other food hubs operate and describe trends we noticed between them. Then, in the second section, we discuss how food hubs interact with their suppliers and how that could be applied to the Food Hub. Finally, in the third section, we look at how the food hubs interact with their customers and explore patterns that might align with our project goals.

Section 1: Food Hub Operations

In our analysis of food hubs from New York to Massachusetts, we discovered some common approaches to their pricing, funding, transportation, and sustainability of operations. The food hubs we focused on for the interviews and content analysis are mostly 501(c)3 nonprofit organizations. We chose to focus on nonprofit organizations because they are the most similar in business structure, goals, and services as the Food Hub, which is also a 501(c)3 nonprofit.

F1: The profit margin of a food hub is an important metric of its success and viability as a business. Food hubs should aim for a profit margin higher than 10%.

After discussion with the Food Hub's directors, Brian Monteverd and Stuart Loosemore, as well as its sales manager, Susannah Hinman, we learned that they would like to see their profit

margin raised to 18% in the future (S. Hinman, personal communication, October 25, 2017). Similarly, according to Sarah Bernstein, the Program Director of Food Systems Enterprise at the Farm Fresh RI Food Hub, explained that they apply an 18% price markup to achieve an 18% profit margin, and the sales cover more of its operational costs than grant funding does, so its profit margin serves as a good benchmark (S. Bernstein, personal communication, November 8, 2017). Additionally, Laura Edwards Orr, the Executive Director of the Red Tomato Food Hub in Massachusetts, shared that Red Tomato is attempting to raise its margin from 10% to 11%, in order to lessen its reliance on grant funding and donations (L. Edwards Orr, personal communication, November 3, 2017). Profit margin is simply the operating costs subtracted from sales revenue, but the price markup is the percentage applied by the food hub to the price the goods were bought at. The table below demonstrates the relationship between the two, and the multipliers that Red Tomato uses in their pricing to reach their specified margin on a sale.

Margin	Markup	Multiplier
1%	1.01%	1.010
2%	2.04%	1.020
3%	3.09%	1.031
4%	4.17%	1.042
5%	5.27%	1.053
6%	6.38%	1.064
7%	7.53%	1.075
8%	8.70%	1.087
9%	9.89%	1.099
10%	11.11%	1.111
11%	12.36%	1.124
12%	13.63%	1.136
13%	14.94%	1.149
14%	16.28%	1.163
15%	17.64%	1.176
16%	19.04%	1.190
17%	20.49%	1.205
18%	21.96%	1.220
19%	23.47%	1.235
20%	25.00%	1.250

Figure 4 - Margin and Markup Table (Margin and Markup Table, 2017)

In order to make a profit or cover other costs due to transportation or storage, Farm Fresh achieves its 18% profit margin by marking up all products by 18%. Red Tomato does not have a flat markup, so it must calculate the markup percentage needed to increase the profit margin. A consideration for the Food Hub is whether or not it wants a robust formula to calculate price markups based on its target profit margin.

F2: Food hubs set their prices based off of farmers' prices and transportation costs.

Analysis of the six food hubs we interviewed showed that many factors, primarily cost as well as supply and demand, affect pricing (See Other Food Hubs Response Chart in Appendix D2). In our initial investigations into how the Food Hub sets its prices, we learned that their pricing strategy is to apply a flat markup to the sum of the transportation cost and the farmer's selling price (S. Hinman, personal communication, October 25, 2017). This flat markup method ensures a consistent profit margin; however, it also means that **the Food Hub loses money on buying and transporting some crops**. Every food hub we interviewed set their prices in a similar manner, though with different markups. Some food hubs would, like the Food Hub, apply a flat modifier to all products. However, Red Tomato applies different markups on a farm-by-farm basis, which cumulatively gives them a 10-11% profit margin (L. Edwards Orr, personal communication, November 3, 2017). While this method is widely used by food hubs, it allows prices to be more easily affected by fluctuations in crop terminal market price, which is the generalized price of a crop within a given region based on its supply and demand at the time. Furthermore, the terminal market price for produce is affected by a myriad of other factors including: seasonality of the crop, regional climate, and disasters such as droughts or diseases (USDA Market News, December 5, 2017). The table below shows a SWOT analysis of different pricing strategies taken from our findings.

<p>Strengths</p> <ul style="list-style-type: none"> • Pricing strategy as it is now accounts for costs to obtain produce 	<p>Weaknesses</p> <ul style="list-style-type: none"> • Pricing strategy is flat markup will not help them achieve target profit margin
<p>Opportunities</p> <ul style="list-style-type: none"> • Flat markup that is high enough to achieve target margin • Excel sheet with different modifiers affecting markup, varying on a farm by farm basis 	<p>Threats</p> <ul style="list-style-type: none"> • Always paying the farmers' prices if it results in a loss for the Food Hub. • Taking occasional losses because of the spreadsheet's suggested markup

Table 3 - SWOT Analysis on Pricing Strategy

Additionally, all of the food hubs we interviewed have a strong mission, which is to give their farmers a fair price for their produce. A representative from Capital Roots, a food hub in New York, informed us that it puts a lot of importance on paying fair prices to farmers and pricing food so it is affordable to the communities it serves (personal communication, November 15, 2017). Furthermore, for all of these food hubs, one of the main reasons for their founding was to promote local agriculture in their given communities. This is a major reason why they will pay what the farmer thinks is fair for the crop. While these food hubs are businesses, they have strong missions to help the producers that supply them, which is why they will occasionally lose money on produce procurement in an attempt to give their farmers a fair price.

F3: Using alternative methods of transporting produce from farms or producers to the food hub may be a better option than owning trucks to collect produce from farms.

During our interviews with other food hubs, it became apparent that owning, maintaining, and utilizing a fleet of delivery trucks introduced a significant operating cost to each food hub. As a result, the food hubs we interviewed opted to either hire out transportation services or minimize the amount of time their trucks were on the road. Both Farm Fresh RI, and Intervale Food Hub in Vermont have their farmers deliver produce to the food hub (S. Bernstein, personal

communication, November 8, 2017; Intervale Food Hub Vendor Manual, 2012). In addition, in our interview with, Katherine Webb, the Finance Coordinator of Brown Market Shares, said that their farmers deliver produce once a week to their food hub (K. Webb, personal communication, November 17, 2017). Using other means of transportation for produce besides the truck owned by the Food Hub could be more cost efficient, based on the long trips to multiple farmers observed through a day of picking up produce (October 20, 2017 & November 3, 2017).

An alternative approach is to maximize trip value by increasing volume. Red Tomato hires independent trucks to collect and deliver all produce from farms. They also informed us that they prioritize the volume per delivery over the distance traveled, meaning that **for a food hub, the amount of produce that travels is more important to consider than how far it travels** (L. Edwards Orr, personal communication, November 3, 2017). Furthermore, not all farmers that the Food Hub works with have the ability to deliver the food to the Food Hub by themselves. We discovered a Microsoft Excel spreadsheet that calculates costs of delivery that could be useful in determining the most cost-efficient methods in an Iowa State University Paper titled, A Manager's Guide to Food Hub Operations (Lyons, 2017). This file accounts for the different costs associated with delivering the produce and maintaining the truck. It also compares the different transportation costs between a food hub delivering the produce themselves, delivering produce to another distributor (who would then distribute it to the customers), and hiring a transportation company. Using this Excel file, a food hub can determine if owning and operating their own trucks is a worthwhile investment at their current size.

Using the information from the Lyons paper as a starting point, we developed an Excel Spreadsheet for use by the Food Hub. The above transportation factors that Lyons discusses can then be used to influence the markup modifiers in the Food Hub's Excel Spreadsheet that we

drafted. The Food Hub can use to calculate pricing modifiers for their own application. We discuss this spreadsheet in more detail in Chapter 5, Recommendation 2.

However, while personally providing a pickup service may be helpful for some farmers, it may not be a financially viable decision for a food hub the size of the Worcester Regional Food Hub. From participant observation of two pickup and delivery trips with the Food Hub (October 30, 2017 & November 3, 2017), we found that the Food Hub travels out to farmers to pick up produce, but has a basic planning system using Google Maps and setting pickup times. Conversely, four out of the six food hubs we interviewed ask their farmers to aggregate produce among themselves, so that the food hubs can send one big truck to pick up the combined produce, thereby minimizing transportation miles and the number of trucks on the road. On the other hand, five of the six food hubs we interviewed as well as Pioneer Valley Growers Association and Brown Market Shares have farmers deliver produce directly to their warehouses. There are multiple avenues that the Food Hub can optimize in its transportation system. See Table 4, below for a table summarizing the different food hubs and their transportation strategies.

Red Tomato (501(c)3 Food Hub)	Farm Fresh RI (501(c)3 Food Hub)	Brown Market Shares (CSA)	Local Food Hub (501(c)3 Food Hub)	Common Market Food Hub
Fill independent trucks, direct delivery	Farmers deliver their produce, they have delivery minimums specified for RI, MA, and CT	Farmers deliver once a week	Growers deliver to them, only pick up if they can fill a truck	They have a procurement team that is in contact with farmers. Common Market has farmer aggregation/drop-off, hired out pickups, self-truck delivery

Table 4 - Table Comparing Transportation Strategies of Food Hubs We Interviewed

F4: Searching for grants and other alternative sources of funding may be worthwhile to the Food Hub

After the interviews, we found that all of them seek grant funding in addition to the revenue they accumulate from sales. Red Tomato has evenly split funding sources, with 50% of their funding coming from their sales and 50% from philanthropy. Their philanthropy consists of a variety of sources ranging from government grants, consultation services, and private donations (L. Edwards Orr, personal communication, November 3, 2017). Furthermore, in our analysis of Local Food Hub in Charlottesville, Virginia we similarly found that approximately one-third of their total revenue comes from sales, while the other two-thirds comes from grants and individual funding (Local Food Hub Frequently Asked Questions, 2017). While Red Tomato seeks to raise its profit margin to reduce its reliance on non-sales revenue, they still expect to have around 40% of their revenue come from philanthropy (L. Edwards Orr, personal communication, November 3, 2017). Additionally, Farm Fresh RI, informed us that despite their 18% profit margin covering their operational costs, that they still actively seek grant funding (S. Bernstein, personal communication, November 8, 2017).

Lastly, one of our team-members attended a marketing meeting that the Food Hub held with an independent company and found that ideas for joint operations with the incubator kitchen have potential for further development in the future (November 9, 2017). These operations include: processing produce to sell value-added products, conducting occasional cooking classes, or offering technical assistance for institutions using Food Hub produce, which we found that Common Market and Local Food Hub both offer (Jillian Dy, personal communication, December 1, 2017; Local Food Hub FAQ Sheet, 2017). See Table 5, below for a comparison of the different sources of revenue utilized by the food hubs we interviewed.

Red Tomato (501(c)3 Food Hub)	Farm Fresh RI (501(c)3 Food Hub)	Brown Market Shares (CSA)	Local Food Hub (501(c)3 Food Hub)	Common Market Food Hub
Half of revenue comes from 10% Net Sales Margin, half comes from philanthropy	18% Net Margin from sales+grants	Brown funds it, sales go back	Want a self-sustaining warehouse, still have grants and donations	Did not share a specific margin, but sales cover operational costs and procurement.

Table 5 - Table Comparing Revenue Sources of Food Hubs We Interviewed

Section 2: Interactions with Farmer/Producer

How a food hub interacts with its suppliers is critical to its continued sustainability as an organization. In this section, we discuss our findings pertaining to how food hubs interact with the farmers or producers they buy their goods from. We specifically discuss payment, communication, and relationships with farmers or producers. The various methods taken in creating and maintaining relationships with the farmers and growers open up a new area of service, cost reduction, and revenue for the Food Hub.

F5: Other food hubs do not use contracts, though trust between food hubs and producers is an important element of food hub operations

All of the food hubs we analyzed, as well as the Food Hub, do not have contracts with the farmers and producers they buy produce from. This means that pricing varies from farm to farm and there are not set prices. **We found that the food hubs mainly pay farmers’ asking prices with minimal negotiation, especially if farmers do not price with the wholesale market in mind.** These farmers price their products with farmer’s market prices, which are more expensive than bulk prices and makes them uncompetitive in the wholesale market. Additionally, some

farmers have shown distrust towards contracts, as some food hubs have been known to go back on their agreements. The food hubs try to build trust and strong relationships with farmers by paying them fairly and minimizing risk to the farmers due to lost crops or canceled orders. The Food Hub pays farmers what they ask except on rare occasions in which the Food Hub asks them to lower their prices (S. Hinman, personal communication, October 25, 2017). We found this happened with a farmer when our group visited Carlson Orchards farm. Though he was selling at wholesale prices, the Food Hub still required lower prices to remain competitive. Red Tomato and Farm Fresh RI have the same mentality as the Food Hub, which is to strengthen the relationships with farmers and pay what they ask. Through our interview with Sarah Bernstein at Farm Fresh RI, we also found that farmers price their produce with the 18% markup factored in, so that the customer is getting a fair market price, while the producer still earns what they need to operate (S. Bernstein, personal communication, November 8, 2017).

Another unique aspect of Farm Fresh RI's payment to farmers is that they pay farmers on a regular two-week schedule, regardless of if the customer has paid or not (S. Bernstein, personal communication, November 8, 2017). This practice reaffirms the relationship that Farm Fresh cultivates with its growers because of the consistency of payments. Many farmers are worried that agreements made with other food hubs will not be honored by the time the crop is grown (L. Edwards Orr, personal communication, November 3, 2017). By paying their farmers on a normal basis, Farm Fresh confirms their own end of the bargain, while also reassuring farmers that their continued partnership is a worthwhile one. This further illustrates these food hubs' dedication to helping local farmers remain sustainable. For instance, Brown Market Shares Food Hub RI, pays their farmers weekly for the portion of their next seasonal harvest (K. Webb, personal communication, November 17, 2017). Each of these food hubs

prioritize the trust and relationships that they have built up with their growers and suppliers well above the consistency that could come from a contract.

F6: Strong relationships with growers and buyers are crucial to many food hubs' success and opens doors to business opportunities.

We have found that food hubs that cultivate strong relationships with its growers and buyers create opportunities for themselves for future growth and price stability. In our interview with Red Tomato, we discovered that they emphasize maintaining strong relations with its growers similar to the Food Hub. Red Tomato uses these relationships to stabilize consumer prices and orders, and it frequently negotiates with its farmers to lower prices when product prices between two or more farms conflict. Furthermore, Red Tomato utilizes its relationships to organize aggregation between its participant farmers. Part of this relationship is planning for the next growing season by letting farmers know what the produce is in higher demand according to customers of the food hub (L. Edwards Orr, personal communication, November 3, 2017). In our interview with Harper's Farm and Garden, David Harper the owner of the farm, emphasized the importance of this when he said that it is helpful for their production when they have an idea of what crops he should focus on for a given season (D. Harper, personal communication, December 1, 2017). Strong relationships also allow food hubs to more efficiently pick up their produce using methods highlighted in F3.

Red Tomato maintains a strong relationship with their farmers by keeping in contact with them year-round. After the growing season ends, Red Tomato talks to their customers to see what crops they would like to see more or less of and to find out what they particularly liked or disliked. They then convey this information to farmers (L. Edwards Orr, personal communication, November 3, 2017). This process allows for easy communication between the customers and

farmers, and leads to an even more successful season the next year. In our interview with David Harper, he said it would be helpful to have a list of suggested crops for the next year. (D. Harper, personal communication, December 1, 2017). If the Food Hub was able to provide such a list to their farmers, it would allow for better communication between the Food Hub, their customers, and the farms they work with. Farm Fresh RI keeps their customers updated on new produce by sending out their availability lists twice a week, which helps the farmers, who post their individual products on Farm Fresh's website (S. Bernstein, personal communication, November 8, 2017). Each of these food hubs use the rapport built up with their farmers and customers to lower their operational costs and to create a more efficient process of bringing the local produce to the local people that want it as described in F3 and F5.

F7: Working more closely with wholesale farms may be a viable financial strategy to raise the volume of produce supplied to the Food Hub's institutional customers.

All six of the food hubs we interviewed either worked exclusively with wholesalers or a majority of their farmers were wholesalers. Red Tomato and Farm Fresh RI, work exclusively with wholesale farms and are thus able to consistently keep up a large volume of produce at prices close to terminal market prices while supplying a wide range of customers such as institutions, grocery stores, buyers' clubs and restaurants. (L. Edwards Orr, personal communication, November 3, 2017; S. Bernstein, personal communication, November 8, 2017). Additionally, Local Food Hub evaluates new potential producers' ability to supply products before forming a relationship (Local Food Hub Frequently Asked Questions, 2017). This trend indicates that working with wholesale farmers or simply determining whether a farm can supply sufficient produce allows a food hub to better meet its volumetric demands. This stability would allow the Food Hub to supply its customers with a larger amount of produce for smaller prices.

Section 3: Interactions with Customer

In our interviews with food hubs, we discovered how they interact with the buyers they sell and distribute their produce to. While trends exist between them all, each food hub has a unique spin to the programs it offers to and the relationships it fosters with its customers. The food hubs we interviewed work with a variety of customers, including institutions. The Worcester Regional Food Hub works almost exclusively with institutions like colleges and the public schools in Worcester County, as well as some smaller buyers like food pantries (S. Hinman, personal communication, October 25, 2017). We found all of the food hubs we analyzed work with institutions as well as grocery stores, restaurants, hospitals, nursing homes, buyers' clubs, and individual consumers. In this section we discuss our findings related to how food hubs communicate with buyers, implement special programs, and make decisions about discounts or markups.

F8: Maintaining consistent contact and providing regular updates to food hub customers is a common thread in sustainable food hubs operations.

Communication is a simple but important aspect of maintaining a healthy business relationship. Most of the food hubs we analyzed send out weekly or bi-weekly updates on product availability and price lists based on our interviews with Red Tomato, Farm Fresh, and Marty Dudek, the Dining Director of the College of the Holy Cross, an institutional buyer from the Food Hub. In our interview with Laura Edwards Orr from Red Tomato, we found that Red Tomato debriefs customers at the end of the growing season about how the season went, the products that were in the highest demand, and what products could potentially be in the highest demand in the next growing season. They then relay this information to their farmers to give them an idea of what crops were most successful and desired by customers. Through our interview with Sarah Bernstein

from Farm Fresh RI, we found that they send out bi-weekly emails and uses their website actively to advertise and sell produce. This allows their customers to pick the produce from the farms they desire (S. Bernstein, personal communication, November 8, 2017).

Although Brown Market Shares and Intervale food hub operate more like a CSA program, they serve as a good example of communication with customers, as both organizations provide detailed listings of produce available and farmers that provided it, which strengthens the producer-consumer relationship (K. Webb, personal communication, November 17, 2017; Intervale Food Hub Vendor Manual, 2012). Table 6, below compares the communication strategies between farmer, food hub, and customer practiced by the food hubs we interviewed.

Red Tomato (501(c)3 Food Hub)	Farm Fresh RI (501(c)3 Food Hub)	Brown Market Shares (CSA)	Local Food Hub (501(c)3 Food Hub)	Common Market Food Hub
Debriefs customers at the end of growing season to obtain feedback for farmers	Farmers upload own variabilities to website and food hub sends bi-weekly availability emails to new and returning customers	Communicates with farmers weekly and provides detailed listings of produce and the farmers who grew it	---	Procurement team communicates with farmers and plans crops a season in advance based on forecasted customer demand

Table 6 - Table of Different Farmer-to-Customer Communication Practices

F9: Giving different program options for customers other than wholesale options may prove beneficial to the Food Hub.

In our interview with Red Tomato, we learned that they primarily use volumetric discounts to draw in new customers. Once they have established a working relationship with the customer, they will then discontinue the discount and bring the prices to an agreed upon rate. This rate will then remain constant throughout their time working with Red Tomato (L. Edwards Orr, personal

communication, November 3, 2017). Farm Fresh RI, on the other hand, offers no discounts whatsoever. They mark up everything equally by 18%. However, they will speak with their farmers on occasion to lower their asking price. This lowers the final selling price indirectly by ensuring a lower cost to markup (S. Bernstein, personal communication, November 8, 2017). Additionally, this also cements Farm Fresh's 18% profit margin by cutting out any deviation in markup rate. The Food Hub can potentially use this information when crafting its prices. It could take parts of each other food hub's strategies onto its own.

F10: While the WRFH reduces its markup rate with volume purchased, the other food hubs use discounts sparingly if at all.

Offering different programs can diversify and increase the customer base, thereby increasing profit. These different programs allow consumers flexibility of buying, which may bring in more customers to the Food Hub. While Red Tomato offers wholesale services just like the Food Hub, it also offers direct delivery options to its customers (L. Edwards Orr, personal communication, November 3, 2017). **The option of direct delivery may open up new markets to the Food Hub should it choose to implement it.** These practices entail the consumer ordering smaller-than-wholesale amounts, which Red Tomato facilitates for an increased markup. Usually, Red Tomato will set its prices similarly to the Food Hub: taking the cost of buying the produce and the transportation and marking it up by 10-11%. However, with its Direct Delivery option, Red Tomato only takes the buying cost and marks it up 30-35%. While this offers a smaller profit margin of only 7.5% as opposed to its normal 10-11%, Direct Delivery caters to an additional market. Furthermore, Farm Fresh RI, functions as a pseudo-CSA, by allowing its farmers to set their own prices and marking them up unilaterally by 18%. This leads to price variation amongst its products. However, Farm Fresh organizes its web postings by farm, posts available products by

farm, and constantly updates the availability lists for its customers (S. Bernstein, personal communication, November 8, 2017). This allows customers to choose their farmers, produce, and price. This satisfies both the farmers’ needs and Farm Fresh’s. In this function, Farm Fresh acts more as a facilitator of trade than as a retail entity (S. Bernstein, personal communication, November 8, 2017). The table below presents a SWOT Analysis of program options discovered in our findings.

<p>Strengths</p> <ul style="list-style-type: none"> • Incubator Kitchen • Relationship with REC Inc., able to connect with its programs to open different sources for produce 	<p>Weaknesses</p> <ul style="list-style-type: none"> • Not a lot of programs in terms of wholesale aggregation and distribution
<p>Opportunities</p> <ul style="list-style-type: none"> • CSA with colleges/universities of Worcester • Direct delivery with a higher markup 	<p>Threats</p> <ul style="list-style-type: none"> • Lack of interest • Approval from colleges/universities • Consistent supply of produce

Table 7 - SWOT Analysis on Other Programs

F11: There may be a market in universities and schools for fresh, locally grown food.

From our interviews with Katherine Webb, the Finance Coordinator from Brown Market Shares, we learned about how Brown university’s students, staff, and teachers participate in a CSA program called Brown Market Shares. In this program, the customers buy a “share” of a farm’s crops, and the amount of produce they then receive is dependent on the number of shares they hold. We also found that Brown University funds part of the program (K. Webb, personal communication, November 17, 2017). Furthermore, from our interview with Marty Dudek, the Dining Director of the College of the Holy Cross, we learned that colleges like Holy Cross enjoyed the freshness of locally grown food, as opposed to food shipped in from distant farms (personal communication, November 10, 2017). Corroborating this, Ellen Nysten, Director of Food Services

for Webster Public Schools, also commented about the benefit of having access to the locally grown produce that the Food Hub provides (personal Communication, November 14, 2017). These interviews show that colleges and schools are receptive to fresh, local agriculture and that students and faculty may also be interested themselves. Furthermore, Worcester Polytechnic has a regular farmer's market in the fall. Therefore, there may be a market for selling locally grown food directly to these potential customers. Our next chapter will discuss our recommendations to the Food Hub based on key findings discussed in this chapter.

Chapter 5: Recommendations

Based on our findings, we have developed six recommendations for the Worcester Regional Food Hub (Food Hub) that will help them implement a more sustainable method of pricing their produce. Specifically, the recommendations will help the Food Hub decide the most important components of our research to include in its pricing strategy as well as its normal produce aggregation operations. The Worcester Regional Food Hub and other developing food hubs will be able to use these recommendations to better understand how to price their produce and improve their financial viability so that they can establish themselves and provide local food to the communities they support while strengthening regional food systems.

[Recommendation 1: We recommend that the Food Hub strive for a net profit margin of 18% by pricing products accordingly and investigating ways to increase sales revenue](#)

Based on F1, we recommend that the Food Hub focus on attaining an 18% net profit margin. Two out of the six food hubs we interviewed have a goal of achieving a net profit margin of at least 10% while the Food Hub, itself, is striving for 18%. The Food Hub should therefore markup its produce based on its own operating cost and find opportunities to generate more sales revenue, such as using the Food Hub's Incubator Kitchen to produce value-added products or investigating the feasibility of a Community Supported Agriculture Program (CSA).

Based on F3, F5, and F6, when considering adding a new farm or institution to its network, the Food Hub should consider the costs that would be associated with either picking up or distributing produce, the amount of produce that each would supply or purchase, and opportunities arising from the farm or institution such as special transportation or purchasing agreements. The Food Hub should continue to foster strong relationships with their producers and customers to create opportunities in the future for these potential shipping agreements, contracts, or other

beneficial deals to either lower costs such as producers aggregating among themselves or increase produce volume for pickup trips.

[Recommendation 2: We recommend that the Food Hub use the Microsoft Excel sheet we have created to determine price markups](#)

As a result of our findings, we have developed a Food Hub Excel Spreadsheet for use by the Food Hub. The Spreadsheet is interactive and flexible. The user can determine the modifiers that affect the final markup, such as transportation miles needed to pick up produce, seasonality, and if storage is necessary, as well as how much each modifier should affect the final markup. The user then checks off which modifier is applicable and the Spreadsheet applies the percentage markup to the inputted item(s). Based off of this markup modifier, the Food Hub can input the different products that a given farm produces and their cost to the Food Hub to obtain a final selling price. There is also a save function in the Spreadsheet to allow the Food Hub to save the prices and markup for a given farm and date. We developed detailed instructions for use of the Spreadsheet, and included them within the file so they are easily accessible.

The recommendations in this chapter will help in determining what the key modifiers in the Spreadsheet should be and their value. We recommend that when using the Spreadsheet, the Food Hub use it on a per-farm basis for simplicity of pricing and recordkeeping as well as the farmers' own needs. We also recommend the Food Hub consider factors such as seasonality, supply and demand, and transportation costs for their pricing based on F1 and F2.

[Recommendation 3: We recommend that the Food Hub use price markups that are flexible and vary on a farm by farm basis](#)

After conducting interviews and content analysis of other food hubs, we found that pricing markups of produce sold to food hub customers is an area with little established research or

concrete strategies. When deciding on the markups of food purchased from farms or producers, **we recommend the Food Hub consider their net profit margin, terminal cost of the produce, the cost of transportation needed to pick up and deliver it, and the cost to store it.** In F1, we identified that three of the six food hubs we interviewed try to attain a net profit margin of at least 10%. This number includes the Food Hub, which is trying to attain 18%. Additionally, in order to improve the profit margin, the Food Hub must cover its operational costs.

As shown in F2, the price markup must be flexible enough to account for the supply and demand of a given item. It should also account for the volume purchased by the customer, perhaps lowering the markup for new customers that buy high volume and increasing it over time. Based on F9, **we recommend that the Food Hub offer volume discounts strictly to new customers because other food hubs use discounts sparingly.** Lastly, from F2, **the Food Hub should pay attention to terminal market pricing for Boston or New York to monitor supply or demand of produce items at a given time and markup accordingly.**

[Recommendation 4: We recommend that the Food Hub minimize transportation costs by planning pickups and deliveries more efficiently.](#)

A common trend among the food hubs that we interviewed was that they minimize the usage of their trucks. In F3, we identified a food hub that focused more on filling their trucks for pickups and deliveries than the distance being traveled. We recommend a balance of these ideas so that the Food Hub can reduce transportation costs while continuing to work toward their mission of bringing local food to residents. Owning, maintaining, and utilizing delivery trucks introduces a multitude of costs to the Food Hub's operational costs. In order to reduce truck usage, pickup routes should be planned to minimize the distance travelled while maximizing truck space used. As mentioned in F3, **one of the ways that the pickup routes could be planned is to have**

farmers, who are located near each other, aggregate their produce among themselves to one location. This would allow the Food Hub's truck to only have to make one stop to pick everything up, as opposed to travelling between all of the farms and taking up more time.

Additionally, since volume of delivery is more important than distance traveled, if a farm cannot aggregate with another farm, Food Hub can communicate with the farm to estimate how much truck space will be filled by their order. From F7, having a strong relationship to a farmer and maintaining clear communication will be necessary for this practice. **For smaller orders we recommend the Food Hub use a table depicting how many cases fill up a single pallet.** From F7 though, if the Food Hub were to start working with more local wholesale farms, the issue of volume would be less important as the wholesale farm will guarantee a steady, high-volume flow of produce.

If it is not possible to completely fill the truck on a pickup day, then **we recommend the Food Hub establish a pickup/delivery minimum.** This minimum should account for the distance being travelled, the amount of time the truck driver is out, and the potential price of the produce. The proposed Spreadsheet, or other similar program, should be able to detail the factors and calculate the costs of sending the truck out. The profits from selling the produce should be enough to cover these costs. If not, then it may not be worth sending the truck out and instead it would be more beneficial to wait until the truck can be filled. The table below presents transportation strategies in a SWOT analysis.

<p>Strengths</p> <ul style="list-style-type: none"> • Food Hub owns its truck through the Worcester County Food Bank • Minimums in place 	<p>Weaknesses</p> <ul style="list-style-type: none"> • Pick up from most farmers, some result in losses • cost/liability of owning trucks
<p>Opportunities</p> <ul style="list-style-type: none"> • Hire out independent trucks (Red Tomato) • Farmers deliver to the food hub (All of the food hubs) • Farmers aggregate produce among themselves (3 out of 6 food hubs) 	<p>Threats</p> <ul style="list-style-type: none"> • Location of the farmers • Willingness of farmers to aggregate • Farmers/Producers that would rather deliver produce to institutions themselves, without the Food Hub

Table 8 - SWOT Analysis on Transportation

Recommendation 5: We recommend that the Food Hub investigate the implementation of other programs besides wholesale distribution

From F11, we recommend that the Food Hub investigate the feasibility of implementing other programs besides wholesale produce distribution and renting the Incubator Kitchen as to introduce other revenue sources and diversify their operation. **We specifically recommend that the Food Hub consider offering a CSA program, a joint operation with the Incubator Kitchen, occasional classes, or technical assistance for institutions’ kitchen staff,** from F4.

Because of our interview with Katherine Webb, the Finance Coordinator from Brown Market Shares, we recommend the Food Hub explore the possibility of developing a CSA-type program with the colleges of Worcester. Based on the responses from the dining service at Holy Cross, we found that colleges could be an enthusiastic source of support of local produce, and some may even help fund part of the program, as Brown University does (F11). A CSA program would enable the Food Hub to buy more produce from farmers and allows them to use a higher markup since it would not be a wholesale quantity or quality. We base this on our interviews with Farm Fresh RI, whose method of pricing its products makes it operate similar to a CSA, and Brown

Market Shares, which is a small-scale CSA (K. Webb, personal communication, November 17, 2017).

Recommendation 6: We recommend that the Food Hub work with customers to get feedback on the past year's harvest and on what they want more of, and that the Food Hub work with farmers to plan ahead for next year's crop based off that feedback.

From F6, we learned that farmers appreciate knowing what crops to grow more of before the planting season. Therefore, **we recommend that the Food Hub have in-person conversations with representatives from its institutional customers after each growing season to obtain feedback on what they liked or disliked about the food and service and about what they want more of for next year.** This would allow the food hub to better assess their own performance and keep tabs on what items are particularly popular. The Food Hub can then talk with its farmers to work out more optimized growing plans to fulfill this demand. As F7 and F8 show, communication is crucial. This recommendation would facilitate better, more transparent communication between customer and farmer, while also getting the customer what they want, in the quantities that they want. It would also benefit the farmers because they would be able know what to plant and how much land to allocate to it ahead of time so that they can make the most use out of their land.

Chapter 6: Conclusion

Food hubs are an important part of a regional food system because of the economic, environmental, and health benefits they can provide communities. They focus on supporting local farmers and strengthening regional food systems using a more efficient food supply chain. As more food hubs begin to open around the country, they will continue to face the same challenges as the Worcester Regional Food Hub because they are a relatively new movement, and questions on their operations and business strategies remain. Each new food hub will have its own struggles to overcome, but all must contemplate best strategies to price produce.

It is crucial for food hubs to become economically viable and sustainable organizations because their mission to supply nearby communities with locally grown, nutritious produce is an important one. We believe that the Food Hub's potential new pricing strategy will provide a roadmap to help guide new food hubs towards sustainable operations. We also hope that our videos will inspire others to bring more produce to local communities through new and existing food hubs. With the Worcester Regional Food Hub, we believe that our recommendations, Excel pricing spreadsheet, and videos will serve as a strong first step towards sustainable operations and future growth. We believe that with enough time, effort, and drive, the Food Hub can make a difference on the food insecurity present in the City of Worcester.

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Appendices

Appendix A: Worcester Regional Food Hub Interview Questions

Appendix A1: Interview Questions for Our Sponsors

Question 1: We've been looking on the Worcester Regional Food Hub's website. It's impressive what programs you have implemented in so short a time span. What have you liked about working with the food hub so far? How did come to be?

Question 2: What sort of outcomes are you looking for from the pricing strategy?

Question 3: What is the pricing strategy currently? Are there certain angles we should focus on in our approach? How do you currently price your produce? Is it a collective system, or do individual farmers set their own prices?

Question 4: What do you see as the main role of the food hub in Worcester?

Question 5: Who do you see as your target group? Who are you looking to connect to the most?

Question 6: In our research, do you want us to focus on any particular food hubs or local distributors to analyze their models?

Question 7: We understand that the Food Hub is relatively new, can you talk about how you market yourselves currently?

Question 8: Could you direct us to any food hubs whose models you like? Do you know anyone we could talk to about this project?

Question 9: What would be the best way to contact you? Can we contact you if we have questions?

Appendix A2: Interview Questions for Susannah Hinman

Preamble:

We are a group of students from Worcester Polytechnic Institute in Massachusetts. We are participating in a research project with the Worcester Regional Food Hub. The goal of our project is to create a more profitable pricing structure for the food hub by developing a pricing formula, as well as methods to educate farmers and potential purchasers about the food hub. We are conducting interviews with farmers to learn more about the factors that influence their involvement with Food Hubs or other food distributors, as well as factors that influence the prices at which they sell their produce to food hubs. We believe their responses will give us a better understanding of how the Worcester Regional Food Hub can better connect to local farmers and how to develop a better pricing strategy.

Your participation in this survey is completely voluntary and you may withdraw at any time. Please remember that your answers are *confidential*. No names or identifying information will appear on the questionnaires or in any of the project reports or publications without consent.**

This is a collaborative project between the Worcester Regional Food Hub and Worcester Polytechnic Institute. If interested, a copy of our results can be provided at the conclusion of the study.

** We only included the names and titles of people who gave us their permission to do so

1. Could you clarify the sales history of potatoes you sent to us? Specifically, the vendor codes, what FOB means, what trans means, and what the pallet pricing means.
2. How far back into the food supply chain should we be investigating?
3. Should we consider the prices the Food Hub pays to farmers for produce?
4. Should operational costs such as transportation, storage, or employee salary be included into the pricing strategy? Should we investigate what would be reasonable transportation costs?
5. Should we look into adjusting prices paid to farmers? For example, asking farmers to lower prices in exchange for higher volume?
6. Do you want us to provide estimates on how much should be paid for produce?
7. What are the crops of interest? Do these crops change in terms of priority?
8. Can we talk to the institutions that work with the Food Hub about pricing?
9. What other food hubs or people should we talk to that would be in a similar market as the Food Hub?

Appendix B: Farmers

Appendix B1: Farmer Interview Questions

Preamble:

We are a group of students from Worcester Polytechnic Institute in Massachusetts. We are participating in a research project with the Worcester Regional Food Hub. The goal of our project is to create a more profitable pricing structure for the food hub by developing a pricing formula, as well as methods to educate farmers and potential purchasers about the food hub. We are conducting interviews with farmers to learn more about the factors that influence their involvement with Food Hubs or other food distributors, as well as factors that influence the prices at which they sell their produce to food hubs. We believe their responses will give us a better understanding of how the Worcester Regional Food Hub can better connect to local farmers and how to develop a better pricing strategy.

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1. How long has the farm been in operation? Can you tell us more about the farm?
2. What is/are your primary method(s) of distributing your produce? How do you think these methods work for your farm in particular?
3. Has your farm had any experience with other food distributors, specifically food hubs? If so, what was it like?
4. How long have you been working with the WRFH?
5. What are the advantages/benefits of working with the Food Hub for your farm in particular?
6. What are the benefits of selling your produce wholesale?
7. How has working with the WRFH affected your farm?
8. In your opinion, how does the WRFH impact the local community?
9. Are you satisfied with the business you do with the WRFH? Do you feel satisfied with pricing or the distribution methods they are practicing?
10. What attracted you to working with the WRFH?
11. Is it easy to get in contact with the WRFH?
12. How did you hear about the food hub? Was the information easily accessible if it wasn't by word of mouth?
13. How are day-to-day operations with the Food Hub carried out? What are some of your personal gripes? What do you particularly like about working with the WRFH?

Appendix B2: Farmer Response Chart

Themes	Carlson Orchards (Frank Carlson)	Oakdale Farms (Mike Smith)	Harper's Farm	Foppema's Farm	Flat's Mentor (World Farmers)
Farm/provider background, how relationship with Food Hub started	Been in operation since 1977, farm operated by the Carlson family. Relationship with the Food Hub started because Frank Carlson knew representative from Worcester Public Schools and got connected with the REC.	Been open for 75 years in Rehoboth, MA. Run by the Mike Smith and his family (6 members)	Opened by Great Grandfather in 1897. Moved to the current location in 1903. Diversified fruit and vegetable farm. Primarily sell retail but they grow extra for wholesale.	Open since 1986. Northbridge location hasn't changed. In 2012 they bought an orchard which added 180 acres (40 acres of mature apple trees).	Employee from Flat's Mentor was on a committee for the Food Hub, this is how the relationship started. The provider operates on one 60 acre plot of land with multiple growers who have their individual plots. They saw an opportunity for another sales outlet for smaller amounts of produce. Short delivery route as well.
Distribution Methods and Wholesale Experience	Pick-your-own, wholesale, and retail buyers. Has experience with wholesalers. They work with a lot of distributors but not a lot of food hubs.	They have a small retail store, pick-your-own, CSA, farmers' market, used to do a lot of wholesaling but are cutting back. These means are flexible from year to year.	Primarily sell through their farm stand and farmer's markets. They also do a CSA program. Sell their extra produce through wholesale. Have done wholesale to other farm stands, but that was smaller quantities than with the Food Hub	Their farm stand. The go to farmer's markets in Boston, Natick, Grafton. Also sell their extra produce through wholesale. Typically to a distributor in Providence, not much with the WRFH.	They have trucks but prefer the Food Hub to continue picking up with its truck, as this is beneficial for World Farmers.
Advantages/Disadvantages of Wholesale	Advantage is that wholesale provides additional market for produce grown at Carlson Orchards. Disadvantage is that the farm doesn't always get them the best price, and oftentimes negotiations result in Carlson Orchards taking a lower price.	Advantage is that it is another market for farm produce. Also it helps the farmer not have to worry so much about logistics. The disadvantage is that Brian Monteverdi is looking for product in September, October, November when institutions are back in school, while Mike's biggest months are June, July, and August. Has to backorder product.	Have an outlet to sell extra produce. They grow extra so that their farm stand does not run out, so this is a way to sell whatever is left over. Creates an outlet for produce later in the year.	Wholesale prices are lower than retail. However, they will sell more through wholesale. Their excess bulk produce will not go to waste. In the video he said, "The trees are going to grow apples regardless, so you might as well try to sell them all."	Price points are unclear, don't know how they compare to other farms' produce.
Relationship with Food Hub	Relationship has been strong. Information is accessible and the line of communication is open and clear. Happy to be helping the Food Hub and the Grow Local movement. Would rather see more local produce being sold than outside markets like Washington State.	Satisfied with the ease of communication. They keep a good relationship with WRFH from the beginning, but weary of the pricing because it is new territory. Price points are unclear, don't know how his prices compare to other farms.	It's been good so far. Easy to stay in contact with. They send Harper's a flyer to see what they have available. Harper's lets them know what they have coming up in the next month or so.	A little dissatisfied with the relationship. When the Food Hub was starting out it sounded like there would be a lot of business but th orders never really started to come in. Would like to do more business if it could work out for both parties.	Value the people there, always accessible when they need to contact the Food Hub. Satisfied with communication and orders purchased.
Effects of working with Food Hub	Working with the Food Hub has specifically opened a market for Carlson's smaller sized apples by offering them to Worcester Public Schools, which assures them a better price than selling them off for juicing.	---	Have an outlet to sell their extra produce to. Selling larger quantities wholesale than they did when selling to other farm stands. Extends their growing season by a few more months. Because of this, they aren't forced to make all of their money in six months. Now they have a few more months to spread the work out; it creates a buffer for them.	No significant effect. Never really did a lot of business with them so it never really had an effect. Liked that they could sell their excess bulk produce to a local distributor and that the produce went to local people.	Another sales outlet and ability to sell a diversity of produce to the Food Hub in smaller amounts.
Suggestions for Improvement	---	---	A list from the Food Hub at the end of the season about what they want for the next season. They began planning for the next season during winter so a list like this would be really helpful in planning for the next season.	Would like to be able to do more business. Mentioned that they could deliver to Holy Cross, or other buyers. Perhaps the reduced transportation costs for the Food Hub would offset the higher price from Foppema's.	More pre-season planning to convey supply and demand, open to the idea of in season contracts that would provide World Farmers an idea of what specific crops to grow for specific institutions, believes a wider collaboration with all parties involved in the Food Hub would be beneficial, more value added products?

Appendix C: Institutions

Appendix C1: Institution Interview Questions

We are a group of students from Worcester Polytechnic Institute in Massachusetts. We are participating in a research project with the Worcester Regional Food Hub. The goal of our project is to create a more profitable pricing structure for the food hub by developing a pricing formula, as well as methods to educate farmers and potential purchasers about the food hub. We are conducting interviews with farmers to learn more about the factors that influence their involvement with Food Hubs or other food distributors, as well as factors that influence the prices at which they sell their produce to food hubs. We believe their responses will give us a better understanding of how the Worcester Regional Food Hub can better connect to local farmers and how to develop a better pricing strategy.

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- 1) Could you tell us about your organization's mission? How does the Worcester Regional Food Hub help you to achieve this?
- 2) How has been your experience working with the Worcester Regional Food Hub?
- 3) What criteria does the Worcester Regional Food Hub meet in order for you to work with them?
- 4) Have you worked with any other local food distributors or food hubs in the past?
 - a) If so, how does working with the Worcester Regional Food Hub compare in terms of pricing, ease of contact, or quality of service?
- 5) How do you feel about the services provided by the Worcester Regional Food Hub? These services may include the ease of ordering, their delivery schedule, or the mix of produce available at any given time.
- 6) How did you hear about the Food Hub? Was the information easily accessible if it wasn't by word of mouth?
- 7) Is it ok for us to follow up? If yes what is the best way to reach you (email, phone, etc.)?

Appendix C2: Institution Response Chart

Themes	Marty Dudek (Holy Cross)	Ellen Nylen (Webster Public Schools)	Dianne Mann (Loaves and Fishes)	Linda Jesse (Holy Cross)	Worcester Public School
Relationship with Food Hub, How it started	When they started this project they reached out to him again to see if he'd be interested in helping out. Holy Cross has a commitment to purchase as much locally grown food as possible, but sometimes it is difficult to get the food there. The WRFH helps with this problem. Working with the WRFH as provides the peace of mind that the produce is clean and safe to eat.	---	Learned about the Food Hub through the Worcester County Food Bank, experience has been great. The people who come thoroughly enjoy the amount of produce available because of the Food Hub. People enjoy the freshness.	Wonderful, they've been great to work with, it's been a collaboration to see what Holy Cross wants farms to provide.	The Food Hub, as an aggregator, has given the district the ability to procure additional varieties of produce from farms previously not in the purchasing mix
Benefits of working with the Food Hub	The quality and freshness of locally grown produce; it doesn't travel across the country to get here. Helping the local economy, keeps money and jobs in the area. Satisfaction of helping out a small farm by selling produce to the WRFH, these small farms are able to stay in operation and are able to be passed down through generations.	The WRFH are easy to order local produce from them and they gave us all the items that we need in our food program service	Ability to provide access to fresh produce to people who normally do not have access or means to purchase fresh produce	Provides good variety of local produce to the students of Holy Cross. Helping the local economy, supporting local farms to help them stay successful. The freshness, the quality, and the ability to use produce that ordinarily wouldn't get used (ugly food movement).	Because of the large volume of produce weekly, the Food Hub submits pricing on Monday for comparison among other distributors
What led you to work with the Food Hub?	Holy Cross tries to purchase as much local produce as possible. If local fresh produce is available, they tend to purchase that over other "commercial" options. The WRFH helps to provide access to local produce.	1- Suppleness especially in a small order delivery, the location, and the accessible to schools, 2- The good relationship that they built with us related to product quality and their prices	Ability to see the availability list once a month and order fruits and vegetables that "wouldn't be available to us otherwise	Part of Holy Cross, so response would be similar to Marty Dudek's	According to Mass Purchasing Law 30B, the lowest price per item from the most responsive bidder must be chosen
Experiences with other Food Hubs	This is the first Food Hub they have worked with. As long as they are charging fair market prices, they will continue to buy.	Yes they worked with out of state food hub and it's very hard to get the orders delivery in the certain time	No, never thought to purchase from a produce company.	See Marty's response	Yes, the same
Thoughts on services provided by Food Hub	Ease of communication and ordering are great. If there is ever any issue, the WRFH deals with and fixes it very quickly. They are also looking into buying "less-than-perfect" produce, so that farmers don't have to pick out only the perfect pieces (i.e. carrots that are straight...)	Everything is excellent, the quality and the quantity is great for 1600 students daily with specific liability. Suppleness especially in a small order delivery, the location, and the accessible to schools. The good relationship that they built with us related to product quality and their prices	Pricing: maybe if the farmers understood where the food was going to (food pantry), that the farmers would bring down the price. Ease of communication has been great. One bad experience with lettuce, but it was fixed quickly, otherwise quality is awesome.	Maybe catch up in the offseason, so Holy Cross can plan to buy something in higher amounts for the next season.	Same professional approach as the other suppliers
How did you hear about the Food Hub? Was the information easily accessible if it wasn't by word of mouth?	Marty Dudek had personally worked with the REC in the past.	Was not sure if they heard about them in marketing Fair or By Worcester Regional Food Hub	Many meetings attended at food bank, really active there	See Marty's response	We were approached for consideration as a supplier
What produce do they commonly buy?	A lot of apples, potatoes, squash, basically take as much local produce as they can get	The top five items are: cherry tomatoes, baby spinach, carrot sticks, chop remains lettuce, and celery sticks	Kale, brussels sprouts, peaches among many other items	Apples, squashes, potatoes, Hubbard squash, candy roasters	Fruits in season such as Apples, Broccoli Florets, Carrot Sticks, Celery Sticks, and Dark Green Lettuce(s). When local is not in season, we will then purchase citrus fruits, pears, etc.

Appendix D: Other Food Hubs

Appendix D1: Other Food Hubs Interview Questions

We are a group of students from Worcester Polytechnic Institute in Massachusetts. We are participating in a research project with the Worcester Regional Food Hub. The goal of our project is to create a more profitable pricing structure for the food hub by developing a pricing formula, as well as methods to educate farmers and potential purchasers about the food hub. We are conducting interviews with farmers to learn more about the factors that influence their involvement with Food Hubs or other food distributors, as well as factors that influence the prices at which they sell their produce to food hubs. We believe their responses will give us a better understanding of how the Worcester Regional Food Hub can better connect to local farmers and how to develop a better pricing strategy.

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This is a collaborative project between the Worcester Regional Food Hub and Worcester Polytechnic Institute. If interested, a copy of our results can be provided at the conclusion of the study.

** We only included the names and titles of people who gave us their permission to do so

1. Is your organization a nonprofit? If so, what type is it?
2. What are the goals of your organization?
3. Who is your primary customer? Please be as specific as possible. For example, if you work with restaurants, are they chain restaurants or are they small “mom-and-pop” restaurants?
4. How many farmers do you work with?
5. How do you primarily get produce from your farmers?
6. Are there other sources where you get produce from? If yes, how do you primarily get the produce from them?
7. Do you have different programs established for your customers? What are the profit margin goals for these programs?
8. What are your order minimums for pickups and deliveries?
9. How far are you willing to travel for pickups and deliveries? What effect does distance have on pricing?
10. How transparent are you with your customers? In regards to spraying and pesticide use, if the farms are certified organic, etc.
11. Do you use volume discounts? If so, how do they calculate the prices for each “tier” of discounts?
12. What are the profit margins that you try to obtain?
13. Do your price mark ups cover all costs or do you seek outside funding?
14. Do your mark ups vary on a farm-by-farm basis?
15. Do you contract farmers/buyers for X amount of produce?
16. Are there other revenue sources besides Grant Funding and selling your produce? (Such as merchandise?) If so, what are they?

17. Do you sell items that require higher safety standards? (Meat, Cheese, Milk, etc. that require refrigeration)
18. Do you just pay the farmer's asking price or is there a system in place to not pay more than a certain amount for the produce?
19. Are your prices flexible?
20. What are your transportation Costs?
21. How do you distribute your Availability List?
22. How do you determine the Markup/Price?
23. How do you measure success for your organization? Why?
24. What does sustainability mean for your organization? How do you plan to reach this?

Appendix D2: Other Food Hubs Response Chart:

	Name	Revenue Sources and Margins	Markups	Transportation	Mission	Warehouse
Food Hub Operations	Red Tomato (501(c)3 Food Hub)	Half of revenue comes from 10% Net Sales Margin, half comes from philanthropy	Use a similar formula as the Food Hub. (Cost + Transportation)*markup required to get desired margin from margin/markup chart. They want 11% margin, so they would markup using 1.124, based on this chart https://tinyurl.com/y86jrw m .	Fill independent trucks, direct delivery	"Red Tomato strives to bring fairness, transparency and sustainability to every aspect of the way we do business... wide access to affordable and healthy food, and the financial well-being of both Red Tomato and the farms in our network." - Taken from Red Tomato's Website	No
	Farm Fresh RI (501(c)3 Food Hub)	18% Net Margin from sales+grants	Uniform 18% Markup	Farmers deliver their produce, they have delivery minimums specified for RI, MA, and CT	Growing a local food system that values the environment, health and quality of life of RI farmers and eaters	Yes
	Brown Market Shares (CSA)	Brown funds it, sales go back	Very small markup, get funding from Brown University	Farmers deliver once a week	Provide Brown University students and faculty with locally grown produce	No
	Local Food Hub (501(c)3 Food Hub)	Want a self-sustaining warehouse, still have grants and donations	20-25%	Growers deliver to them, only pick up if they can fill a truck	Local Food Hub aims to form strong relationships with regional farmers to increase community access to local food. Wants to ensure small farms have a place in the marketplace.	Yes
	Common Market Food Hub	Did not share a specific margin, but sales cover operational costs and procurement.	Did not share specifics, but it can be assumed their markups factor in their overhead costs. They have product-specific markups, but also have farms that produce one crop for them.	They have a procurement team that is in contact with farmers. Common Market has farmer aggregation/drop-off, hired out pickups, self-truck delivery	Common Market's mission is to support sustainable family farmers in the area local to Philadelphia. They also support food access by working with and through institutions. They believe that they should serve people where they work and spend their time to better spread access to healthy food.	Yes
	Name	Payments	Relationship	Work with Wholesale Farmers?	Contracts	Pre-Season Planning
Food Hub to Farmer	Red Tomato (501(c)3 Food Hub)	Pays producer's asking price	Try to build a strong relationship with farmers/producers	Yes	No	Talk to customers after season, ask about demand, and convey this to producers
	Farm Fresh RI (501(c)3 Food Hub)	Sets prices prior to season	Farmer relationship is key, transparent to the point that farmers know about the 18% markup and set their price accordingly	Yes	No	Did not specifically answer, but the producers have a pretty good idea of demand
	Brown Market Shares (CSA)	Weekly, pay a farmer what they ask in the winter for a portion of their summer and fall harvest	keep contact farmers weekly, built a strong relationship for many years	No	No	Do not plan pre-season, but they do ask about upcoming weeks during the season
	Local Food Hub (501(c)3 Food Hub)	Production minimums for farms, challenge with capital for payments.	Annual memberships for farmers offer technical assistance.	Yes	No	Before working with a farm, LFH determines whether or not it can meet the supply needed
	Common Market Food Hub	Pay the producer/farmer's asking price	Farmers are important to Common Market, aim to pay their prices	Yes	No	Verbally plan pre-season. They will talk to consumers then talk with farmers. Sometimes, Common Market has a farm supply team with one type of produce
	Name	Programs	Volume Discounts	Contracts	Communication Practices	
Food Hub to Consumer	Red Tomato (501(c)3 Food Hub)	Deliver healthy food from small organization to local grocery stores, produce distributors, neighborhood restaurants, schools and colleges. Direct delivery as well	For new customers only	No	Debriefs customers at the end of growing season to obtain feedback for farmers	
	Farm Fresh RI (501(c)3 Food Hub)	Farmers Market Program and outreach to potential customers	Occasionally, if they get volume discount from producer they try to pass it off to the consumer.	No	Farmers upload own variabilities to website and food hub sends bi-weekly availability email to new and returning customers	
	Brown Market Shares (CSA)	Only program is a CSA, in which students and faculty can purchase a share of local food.	No	No	Communicates with farmers weekly and provides detailed listings of produce and the farmers who grew it	
	Local Food Hub (501(c)3 Food Hub)	Technical assistance program for farmers. One experienced staff member helps farmers adjust to wholesale market, food safety training, comprehensive workshops	---	Membership agreements with producers, LFH assesses potential producers' ability to produce a minimum amount of product before beginning a partnership	---	
	Common Market Food Hub	Farm-to-school, educational programs for institutions, farm-to-hospital programs, farm stands	---	No	Procurement team communicates with farmers and plans crops a season in advance based on forecasted customer demand	

Appendix D3: Food Hub Comparison Matrix:

See attached document for the Food Hub Comparison Matrix.