An Analysis of New England Food Hubs

With a Focus on Applications in Low Food-Access Areas

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Abstract

Food Hub organizations have great potential to increase sales for local farmers, increase food access in underserved areas, and improve the sustainability of the food system. Our team researched food hubs, food access issues, and the current food system to gain insight into the viability of a food hub performing these functions in Worcester. In order to help answer these questions our team carefully studied the relationships food hubs have within a food system. Our team generated a list of key questions that need to be addressed when considering starting a food hub.

Acknowledgements

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Executive Summary

There is a growing consciousness in the United States—as well as other developed nations—of the unsustainability, environmental degradation, and social inequity of the current industrial food system. The unsustainability of it refers, among other worrying issues, to the fact that each calorie from food requires ten calories from nonrenewable and greenhouse gas-emitting fossil fuels (Lott, 2011). The environmental degradation refers to heavy fertilizer and pesticide use running off into rivers and creating ocean "dead zones" (Lash, 2007). Lastly, the social inequity refers to the indebtedness of modern farmers (Briggeman, 2010), the existence of "food deserts," whose residents have inadequate access to healthy food (USDA Food Desert Locator), and the inadequate pay and working conditions of workers in the food system. Referring to this last point, "the US Bureau of Labor Statistics listed food preparation and serving-related occupations as the lowest paid of all occupational categories...followed by farming, fishing and forestry occupations" and according to Oxfam, "in 2004, farm-workers suffered higher rates of toxic chemical injuries on the job than workers in any other sector of the U.S. economy..." (FoodFirst.org, 2009).

A compelling solution to this condition is to create a food system based on small or mid-sized local farms. While the extent to which a local food system would address all these issues is debatable, such a system would undeniably reduce "food miles"—the 1,500 to 3,000 miles industrially processed food travels to reach the consumer (Grace Communications Foundation). This oft-cited statistic comes from Rich Pirog, the associate director of the Leopold Center for Sustainable Agriculture at Iowa State University. In 2005, he found that the milk, sugar, and strawberries that go into a carton of strawberry yogurt collectively journeyed 2,211 miles...just to get to the processing plant (DeWeerdt, 2011)."

Additionally, a local food economy would exhibit the advantages given for proponents of local economies, in general. Wendell Berry—farmer and economic critic—discusses starting local economies by first focusing on local food economies. "They want to use the local economy to give consumers an influence over the kind and quality of their food, and to preserve land and enhance the local landscapes. They want to give everybody in the local community a direct, long-term interest in the prosperity, health, and beauty of their homeland (Berry, 2001)." Section 1 of this paper's Background chapter discusses further the topic of local food.

Food Deserts

One of the problems mentioned above that is present in the global industrial food system is the existence of regions, "food deserts," whose residents have inadequate access to healthy,

unprocessed food. This is related to the distribution infrastructure built for the food system, which is dependent on large scales—both on the supply side (vast, monoculture farms in the fertile Midwest) and the consumer side (supermarkets unsuited to urban, low-income areas). A local food system, less dependent on large scales, could be especially apt for addressing this particular issue. Since diet is such an important aspect of overall health, this function would be a public health initiative, in addition to an environmental, economic, and social justice one. As especially emphasized in one of the interviews conducted for this project—with Wanda Givens of the Mason Square Food Justice Initiative (Appendix B.1)—food deserts are correlated with minority neighborhoods, making this a discrimination/racism issue, as well. The issue of food deserts is discussed in Section 2 of the Background chapter.

Food Hubs

Emerging in response to demand for a local food system is the concept of a "food hub." Still quite loosely defined in this early stage of its existence, the general function of a food hub is to aggregate the produce of several small to mid-size local farms so as to allow distribution on a larger scale to fit in with the infrastructure already present. A diverse set of organizations fall into this categorization—diverse both because of the loose definition of a food hub and the necessity of local institutions to cater to the local context, an attribute that local economy advocates would not want to lose. Section 3 of the Background delves deeper into the diversity of food hub business models and Section 4 profiles some examples of existing food hubs.

Connecting Food Hubs with Food Deserts

The course of our project was directed toward the prospect of a food hub increasing food access in a food desert. Though all regional food hubs—whether intentionally or not—are contributing to change in the arenas mentioned above (environmental, economic, social equity, public health, and discrimination), using a food hub specifically to increase food access stood out to us because it would benefit most from further research. We saw a supply-side (the farming community) wanting to sell more fresh produce and a demand-side (under-served communities) wanting to buy more of it. Despite this, there was limited communication between the two groups. This potential compatibility is what attracted us to this project.

Figure 1: Map showing process of food from small farms to local demand.

Methods

We identified the goal of our project to be as follows: “to help food hub initiatives, particularly in the early stages, identify best practices and address key questions to increase food access in underserved communities, specifically focusing on how such an initiative could unfold in Worcester.” We then identified the following broad research objectives, each with specific research questions, to focus our research.

- Identify the best practices of successful food hubs.
  - What motivates a farmer or entrepreneur to start a food hub?
  - What informational programs and community resources are available for food hubs?
  - What is the structure and function of a food hub?

- Identify the strategies of food justice organizations to improve food access.
  - Where are the key low-income/low-access areas in Worcester?
  - What strategies are currently being used to help improve food access?
  - What food justice organizations could a Worcester food hub utilize?

- Identify how food hubs have increased food access, and assess the sustainability of these hubs.
  - How can a food hub work with a food justice initiative to boost community interest, and therefore food access? What obstacles face such a partnership?
  - How does a food hub identify their niche in a community to optimize efficiency?
  - How does a food hub establish itself in the consumer and farming communities?

- Identify the resources needed to use food hubs to increase food access.
  - Were there any trends in the practices employed by the successful food hubs studied?
  - What strategies used by the food justice organizations could be helpful to a food hub intending to serve food deserts?
  - What information would a food justice organization intending to start a food hub like to know?

Findings

We identified the following themes under which to organize our discussion of what we learned:

- Profitable farmer relations,
- Communication between food justice organizations and food hubs,
- The need to be a business-minded organization,
- Building strong relationships with consumer partners,
- Financing,
- Infrastructure, and
- Knowing your territory.

The first theme—profitable farmer relations—discusses the importance of developing a good relationship between the food hub and the farmers supplying the food hub. A sufficient number of producers should be lined up to supply the food hub before the hub is even started. They should be invested in the success of the food hub. Engaging them in this way can be done by including them in discussions of the food hub from the start. A close relationship between the food hub and the farmers needs to be maintained throughout the hub's operation. A potential benefit of this relationship is the use of a farmer's story in differentiating the product for sale.

Our second theme—communication between food justice organizations and food hubs—refers to the relationship between the two stakeholders we identified as having compatible interests—food hubs and food justice organizations. We found very little communication between these two parties; that neither group really looked beyond their conventional place in the current food system, despite such a system not naturally incorporating them. Food hubs targeted the same markets that already have access to food and food justice organizations worked to attract conventional food retail outlets to their neighborhoods—such as grocery stores and farmers' markets (albeit, those able to accept SNAP benefits).

Our third theme—the need to be a business-minded organization—emphasizes the fact that a food hub is a business and therefore needs at least one individual with business acumen. This was the major point obtained from our interview with the food hub Investment Director of Wholesome Wave and modeled to us by the successful Intervale Food Hub. A food hub needs a business plan and a staff member able to commit him/herself to the business operations of the hub.

Our fourth theme—building strong relationships with consumer partners—discusses the ways that successful food hubs have interacted with either the institutions or individuals they serve. The relationship between the hub and either type of consumer is benefited by educating the consumer on the advantages of local food. Food hubs can hold business meetings with potential institutional buyers to do this, as well as develop a good working relationship with them. Food hubs can educate individual consumers through the internet and social

Figure 2: SNAP coupons are accepted at many food hubs.

media (which most hubs utilize to market their products) or printed newsletters. Either way, engagement is increased through an education of the benefits of local food.

Our fifth theme—financing—discusses the importance of a food hub to secure financing from investors or financial aid to cover the high start-up costs. The decision to be for-profit or non-profit will affect this process, something one starting a food hub should consider. The USDA offers a comprehensive list of all their funding programs on their website. These include State and Federal loan programs, farming grants, and other such financial aid.

Our sixth theme—infrastructure—discusses a topic that can be a challenge to starting food hubs because of the expense of buying all the necessary equipment of a food hub. This expense may be exasperated by the need to follow food safety regulations. The key is to utilize all existing infrastructure that one can, and attempt to lease or borrow if one can't. An example of using existing infrastructure is the use of a community kitchen to process food for value-added products. A truck is often the most expensive individual piece of infrastructure for a food hub; leasing a truck is generally the smarter option than buying.

Our seventh theme—knowing your territory—discusses the need for a food hub to know what their region and target market is. Their region refers to how far they are willing to travel to sell their products. Their target market is the type of consumers within that region that they are marketing to. An example of a food hub adapting to meet the needs of its target market is a food hub that sold produce from a van—a "mobile market"—to accommodate residents of an area with limited transportation options. Another example is a food hub that offered a program designed to accommodate college students' schedules.

Recommendations

Our group condensed the data we gathered on food hubs into a list of "key questions" that a group or individual intending to start a food hub would need to address. These questions are located in the first section of the Recommendations chapter. The second section of that chapter contains suggestions for further research pertaining to food hubs.

Authorship

Tara Shewchuk was the author of the Executive Summary and Introduction. Her contributions in the remaining sections of the report include the introduction and first two sections of the Background chapter. She also wrote the final section, "Identifying the Resources Needed to Use Food Hubs to Increase Food Access," of the Methods chapter. Lastly, she introduced the Findings and Recommendations chapters. She was an editor of all remaining sections. She conducted the interviews with the Mason Square Food Justice Initiative, Drew Love, and Grace Duffy of the REC, as well as participating in the two group interviews—with Wholesome Wave and the REC.

Robert Mahoney was the primary author of the abstract and acknowledgements sections. In addition, he worked on numerous subsections of the report. He wrote the Background chapter section "Emergence of Food Hubs", as well as the Introduction and "Identifying Best Practices of Successful Food Hubs" sections of the Methodology. In the findings chapter, he contributed sections concerning Financial Support, Use of Infrastructure, and Composition of Territory (sections 4.5, 6, and 7). Furthermore, he contributed to the food hub and food justice case studies and interviews located in the Appendix, as well as the Key Questions and Future Research in the Conclusion.

William Frankian was the author of the Background chapter section 2.4, providing examples of existing Food Hubs, Methods section 3.3 "Identify how Food Hubs have increased food access, and assess the sustainability of these Hubs", and Findings sections 4.3 and 4.4. He also interviewed the Monadnock Farm and Community Connection Food Justice Initiative, as well as conducted case studies of the New Hampshire Food Bank and the NH Healthy Corner Stores network. He extensively researched the Intervale Food Hub, and did case studies of five additional food hubs in Vermont.

Brandon Okray was the primary editor of the final report and was an author of many key aspects of the report. He worked on the subsection Background chapter section "Challenges Facing Food Hubs," which discussed the issues and problems with modern food hubs that need to be overcome. Additionally, he wrote the subsection entitled "Strategies of Food Justice Organizations to Improve Food Access**"** in the Methodology of the report. In the Findings Section of the report, Brandon contributed to the understanding and analysis of food hubs and food justice movements. He wrote section 4.2 in the Findings Section called "Understanding the Food System in Low-Income and Low-Access Communities." Additionally he helped conduct case studies of various food hubs and food justice organizations. He also performed a phone interview with Boston Organics and Wholesome Wave.

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1.0 Introduction

One of the biggest problems facing local farmers is the constant competition with large corporations. These businesses can invest billions of dollars into making their products cheaper, more reliable and more efficient. Local farmers don't have the capital to invest in making their product better, or the means to transport their products to markets with high demand without accruing high costs; most of the farmer's time is devoted to the growing of their products.

Figure 3: There is high demand for fresh local produce.

Additionally, there are a large number of Americans without easy access to healthy and affordable food, living in areas known as "food deserts." Food deserts have arisen as a result of economic factors. Supermarket chains want to locate in places where they can maximize profit, a motivation that may exclude low-income areas. Also, "bargain-oriented superstores" are often too large to viably operate given the small populations of rural communities, or the small lot sizes of urban communities; they thus end up in suburbs. The USDA estimates that groceries sold in food deserts cost an average of 10% more than the groceries sold in these suburban markets (Trimarchi, 2008).

A food hub is an organization that aggregates and distributes the produce from small to mid-size local farms. Such an entity could address the mentioned problems facing small, local farmers. Additionally, a food hub serving a food desert, could address the mentioned problems associated with this phenomena. The goal of this project was to help food hub initiatives, particularly in the early stages, identify best practices and address key questions to increase food access in underserved communities, specifically focusing on how such an initiative could unfold in Worcester. We performed background research on local food, food hubs, and food deserts; conducted case studies on food hubs and food justice organizations, including extensive interviewing; and condensed our research into a list of "key questions" that those intending to start a food hub need to address. We found that there is very little communication between food hubs and food justice movements, despite compatible interests. We also found that many of the challenges cited by interviewees in running a food hub are challenges present in running a business, in general. We were able to group these commonly discussed topics into themes in our findings section.

2.0 Background

The goal of this chapter is to provide background information on both "local food" and "food deserts" such that the reader recognizes the advantages of local food, the problem of food deserts, and the beneficial role that food hubs may play to simultaneously promote local food and eliminate food deserts. It begins with a description of the local food market, leading to the emergence, growth, and applications of food hubs, followed by information on low-food access areas known as food deserts.

2.1 Local Food

The conventional food system refers to the system that produces and distributes the food consumed by the majority of Americans. This system is industrialized and therefore characterized by efficiency. However, that efficiency does not take into account many externalized costs. These costs include monocultures of commodity crops highly subsidized by the U.S. government; vertical integration such that a small number of corporations control and profit from the production, processing, and sale of food; reliance on food imports and exports; and global monopolies made possible by biotechnology and globalization (Campbell, 2004). In response, the past several years has seen the emergence of an alternative food system, built around local food. There is no universal definition of local food; some definitions do not even describe local food based on geography, instead characterizing it based on the social implications or the supply chain it passed through. For our purposes, however, the definition developed in the 2008 Farm Act regarding the Value-Added Agricultural Market Development program is appropriate. This "defines the total distance that a product can be transported and still be eligible for marketing as a 'locally or regionally produced agricultural food product' as less than 400 miles from its origin, or the State in which it is produced (Martinez, 2010)."

According to the “Regional Food Hub Resource Guide” published by the USDA, in a 2011 consumer survey, 86% of respondents called the presence of local foods “very important” or “somewhat important” to their choice of food store. Additionally, chefs voted locally grown foods as the top restaurant trend for 2012 for the fourth year in a row (Barham et. al, 2012). Andy Pressman, Southern New Hampshire farmer and member of the National Center for Appropriate Technology (NCAT), told of the high demand in his region for local products in a recent interview. His findings echo statistics indicating high demand for local food. He also told of the difficulties faced

Figure 4: NCAT

by the local farmers of meeting this demand (Pressman, 2012).

Compared to the farms of the conventional food system, local farmers tend to run small or mid-size farms. The small production volumes necessitate that wholesale buyers wishing to purchase local food buy from numerous farms, thereby increasing transaction costs. Other difficulties for these farmers are due to their inability to supply year-round and the logistics cost (Bosona & Gebresenbet, 2011). They often lack the capital or facilities to store, process, and distribute their products; and lack the staff or experience to devote to business and marketing. The USDA is aware of these circumstances. In their aforementioned Resource Guide they wrote, "Many farmers and ranchers – especially smaller operations – are challenged by the lack of distribution and processing infrastructure of appropriate scale that would give them wider access to retail, institutional, and commercial foodservice markets, where demand for local and regional foods continues to rise (Barham et al, 2012)."

The inability for local farmers to meet the demand for their products wastes an opportunity to benefit both these local farmers and the local economy. Local farmers could benefit here because they receive a greater share of the retail price from a local supply chain than from the conventional one. The local economy could benefit because increasing local food production creates jobs, generates business taxes, and increases earnings throughout the region (Barham et al, 2012). Additional benefits have the potential to arise if local farmers distribute their produce in food deserts

2.2 Emergence, Growth, and Applications of Food Hubs

Food hubs offer a combination of production, distribution, and marketing services that allow small farmers to gain entry into new and additional markets that would be difficult or impossible to access on their own (Singleton, 2011). For many years, the only viable retail options for small to mid-scale farmers were small farmers markets or selling directly to individual consumers. This was not a large enough market to support these farmers' growth, and so food hubs started to emerge. Local CSA (Community Supported Agriculture) programs originally developed food hubs. CSAs usually sell shares of a single farms' produce to individuals or families; larger CSAs looking to expand into larger organizations and access larger markets provided the impetus for food hubs to emerge. The food hubs started to spring up in warehouses, farm buildings, and

Figure 5: Local farms at a food hub

other structures large enough to house high volumes of produce. Many hubs shared the goal of assisting farmers with production, distribution, and marketing.

Food hubs can greatly reduce transaction costs of institutional and retail buyers by providing a single point of purchase for consistent and reliable supplies of source-identified products from local and regional producers (Borst, 2010). This single point of purchase allows large institutions such as schools, supermarkets, and restaurants to purchase large amounts of local produce, much larger amounts than if they were limited to the individual farmers markets that were originally the only option. Not only do they get a consistent supply of fresh produce, they can track that produce back to the original producer and know that it is locally grown. This in turn opens up a much larger market for the farmers, allowing them to be sure of selling all the produce and goods they produce, as opposed to producing said goods and hoping to be able to find buyers in the future.

Food hubs can also add significant value to traditional distribution channels, by enabling them to offer a broader and more diverse selection of local or regional products. In the past, a farmers market may have ten farmers each selling similar products. With the advent of food hubs, farms can work with each other and the hub to plan out which farm grows what, with every farm growing different crops. This significantly diversifies the product base available to the consumer and therefore creates a larger market. This brings in new customers and in turn adds value to the whole food system.

Figure 6: View of the Headwater food hub.

A number of different styles of food hubs have emerged in North America, basing their services on unique market demand and entrepreneurship capabilities (Starkman, 2011). These include non-profit driven models, entrepreneurship ventures that have created sole proprietorships or corporations that take a portion of the profits from the food hub, retail driven models created by individual stores, and even virtual food hubs that operate completely online.

USDA data shows that currently nearly a third of food hubs are non-profit. These non-profit driven models are run with the sole intention of supporting regional farmers and making healthy, local food widely available. The food hub itself does not make a profit; revenue covers employees' salaries and other expenses. The intention of having a non-profit model for a food hub is to keep produce costs as low as possible while still maintaining the farmers' selling price.

Other food hubs have been started by entrepreneurs looking to use the food hub as a business venture. Entrepreneur or for-profit driven models are run with just that intention: to make a profit. Generally, the prices of the produce are slightly higher, but often this is

accompanied by better facilities and larger selection due to the owner's capital gains allowing them to improve and increase infrastructure over time.

Two of the most recent forms of food hubs to emerge are retail driven models and virtual food hubs. Some retail stores and supermarkets use their facilities and combined consumer support to start successful retail model food hubs. These create wholesale market opportunities for their customers, offering them a direct supply line of fresh local produce. Virtual food hubs operate completely online, offering "farm to table" services. This allows customers to order products from the food hub on the internet and have them delivered to their homes or businesses. This is especially useful for restaurants, which can place an order at night online for the next day's produce, and have it delivered in the morning.

A number of technological advances in food hub infrastructure have developed in recent years to make food hubs more efficient (Singleton, 2011). Most food hubs are behind the curve technologically when they first start out and lack all the possible processing and management programs that could increase their production and efficiency. A main reason for this lack of technology is the cost; however new, more affordable options are beginning to surface.

Matchmaking programs are starting to become popular, particularly with virtual food hubs. Matchmakers allow larger institutions to find and connect with food hubs in their region. Internet-based buying clubs (such as are used in virtual food hubs) are also becoming more popular due to their ease of use and the fact that they provide the consumer with a way to access local produce without having to physically travel to a distribution location. Distribution and management technologies are also advancing. New software is beginning to emerge that keeps track of all accounting and financial aspects of the food hub, making life much easier for the managers. One of the most widely used and popular examples of this is accounting software that offers systematic instructions on how to handle all aspects of financial record keeping. Classes and seminars are also starting to be offered teaching the main aspects of managing a food hub, from financial and managerial standpoints. If all of these new technologies and resources are taken advantage of, the production and efficiency of food hubs could be greatly increased.

The USDA "Food Hub Resource Guide" provides a broad description of the functions of a food hub. For this project, it was important to identify examples of food hubs that also aided local food deserts. Additionally, these hubs should be well-established parts of their communities and have good economic practices in order to serve as good models from which to learn.

Due to the independent formation of food hubs across the country, most hubs have emerged as organizations specialized to fit the needs of their local communities. The Mad River food hub in Waitsfield, VT has specialized in storage and value-added processing. Opened in January 2012, the food hub allows farmers to rent out its space at reasonable

Figure 7: Logo of the Mad River food hub.

rates. The hub provides three processing rooms, one for vegetables and two for meats, as well as industrial-scale freezing and cooling rooms. The hub's designers also incorporated eco-friendly design features to reduce operating costs, such as utilizing winter air to cool stored food (Partridge, 2012). The food hub is fully licensed at the state and federal levels for meat processing. This important accomplishment ensures the credibility and safety of meat produced from the hub when it reaches consumers. Offering licensed meat processing facilities also makes the food hub unique for its area (Levitt, 1998). This is also a significant advantage for the local farmers, since there are very few meat-processing facilities in New England.

The Mad River food hub collaborated with another local distributor to purchase a refrigerated truck. This allows each hub to increase the amount of deliveries they can make, as well as reach locations that do not have loading docks. According to their website, "distribution takes place once a week and includes local deliveries in the Mad River Valley followed by stops in Montpelier, Waterbury, [and] Burlington (Freenstra, 2012)." By supporting cold storage, truck deliveries, and licensed processing facilities, the Mad River food hub demonstrates the potential food hubs have to improve productivity and marketability of local farms.

Another example of a highly specialized food hub is The Farmers Cow, based out of Lebanon, CT. This hub works entirely with milk and dairy products produced by six local farmers. The Farmer's Cow serves to connect these dairy products with grocery stores, large restaurants, and local institutions. This hub conducts marketing operations through its website, and also through the cartons it sells its milk in. The vision of this hub has met with success; after eight years of operation it now sells to over 100 locations, and has opened its own café to hallmark its products.

Figure 8: The Intervale food hub of Burlington, VT.

The Intervale food hub in Burlington, VT began in 2007 as a research project by The Intervale Center. The Center is a non-profit organization dedicated to strengthening community food systems, and has been in operation since 1988. The Intervale food hub now services the greater Burlington community. The mission of The Intervale food hub is "to increase local food production and consumption and… to market and distribute local foods in a way that ensures fair prices for farmers (Intervale Center, 2012)."

The economic engine of this food hub is its CSA distribution model. The hub receives produce from 24 participating farms, each within 75 miles of Burlington. It then combines the

produce and ships specific amounts, or 'shares,' to more than 50 delivery locations in the area (Singleton, 2011). Intervale food hub also provides a wholesale marketing service for farmers, and a distribution service for local restaurants, schools, or grocers (Berman, 2011). By adopting a CSA model, the hub is able to magnify the reach of its farmers' food without the need to negotiate with existing markets for sales space.

Food hubs can also provide a wide variety of social benefits to a community and can serve more purposes than generating more market opportunity for farmers. Food hubs create awareness about not just eating healthy but also buying local in order to maintain more self-reliant communities. Food hubs can provide a great service to a community in terms of strengthening bonds and relationships among its residents. Some food hubs are driven by the community and the community volunteers to help with packaging, distribution and sales of the food hub. Additionally, food hubs can create jobs and opportunities for employment within the local community. Food hubs create employment not just for farmers but also for the individuals that run the food hub. Food hubs have also been known to provide food bank donations, health screenings, cooking demonstrations, and recycling programs (USDA, 2012).

2.3 Food Deserts

The Center for Disease Control and Prevention (CDC) defines "food deserts" as "areas that lack access to affordable fruits, vegetables, whole grains, low-fat milk, and other foods that make up the full range of a healthy diet (CDC, 2012). The Mari Gallagher Research and Consulting Group emphasizes that food deserts do not lack food, in general; rather, they are characterized by an imbalance of food choice - a heavy concentration of unhealthy food options, called fringe foods (Mari Gallagher Research Group, 2010). In other words, a lack of healthy affordable produce in an area forces the population to rely more on unhealthy fast foods, therefore increasing health risks. Though the relationship is not proven, it has been hypothesized that disparities in food access may contribute to the disparities in health due to race, ethnicity, or socioeconomic status (Ver Ploeg et al, 2009). This is based on the hypothesis that the food environment (accessibility to

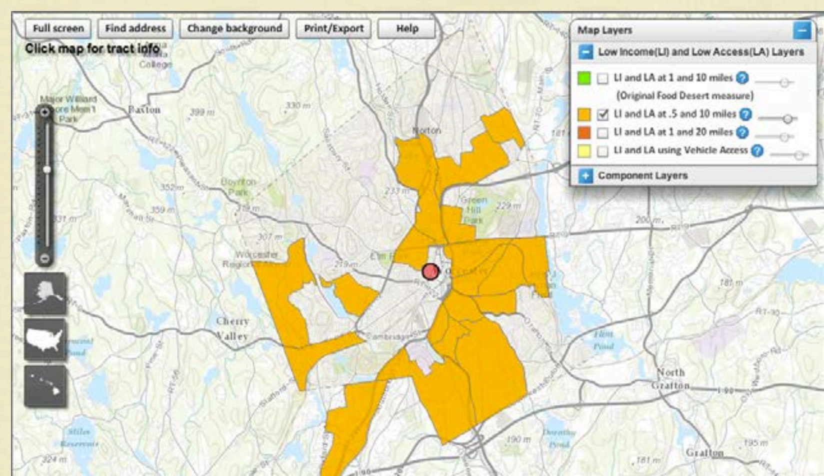

Figure 9: Map of the USDA food desert locator centered on Worcester, MA.

stores and restaurants) impacts decisions about one's diet, which is a factor in one's risk of disease such as cardiovascular disease and diabetes. These diseases are detrimental to the U.S. health care system, as well as to the individual. "The estimated cost to the U.S. health care system due to obesity and obesity-related problems is $100 billion a year (Trimarchi, 2008)."

A map of the areas with food deserts in Worcester is provided, using the USDA Food Desert Locator mapping tool. These areas are classified as food deserts by this new definition provided by the USDA—an area where there is no grocery store or supermarket within a half mile, for an urban area. These areas have different issues than most traditional markets.

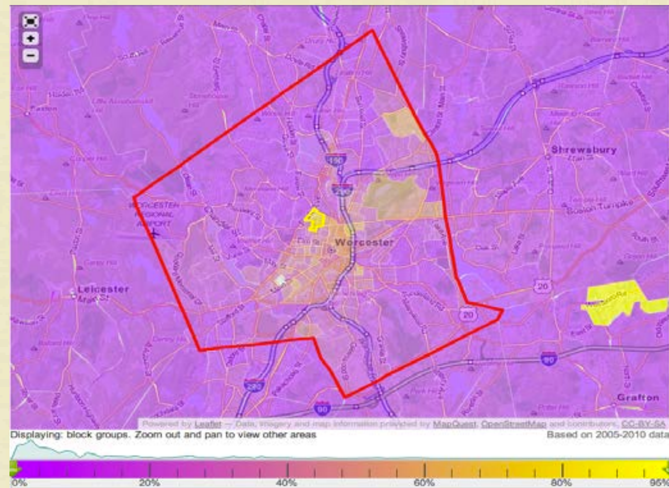

Figure 10: Further food desert map, with Worcester City outlined.

Food deserts in urban areas like Worcester have been traditionally challenging to serve because of the lack of economic market potential (Bonne, 2011). For example, notice in Worcester that the areas of poverty tend to be the same as the areas designated as food deserts.. These economic challenges that residents in food deserts have make it difficult for food distribution centers to stay in business because of the limited buying power of the residents.

Another challenge that residents in urban food deserts have is that most individuals don't have a means of transportation to travel to supermarkets or grocery stores located long distances away. This makes it more difficult for grocery stores to attract more customers and therefore less attractive for large grocery stores and supermarkets to establish there.

Residents in food deserts obtain food through: fast food restaurants, corner stores, food justice organizations, community gardens/kitchens, soup kitchens/homeless shelters, urban agriculture plots, and institutions (schools, hospitals, prisons, community centers). Food justice and food security organizations have currently been trying to overcome the issue of food deserts through programs that promote healthy, local and/or organic food in urban food deserts.

3.0 Methods

The goal of this project is to help food hub initiatives, particularly in the early stages, identify best practices and address key questions to increase food access in underserved communities, specifically focusing on how such an initiative could unfold in Worcester. The following is a list of objectives that helped us accomplish this goal:

- **Identify best practices of successful food hubs** that could be used as a guide for a Worcester food hub.
- **Identify strategies used by food justice organizations** to improve food access in low-income and low food-access communities.
- **Identify how food hubs have attempted to increase food access and assess the outcomes of these efforts** by researching other model food hubs and working with organizations that specialize in the startup and sustainability of food hubs.
- **Identify what resources, skills, and partnerships are needed to launch and sustain food hubs working to increase food access.**

This chapter describes the blueprint for our project and the broad questions that we are addressing. An important point to note is that while this research is primarily focused on the Worcester area, this approach can be adapted for starting food hubs in other areas.

3.1 Identifying Best Practices of Successful Food Hubs

What motivates a farmer or entrepreneur to start a food hub?

At the start of our project, we worked with Roger Noonan, a farmer in Manchester, New Hampshire who had recently purchased a facility previously used for processing apples with the hopes of transforming it into a food hub. Unfortunately, his project was delayed and we were not able to continue working with him, but through our initial conversations, along with a visit to the potential food hub facility, we were able to better visualize how a food hub would look and run, as well as why a farmer starts a food hub in the first place. Roger explained to us his personal goal of using the food hub as a business to generate an income for himself, but he also stressed the importance of connecting local farmers with a larger market. Roger is a farmer himself with first-hand experience, and he explained the challenges a small to mid-scale farmer faces when trying to compete with giant food companies. His goal with the Manchester hub was to give the farmers in the region a steady outlet for their crops that they could count on in the future.

What informational programs and community resources are available for food hubs?

Our sponsor for this project, Andy Pressman, is a contributing member of the National Center for Appropriate Technology (NCAT), a group working to increase natural resource sustainability. Through working with Andy, we were able to identify how a food hub could be linked with organic farmers, knowing that many consumers would like to see organic food available for purchase. Mr. Pressman was able to give us valuable information regarding this issue, noting that many food hubs initially are not able to operate with purely organic inventory due to the large demand a food hub faces and the relatively small supply of organic produce. NCAT, along with other organizations discussed later (such as Wholesome Wave) offers programs to link food organizations such as food hubs with the community. Mr. Pressman also connected us with the Northeast Organic Farming Association (NOFA), an organization offering sustainable food and organic community interest programs. NOFA offers a number of programs that could be useful to a food hub, such as their Organic Food Guide and CSA Connect program.

NOFA also offers winter and summer conferences for the farming community in the Northeast. About halfway through the completion of our project we were given the opportunity to present our current findings at the 2013 NOFA/Mass Winter Conference. Through presenting at this conference, we were able to get extremely valuable feedback from the audience of the farming community, much of which acted to guide us in our future research.

What is the structure and function of a food hub?

In order to identify successful practices in food hubs, our team conducted case studies of seventeen food hubs in New England, the data matrix for which can be found in (Appendix B). The reason for limiting our research to New England was the unique climate, growing season, and scale in this region. For example, food hubs in the Midwest may deal with extremely large volumes of crops with little variation in type due to the large-scale Midwest farms they are supplied by, while a New England hub would generally focus on diversified small-scale farms.

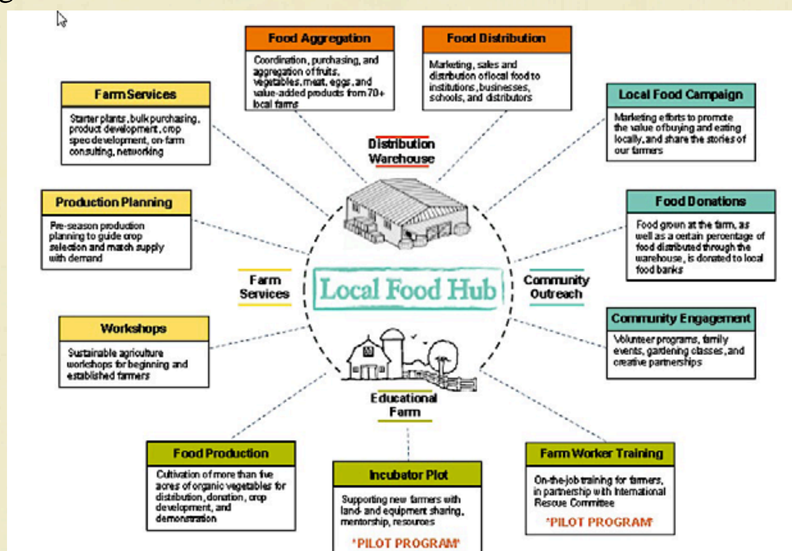

Figure 11: This diagram shows the large variety of organizations that a food hub can have ties to in the community

These case studies were done both through literature reviews and through interviews with professionals in related fields in order to understand the economic, institutional, and operational context from which best practices emerge in successful hubs. Our team organized the food hubs by state, and then identified what we thought of as the key factors of the hubs' operation. These included the financing options the hub uses, distribution methods to get food to consumers, business models, target markets, as well as the history and evolution of the hub itself. By gathering this data for each food hub and then doing a comparative analysis, we were able to pick out what we saw as the most common and most successful practices.

In order to further our research of food hubs our team conducted a number of interviews with food hub managers across New England. These included Boston Organics, Mason Square, and Mondadnock Farms, as well as interview with the Regional Environmental Council of Worcester and Wholesome Wave, a company specializing in food hub development. The information gained from these interviews were vital to our findings, and copies of said interview can be found in Appendix A.

3.2 Strategies of Food Justice Organizations to Improve Food Access

Where are the key low-income/low-access areas in Worcester?

In order to better understand the Worcester food system, we used the Food Desert Locator on the USDA website. The Food Desert Locator is an interactive map based web tool that uses census data to see how much of the Worcester community is classified as a low food access and low-income area. This tool helped our team gauge the situation of the Worcester community and other neighboring areas. A map of the food deserts in Worcester can be seen in the Background Section 2.2. Once we realized the rates of low food-access and low-income, we tried to look at who was already trying to distribute food to people in these areas.

What strategies are currently being used to help improve food access?

Similar to the food hub case studies, our team made a matrix that looked at 12 food justice organizations in New England (matrix located in Appendix C). These organizations were compared based on a series of different criteria: distribution methods (how does the food justice organization bring food into the community), financial support (grants, donations, etc.), targeted community, programs offered and their contact information.

The data for the matrix was gathered through research, as well as phone and in-person interviews with several food justice organizations. Through the interviews, we were hoping to better understand: how they operate and their structure, the challenges they faced, their funding and anything interesting that we found during the initial case study research. We ended up completing six interviews with: Wholesome Wave, Regional Environmental Council, MFCC, Worcester Food Bank, Boston Organics and Mason Square. These interviews were very helpful in understanding the market that a food hub established in Worcester would be serving.

Food Justice Organizations Researched:

- Regional Environmental Council (MA)*
- Mason Square Food Justice Initiative (MA)*
- Buy CT Grown (CT)
- CT Food Bank (CT)
- Wholesome Wave (CT)*
- New Hampshire Food Bank (NH)
- Monadnock Farm and Community Connection (NH)*
- New Hampshire Healthy Corner Stores (NH)
- Central Vermont Food Systems Council (VT)
- Vermont Feed (VT)
- NOFA Vermont (VT)
- Cultivating Community (ME)

*Interviews Conducted (Appendix A)

What food justice organizations could a Worcester food hub utilize?

For a Worcester food hub specifically, several food justice organizations could help establish a food hub within Worcester. One of those most likely to spearhead a food hub in Worcester was the Regional Environmental Council (REC), which is already working with local farmers to run a mobile farmers market in the Worcester area. Additionally they are able to source a small amount of food from within the city from urban gardens. We wanted to know if these existing supply lines would facilitate their organizing, collecting and distributing this food to large institutional markets.

Another organization that was helpful to talk to about a food hub in Worcester is Wholesome Wave, which has been a rapidly growing food justice organization, from its double points SNAP/EBT program. Wholesome Wave was the only food justice organization that was

directly working with food hubs. The organization provides financing and consulting to emerging food hubs. We conducted an interview with Victoria Foster, the program director of their Food Hub Investment Program, in which we tried to get a sense of their process of assisting these mission-driven food hubs. A summary of this interview is located in Appendix A.7.

3.3 Identify how Food Hubs Have Increased Food Access, and Assess their Sustainability

How can a food hub work with a food justice initiative to boost community interest, and therefore food access? What obstacles face such a partnership?

Figure 12: Wholesome Wave's marketing logo.

Our parallel research into food hubs and food justice movements was done with the goal of determining whether a connection already existed between the two and, if not, if such a connection would be feasible and useful. A lack of prior research into this subject prompted us to conduct case studies and interviews with existing food hubs and food justice organizations. Our research included gathering information on effective campaigns put on by food hubs and food justice movements to improve awareness and community involvement with local food. Our complete case studies can be found in Appendices B and C.

How does a food hub identify their niche in a community to optimize market efficiency?

Our team gathered data on existing efforts in the field of fostering community connections to local growers. We conducted interviews with the Wholesome Wave food justice initiative and the Monadnock Farm and Community Connection, as well as performed case studies on many other food justice organizations. These groups are both committed to bridging the gap between small-scale farmers and the communities around them. We also studied what food hubs do in order to connect with the individual buyers in their community.

How does a food hub establish itself in the consumer and farming communities?

Once a niche is identified, we wanted to better understand the steps a food hub could take to fully leverage these opportunities. Limited documentation exists about this area of research, but we utilized our previous case studies—particularly the one on the Intervale Center—to

understand how a food hub could form a strong connection to the community. Our interviews and case studies helped us understand the strategies a food hub could utilize in order to gain a valued place in the food system of many communities of varying size and composition.

3.4 Identifying the Resources Needed to Use Food Hubs to Increase Food Access

Through analysis of data collected for previous research objectives and an additional interview with the Food Justice Investment Program Director of Wholesome Wave (See Appendix A.7) specifically for this objective, our group researched how to use a food hub to connect the compatible causes of increasing local food consumption and increasing food access in food deserts.

Were there any trends in the practices employed by the successful food hubs studied?

The first of these research questions was approached by analyzing the data matrices created from the food hub case studies. These data matrices were organized under the following criteria:

- Food Hub Name
- State/Area
- Financing
- Distribution Methods
- Business Type (profit vs. non-profit)
- Target market
- Community interest/links to community
- Marketing
- Governance/Structure
- History & Evolution
- Impact on community

Specifically, we looked for trends in each of the criteria. We attempted to explain a lack of any trend.

What strategies used by the food justice organizations could be helpful to a food hub intending to serve food deserts?

This second research question was also approached by utilizing the data matrices created from case studies—this time on food justice organizations. The criteria used in the matrices were as follows:

- Movement Name
- State
- Year Founded
- Serving Strategy (what they do with the food once they get it)
- Supporters (grants, federal programs, etc.)
- Community served
- Other Programs/Services They Provide (that may not involve food distribution)
- Website

Our focus was especially on identifying successful strategies used to improve food access that would be useful to a food hub attempting this same function.

What information would a food justice organization intending to start a food hub like to know?

The final question was approached by organizing a meeting with members of the REC of Worcester to directly ask them this question. Our objective from the meeting was to identify a product within our group's ability and the timeline for the project that would be of some use to them in this initiative. We traveled to their office (all other interviews were conducted over the phone) to have a face-to-face conversation with the Executive Director of the REC, the Food Justice Program Director, and a graduate student working for them on this topic. We discussed the topic for about an hour and 15 minutes (See Appendix A.6). We told them what we had done over the course of the project, asked them what they had done toward their food hub initiative to date, and discussed the utility and feasibility of potential deliverables from our project.

4.0 Findings

Through an academic year of thinking, reading, and talking about food hubs, a culmination of advice on starting a successful one was collected. This advice could be grouped into themes, while maintaining the references from which each piece of advice was obtained. A focus on food access is incorporated throughout the themes, as well as being the sole topic of section two.

4.1 Profitable Farmer Relations

While food hubs face a variety of major challenges, one of the most significant challenges is generating a good supply line from the farmers/producers they are working with. No matter what kind of food hub it is, it needs to have suppliers lined up to provide the food. In addition, in order to make a successful food hub, there must be a sufficient number of producers who are invested in the success of the food hub. There are a large number of examples that we have seen where food hubs have a great vision but just lack the supply to make it affordable and feasible.

One of the first issues we saw first-hand when working with Roger Noonan was that it is difficult to get farmers involved in a food hub. At the time, Roger had only two farmers lined up to supply the food hub, including himself. He was looking for his food hub to output a few million dollars' worth of food each year. In order to obtain this volume, he was looking to branch out to more farmers. However, Roger said that when he talked with other farmers they were looking for him to start placing continuous orders for what they had and were not entirely interested in trying to make the food hub successful.

Additionally, when talking with the Regional Environmental Council (REC) we found that they had a good network of farmers for their Mobile Food Market program but would require reaching out to other farmers to maintain the mainstream supply that is required to fulfill the required demand of a food hub.

It is important not only to receive the quantity of supply promised by farmers, but also to maintain very close relationships between the food hub and the farmers. From our case studies, we found that these connections are very important. One very successful food hub that does just this is called The Farmer's Cow. This food hub distributes milk in Connecticut to a large number of supermarkets and grocery stores. Their food hub consists of six farmers that are able to maintain supply for the food hub and receive effective community engagement and marketing from it. From their inspiring mission statement to their newsletter and farm tours, they know how to market their product to the community (See Appendix B.3).

In our discussion with Wholesome Wave, the representative we spoke to said that there was a lot of value in being able to develop a story for your product. It is important to approach an

institution or any customer with more than just saying you have fresh food to offer. A food hub's customers like to know the value of the food; providing the story of the farmers can make a huge difference in this. A method that our sponsor Andy suggested to make sure that the farmers feel engaged in the food hub is to make sure that they are included in some discussions and decisions from the start. This will prompt farmers to invest more than just their food to the food hub.

4.2 Communication Between Food Justice Organizations and Food Hubs

Two of the questions raised by our group in looking at the potential of food hubs in food deserts were: What are the major organizations trying to serve residents in food deserts? Would they be willing to work with a food hub? When looking further into this issue, we found that fast food and other restaurants; corner stores/general stores and food justice organizations were the key providers of food in low-access areas.

4.2.1 Food Justice Organizations Serving Food Deserts

Food justice and food security organizations are actively trying to bring local, healthy and/or organic food into areas that could not normally obtain it. In order to best understand food justice organizations, we developed case studies to look into several criteria. The goal of these case studies would be to allow our team to look at a variety of different food justice organizations across a large range of different topics. These topics would highlight key elements in the organization like the history, target audience, operations, programs and impact. The food justice organizations we researched were analyzed using the following criteria:

- Movement Name
- State
- Year Founded
- Serving/Distribution Strategy
- Supporters (grants, federal programs, etc.)
- Community Served
- Other Programs They Provide
- Website

We only looked at the food justice organizations in New England, since the New England food system is different from food systems in the rest of the country. Food Systems in New England have to overcome certain challenges, such as densely populated urban areas, seasonal changes in climate, small to medium scale farmers and different buyer interests. Our group chose

12 examples of food justice organizations to analyze (See Appendix C). These food justice organizations came from a variety of different states across New England.

We found that these food justice organizations can have a variety of different missions but generally were geared to finding ways to bring in healthy food to low access/food desert communities. Some other similarities found among food justice organizations is that they tend to be non-profit organizations relying on funding from grants and sponsorships. From what we found none of the organizations we looked at got the majority of the funding from revenue for food distribution serves.

There were several distinct differences we found among food justice organizations but the biggest was the way these organizations tried to serve/distribute food to low access communities. Half of the food justice organizations we studied try to distribute fresh food by establishing and managing farmers' markets within the low access communities. Several other food justice organizations like the Intervale Food Hub, Cultivating Community and BuyCT Grown use CSA to distribute food. Some food justice organizations would provide information on farmers in the local area and promote eating local in schools, like Vermont Feed.

4.2.2 Food Justice and Food Hub Relationships

However, after looking extensively at food justice organizations, we found that there was very little communication between food hubs and food justice organizations to work on serving low-access areas. Food hubs can make a very large impact in the community and can provided a great service to the community, especially those located near "food deserts." However, there are challenges that a food hub must overcome in order to be successful. Their issues can range from infrastructure, logistics, marketing, funding, contracts and legal problems. Usually these factors are easier to overcome once a food hub is established, but a beginning hub must give these issues serious consideration.

The Intervale Food Hub was the only food hub truly working with a food justice organization and has become very successful in doing so. The Intervale Food Hub is a food hub that was founded in 2008 and it receives a lot of its backing from the Intervale Center, a non-profit organization trying to strengthen food systems. This partnership makes it less critical to be profitable and more focused on its mission. When looking at the success of the Intervale Hub it raises the question of why there isn't more food hub-food justice partnerships, when food hub and food justice organization have such compatible interests?

From the trends we saw in both of our food hub and food justice case studies, we saw that the food hub organizations are looking at market potential. Food hubs are looking for people who are willing to pay more for locally grown food and as discussed in the background, a food desert is generally located in low-income area. A good example of a food hub serving several small food deserts is Boston Organics Food Hub. They exclusively serve organic food, which was one of three of the food hubs we studied that did this. They source their food from farms in CT, MA, NH, and even from ME. The reason for this food hub's success is that they are serving the

Boston area, which in addition to having some food deserts has a lot of buying power for organic food.

As we saw with Roger Noonan's case, food hubs need to be able to generate support from farmers/suppliers to the idea of a food hub. This can be more difficult to do in food desert areas because typically suburban farmers are small to medium scale. In order for a small to medium scale farmer to serve a food hub, he/she may need to give up their stake in their CSA or farmers market as well. This can be dangerous for the farmer if the food hub fails within a year or two. Then the farmer is left having to reestablish those customer relations they already had.

Once these farmers are supplying the food hub, the most difficult day-to-day job of the food hub is balancing the supply and demand. What most food hubs are seeing is that the demand for locally grown food is much greater than the local farmers can produce. Then the food hub has to consider what to sell during the winter months. Most farmers that have to deal with seasonal weather are not interested in selling during the winter because it can be a gamble and requires learning new practices. Boston Organics has to resort to shipping in produce from various areas of the country in order to maintain consistent production to their customers. These problems can plague a food hub that is trying to work with food justice movement to help serve food deserts.

When we talked to the REC of Worcester, they sounded very interested in helping support the development of a food hub to serve low-access and food desert communities. According to our research, they would be one of few organizations in New England to do so. However, this means they must overcome several big challenges such as funding, staff commitment and business expertise. They hope that they will be able to keep it sustainable through other means than just revenue. However, they do intend to have the revenue cover a significant portion of costs to run the food hub.

4.3 The Need to be a Business-Minded Organization

The hallmark of a successful food hub is an emphasis on good business planning and development. Many successful food hubs have the support of at least one dedicated entrepreneur from the beginning. This focused individual is a dynamic source of innovation for the food hub as it begins operations, and is a source of business acumen. Essential decisions about the hub's future flow from that group or individual. The entrepreneurial spirit is a powerful influence on the food hub, steering it away from becoming a merely ideological establishment and grounding its plans in viable business strategy.

The value of business-minded development is supported by evidence gathered from our interview with Wholesome Wave and the Intervale food hub case study. With its experience in assisting many food hubs towards financial sustainability, Wholesome Wave has found that hubs with an already established business plan succeeded most often. Those plans were often created by a single motivated volunteer or employee working on the hub, and were detailed enough to

provide Wholesome Wave with enough confidence to invest in the project. During our interview, the representative stressed multiple times that a business-minded entrepreneur is key to the success of the food hub. They also mentioned that Wholesome Wave does not give 'mission-driven' hubs a lot of consideration. 'Mission-driven' implies that the hub was founded only on the ideal of helping organize local farmers, or to increase food access. According to Wholesome Wave, these hubs do not often have a well thought-out business plan or a high degree of fiscal responsibility. A motivated employee or group of directors would provide the hub with these assets, while also freeing up resources to focus on the mission.

The Intervale food hub is a prime example of a business-minded organization. During the formation of the food hub in 2007, the Intervale Center hired a full-time, paid employee to be their food hub Coordinator. She has an extensive background in both farming and business management, and serves on the Board of Directors for NOFA in Vermont. Her capabilities in these regards allowed her to effectively manage the growing business and establish a plan for its fiscal success. It was also through her efforts that the food hub established personal connections with their farmers during the planning and construction phase, which helped secure the hub's supply of produce for the future. The Intervale food hub continues to grow in the Burlington region because of the Coordinator's early creation of a robust business plan.

It is evident from our research that a food hub should have at least one member of its staff dedicated to both the business and financial planning of the enterprise. It is not enough to be an organization with connections between farmers and consumers; without a viable business plan, a hub will quickly fall apart due to lack of governance and foresight. A new food hub should make hiring a well-qualified full time coordinator a top priority. The contributions they provide will have a high return on investment.

4.4 Building Strong Relationships with Consumer Partners

Successful food hubs also establish good working relationships between retailers, consumers, and large buying institutions. Institutions may have very little knowledge about the origins or quality of the food that they serve, as it is provided by large corporate distributors. This is especially concerning for institutions with populations with strong feelings about food traceability, such as universities. By providing consumer education about the sources of local food, as well as information about environmental and social impacts of buying local, food hubs can play a vital role in both changing the source of institutional food and in educating a population about the food system. Being a source for education also builds strong relationships with individual consumers.

For food hubs that rely on individual purchases, such as those with CSA distribution models, we found that most hubs utilize the internet and social media sites to spread their message and market their products. Other hubs have printed newsletters, which they send regularly to subscribers. These are very effective strategies, as it requires very little effort on the consumer's part to acquire a great deal of information on the hub. The internet also allows food hubs to offer digital sales capabilities, which reduces the consumer's need to travel to the hub itself. Utilizing the well-established notion of providing helpful and friendly staff for the hub is also a good pathway to success. These employees or volunteers will guide new customers through the process of buying from the hub. The positive attitude and large knowledge base of these people will benefit the hub's public image and help attract more business.

Figure 13: Example of an event promoting local food, Earth Day and Spring Fest.

Some food hubs also provide more for their communities than a source of food. For example, The Intervale food hub hosts public farming demonstrations, and local bands often play a part in the hub's seasonal sales. These offerings help engage the community and establish the food hub as a permanent fixture in the region. Involving the hub in established local activities, such as a summer fair or parade day, is also a good strategy to gain more business.

Larger institutions require a nonconventional approach to marketing. Andy Pressman at NCAT and Wholesome Wave has seen many hubs pursue the strategy of holding business meetings between hub representatives and the potential institutional buyer. These meetings are official events meant to discuss the capacity of the hub to supply the institution's needs, and to be information sessions about the advantages of local food. food hubs have the ability to provide farm-to-table traceability for their produce, which can be a boon for institutions with sustainability initiatives. These meetings can also establish a contract for the hub's delivery services.

It is important for any food hub to appeal to its consumers, either institutional or individual. food hubs offer a unique alternative to conventional forms of food access, and business-minded hubs take advantage of that through their advertising. Food hubs serving institutional markets also benefit from advertising the advantages of buying local to their consumers. Institutions can benefit financially by offering local food, and their profits increase by using a food hub's efficient distribution model.

4.5 Financing

A food hub needs some source of financial support to be successful, either from investors or financial aid programs. The startup overhead cost of operating a food hub is, in general, too high for entrepreneurs to handle on their own, but many funding options are available to them. These options include federal, state, and private funding as well as private companies dedicated to investing in food hubs and assisting them in their early years.

During our research period, we conducted an interview and case study for one such company: Wholesome Wave. This company operates to assist food hubs in startup, acting as a so called "angel investor" for the hub, with the goal of establishing organizations which can increase healthy food access in communities. Victoria Foster, the representative for Wholesome Wave we were able to interview, stressed the importance of strong financing in food hubs. . Victoria explained to us how on a fundamental level food hubs are businesses, and just like any other business they need sufficient capital and revenue to operate. Victoria explained how many hubs started by a coalition of farmers with the goal of helping the community tend to fail, simply because the managers of the hub do not focus enough on the financing aspect of the business. The hub can by all means be used to help the community and improve food access, but must at all times be run as a business with the necessary sales revenue to stay functional.

Wholesome Wave does not just invest in food hubs, but also serve as advisors and consultants for the hubs' management to ensure that the hub runs efficiently and their investment stays profitable. Once a hub has determined a solid business plan and has a driving entrepreneur or manager, Wholesome Wave will invest the needed startup capital and then work with said managers to find the best business options for the future of the hub. This could be an extremely useful program for a food hub in Worcester, with the hub benefiting both from the financial aid of the program and the extensive experience of Wholesome Wave's consultants.

Our research has shown that a food hub's business model, that is whether they are for-profit or non-profit, is often the deciding factor for funding options. The majority of non-profit food hubs cannot operate solely based off revenue, and as such rely heavily on either private investors or financial aid. A factor in this finding is the non-profit organizations operating on a smaller scale, catering to individuals and smaller groups rather than institutions. This smaller sales volume leads to smaller revenue, meaning the hub must find funds somewhere else to cover their expenses.

Through our research analysis of the various food hubs, we have found that for-profit organizations, on the other hand, seem to operate with a lower reliance on outside funding. This is a consequence of a higher sales volume, brought about by the hubs' generally focusing on larger market areas. This is not to say that the majority of for-profits do not require funding assistance; our research has shown that the majority of food hubs do; however, for-profits seem to have a smaller dependence, and can work to pay back these debts.

In order to use these funding assistance programs, a food hub must first locate and apply for them. The USDA offers a comprehensive list of all their funding programs on their website. These include State and Federal loan programs, farming grants, and other such financial aid. One point of interest on this subject however, which Victoria Foster explained , is that the available financial aid programs such as those listed on the USDA are becoming more and more difficult to receive due to the increased number of organizations applying for them. Because of this, many hubs are focusing more on private investors and companies such as Wholesome Wave to meet their financing needs.

4.6 Infrastructure

A starting food hub needs to address the physical challenges of planning the process flow of their hub's infrastructure in order to operate efficiently. The workspace and process flow must be as efficient as possible in order to maximize output and therefore profit, and to do this they must have all the necessary equipment and infrastructure. This infrastructure includes processing, packing, and shipping equipment, which in some cases can be leased from outside sources.

One of the key points taken from the visit to Roger Noonan's hub site in Manchester was the necessity of using different processing machines for different crops. For example, the machines used to peel and cut potatoes are different from the machines used to process squash. Because of this, Roger explained how all of the equipment must be mobile, usually in individual sections that link together when needed, and stored easily. He also stressed to us the importance of Food Safety regulations in the food hub, noting that the regulations the hub must follow vary based on state and even city. It is imperative for a hub to know these rules and regulations and put them into practice in their business.

In order for a hub to maximize their profits, they must maximize their output. This means that the hub infrastructure must be as efficient as possible; from the point the food enters the hub until it is delivered to the customer. In the case of Roger Noonan, the food entered directly into the processing room through

Figure 14: A truck used by the Intervale food hub.

a loading door, was processed, and then stored in a refrigerated room next door. From there it was delivered by trucks to the buyers. This design, while limited somewhat by the facility itself, was setup to minimize the time taken between steps to make the food travel as fast as possible. This goal of creating an efficient workspace and process flow of the hub is one of the most important design aspects to consider for a food hub entrepreneur.

Another key finding our group took from our research, and one stressed by Victoria Foster of Wholesome Wave was the need for starting food hubs to utilize whatever existing infrastructure they can. The processing, packing, and shipping equipment needed to operate the hub can be extremely expensive, but often times it is available from some other organization or business in the area. The advantages of leasing said equipment, or even better borrowing it from someone willing to help, make it a feasible and smart option. For example, the New London food hub of Connecticut utilizes the refrigerated storage of a nearby food bank, in exchange for donation of food. This allows them to avoid the large investment cost of a refrigerated storage room. Our team has contacted Jean McMurray, the Executive Director of the Worcester Food Bank, who expressed a willingness to work with a food hub in Worcester in a similar collaboration. The Food Bank is in need of fresh produce and if a hub could utilize their storage in exchange for such produce, both parties would benefit.

One of the largest costs for a food hub, other than the facility itself, is the trucks used to ship and deliver food. Considering the cost that these trucks pose, the advantages of leasing generally outweigh buying. If a food hub can lease trucks for delivery, it considerably lowers their startup cost, and also eliminates the costs they would incur for maintenance. We recommend that any food hub, at least in the startup years, lease trucks and whatever other infrastructure possible in order to minimize initial costs.

Another topic of consideration related to infrastructure is the possibility of using community kitchens for value-added services. Many food hubs have kitchens of their own in their facility, in which they make applesauce or carrot sticks or other such value added products. However, the cost of building and maintaining such a kitchen can be high, especially for a hub just starting up. If the hub can take advantage of a community kitchen, for example at a church or food bank, they can benefit from offering value added products without the cost of operating their own kitchen.

4.7 Knowing Your Territory

In order for a food hub to be successful, they must first understand their region and target market—what we refer to as their “territory”. The hub must identify whom they mean to cater to, what they want to sell, how they are going to sell it, and how far they are willing to travel to do so. This target market and distribution range is not standardized for all hubs, but rather depends on the context of each hub individually.

In order to understand their market, a food hub should consider what kinds of consumers exist within it. For example, if their market is a low-income urban community, the buying power of the population will be lower and the hub would want to cater more towards institutions. However, if they are targeting a higher income suburban neighborhood they might be able to offer higher priced orders to individuals and still meet the revenue they need. A number of hubs we have researched that are located in lower income areas have begun shipping their produce to larger cities in order to access the higher-income market that exists therein. Additionally, approximately 64% of food hubs we have studied mainly target institutions and restaurants in order to increase sales. Whether they started out doing this or transitioned from sales to individuals, they have done so because the revenues are significantly higher due to the higher buying power of the institutions versus smaller scale buyers.

This idea brings about the problem when trying to connect food hubs and food justice programs in lower income areas, with the goal of getting fresh produce into said areas. food hubs are a business and need adequate funds to continue operations, so without outside funding and financial support, many hubs are unable to operate serving lower income communities. For this reason, it is imperative that a food hub looks for investors and financial aid, and partner with food justice initiatives, in order to help these communities.

Many hubs offer programs of their own in order to assist with this problem. One such that could be utilized is a mobile market program—a truck or van that sells the hub's produce and can access the market of individuals with limited transportation opportunities. Additionally, the Intervale food hub offers a program designed to accommodate college students' schedules, adapting their hours to do business when students would be available.

Once the hubs' target market is identified, it must then determine what exactly they wish to sell. This means determining whether they are selling organic, non-organic, or a combination of both, as well as what specific produce they wish to carry. Many hubs offer only CSA programs in which the customer has no input into what they receive. They simply place an order for a basket and the hub fills it with whatever crops they have available at the time. While this does limit the customer's choices, it also reduces price, something to take into consideration based on the target market.

On the other hand, many hubs operate programs similar to custom-order grocery stores; the customer ordering specific products and the hub delivering them. This requires the hub to have a large, reliable supply of produce, which increases costs of storage. However, the prices for these orders compared to those of CSAs are considerably higher, meaning that the profits may outweigh the expenses. Again, before determining what the hub will sell, it should first conduct a thorough market analysis to determine what would be the most profitable.

Our research has shown that the feasibility of a food hub operating purely organic from the start is not high. Many of the hubs we researched started with this goal in mind in order to increase the supply of organic food in their communities. The problem they encountered was that the supply of this organic produce was not large enough to meet the high demand. They

simply could not make the necessary revenue in order to continue operations. Out of the food hubs we researched who fell into this category, almost all either went out of business or converted to selling non-organic as well as organic. However, a food hub with adequate financial support or one operating both organic and non-organic would find a huge market for organic produce and, depending on their region, could charge a premium for said produce.

For example, Roger Noonan expressed to us a desire to operate organically, but explained that the supply he needed to operate on the scale intended just simply did not exist in the area. He stated the demand for organic is high, but the majority of farmers do not grow organic due to the large risk and lower output this brings about. They can make more money growing non-organic, and so they do so, meaning a hub can rarely find adequate supply.

Despite the added challenges of operating organically, some food hubs are able to do so because of their market context. For example, Boston Organics is a hub operating in Boston, Massachusetts, catering organic food CSAs to higher income customers. This higher income customer base allows them to charge more for their products while still keeping up sales, allowing them to operate organically. This is a further example of the importance of understanding the target market of the food hub before determining sales strategies.

The last step in understanding a food hub's territory is determining large it is; e.g. how far they are willing to travel to access customers. The travel costs of distribution are one of a food hub's main expenses, meaning that the efficiency of that travel is extremely important to maximizing profits. The hub must determine the maximum range they can travel while still making adequate profits. Something to consider in this planning is the possibility of accessing higher income markets through extended travel. For example, many food organizations in Western Massachusetts will cater to the Boston area in order to access the higher income markets therein, finding that the cost of travel to reach said markets is feasible given the increased revenue.

The context of a food hub and the territory it operates in is one of, if not the most, important aspects included in the planning of the hub. Without an adequate understanding of this context, the hub will not be able to maximize efficiency and profits, and will most likely fail. However, a strong understanding of the territory will help the hub to be successful and sustainable for the future.

5.0 Recommendations

5.1 Key Questions to Consider When Starting a Food Hub

Above all else, it was determined that establishing a food hub is a serious challenge. food hubs are new concept, there lacks a well-established process for doing so, or even a concrete definition of a food hub. Therefore, those starting a food hub may find themselves having to make a lot of decisions in defining the concept for themselves and creating a process for themselves. The business acumen needed for any business is needed here, with the additional challenge of dealing with a supply that is dependent on nature for its quantity and quality. In attempting to serve a food desert with a food hub, one would have even less models of existing businesses to inform the project. In general, though, we believe it is the same key questions that need to be addressed for these regions—since taking into account the food hub's target market is critical, regardless of what that market is. From our research, we have compiled this list of questions that must be considered by those intending to start a food hub.

Business Model

- On a national scale it was found that about 32% of food hubs were non-profits and 40% were privately owned. What kind of business model would allow your food hub to be the most sustainable given the context? Who will be running the food hub? What skills do they possess that will be applicable to food hub management?
- Is there a driven leader with the motivation to complete the food hub's startup process?
- How will the organization be structured, how will staffing needs be met? How will you identify different job descriptions?
- What is the overall mission of the food hub? How does this mission resonate within your community?
- Is there a way to incorporate volunteering into your food hub, assisting with value-added service or distribution?

Financing

- From our case studies 60% of the food hubs relied on some kind of government funding. Will your food hub rely on government funding to support any of the operating costs?
- What kind of funding could you obtain from your state or local regional government?
- What kind of partnerships with food banks, public kitchens and other organizations could reduce your investment costs?
- Are there any private investors who would support your business model and provide funding?

- Does your business plan look sustainable without external funding? How will you generate revenue, through CSAs, Co-ops, institutional contracts, or individual sales?
- From our findings, successful food hubs must operate on a large scale if they want to be profitable; how does the business plan address expansion in the first couple of years?
- Most successful food hubs have a financial supporter, like the Intervale Food Hub and the Intervale Center. What kind of supporter would financially back your food hub?

Target Market
- What types of markets will generate the most profit for your food hub? Is there an interest among these groups for buying local?
- In our findings New England food hubs had a higher rate of hybrid food hubs than the national numbers; this can be most likely attributed to food hubs trying to serve dense urban areas. What are the demographics of your potential customers? Are institutions or individuals? In what ways would to appeal to their age, sex, race, income, location, etc?
- What food suppliers are already providing to the target market? Would your product be competitive without any local or organic branding?
- What is the buying power of the customer market?

Marketing
- From our findings, almost half of the food hubs had distributed periodic newsletters to those interested. How will your food hub engage current customers and prospective customers?
- Almost all of the food hubs studied had a website that allowed individuals to contact the food hub or place orders directly. What features should your website have to best serve your targeted audience?
- What methods of marketing would reach your targeted audience the most effectively, considering demographics and logistics?

Community Interest
- Many food hubs we studied had a greater presence in their communities than simply as a business selling food. For example, conducting farming exhibitions, hosting food shows, or distributing newsletters. Do you plan on incorporating any other such functions into the food hub?

Distribution Methods
- There are a large number of ways food hubs can distribute food conventionally or unconventionally. Who are the suppliers that could serve the food hub and what are their capabilities? Likewise, who are the customers and what are their preferences?

- When talking with Wholesome Wave, they found that operating to your market interest is key to being sustainable, what kind of infrastructure can be leased or rented to scale back on ownership until the food hub has the revenue to support the investments? How can you effectively reach the needs of your customers without investing large amount of capital?
- CSAs are generally affordable to the customer, but don't give the customer variety. Do your customers prefer to have variety or affordability? This needs to be determined before deciding on a distribution method.
- What is the maximum cost effective range you are willing to travel to search for suppliers or target market?

5.2 Areas for Further Research

Our project introduced us to several avenues of research that we, unfortunately, did not have the opportunity to pursue. We have included them here as a recommendation for future researchers.

Develop a business plan/feasibility study for the Worcester area.
Our interview with Wholesome Wave showed us that a strong business plan is vital to a food hub's success. The process ended up being more involved than the scope of our project allowed. Such an endeavor would involve extensive business research, but it's a key aspect of food hub development.

Determine how to best take advantage of existing food access initiatives.
In order to assist the low food-access areas, a thorough working knowledge of opportunities available to supplement the buying power already present in these communities is needed. Our research revealed to us a variety of different organizations with different strategies toward improving food access. This abundance of information could actually be daunting. For instance, in the interview with Drew Love (Appendix A.2), he listed off the following:

- Harry Chapin Foundation
- Green Mountain Coffee
- Specialty Crop Block Grant
- Robert Wood Johnson Foundation
- Project Bread

These were all additional to organizations throughout the rest of our project. Developing a plan to best utilize all of them would be useful for those interested in the food justice aspect of this project.

Perform a market analysis of local produce demand in Worcester.
Our research has shown that the context of a food hub's market is critical to its decisions. From our interview with the REC, we know that an analysis of this market would be a desired product for a starting food hub. This market analysis would include the make-up and shopping preferences of the target market and the demand and buying power of the community. The analysis would be sufficient to make an educated guess at what to sell, where to sell it, and what prices would be workable.

6.0 Appendix

Appendix A: Interviews

A.1 Boston Organics Food Hub

Phone Interview with: Amy Moses
Conducted on: 1/22/2012
Conducted by: Brandon Okray

Can you describe for me the mission of your food hub?

Summary of Response: This food hub tries to address the food Desert problem by having an intense operation where the food hub delivers directly to customers in the Boston Area. Boston Organic delivers to the Boston and Greater Boston area (which has several small food Deserts). The mission of the food hub is to support local farmers, while encouraging available, healthy and organics food availability in the metropolitan area.

How does your food hub operate and what services do you provide to your customers?

Summary of Response: This food hub operates different than most because it brings in organic produce from farmers, who are usually in the New England area. However, when certain fruits aren't in season they will continue to supply their residential customers with organic food. This will ensure that the costumer is getting a consistent balance in the food choices and aren't deprived of certain foods. The food hub delivers what are called "Food Boxes", which can vary in size and content. This way the costumer will pick a package that fits their needs depending on how much food they want and how much fruit vs. vegetables they want. This way the costumer has a variety of different opportunities to find the food that fits them. This food hub not only has produce but also other special items can be purchased for delivery in the Food Box. Some examples of these foods are chocolates, breads, coffee and more, which all come from local operations and are generally organic.

What are you methods of distribution and structure of your supply chain?

Summary of Response: This food hub has a distribution model that makes continuous stops all around the city to service as many individuals as possible. The way the distribution works is costumers can sign up for bi-weekly or weekly deliveries depending on where the costumer is located. Customers can also choose what day of the week their "Food Box" will be delivered.

This food hub really utilizes the technology of the 21st century, where individuals can customize their orders and manage their delivery schedules all over the food hub's website. The food hub not only has an expansive distribution system for the Food Boxes, but the food hub also brings in food from all over New England and Canada. Some of the food gets shipped from seasonal farms in California and Florida. The coordination and supply routes mean that they have to know their market in order to predict demand and gather produce from all over the country.

A.2 Drew Love

Phone Interview with: Drew Love
Conducted on: 2/25/13
Conducted by: Tara Shewchuk

What strategies have you used to increase food access?

Summary of Response: All farmer's markets can theoretically accept SNAP, since it is a legal form of tender, but they are often unequipped to do so. He would outfit existing farmer's markets with terminals that allow them to accept SNAP and EBT. Additionally, he would provide an incentive program that doubled the worth of the SNAP benefit. He found that, even well after a farmer's market was equipped to accept SNAP, there would still exist a belief that it did not. He identified this as a challenge, as well as the fact that farmer's markets tend to be located in upper-class neighborhoods.

The CSA model was modified a little for low-income populations. They were able to pay on a weekly basis, as opposed to up-front. The amount of food was appropriate for people with families and others were encouraged to make "CSA buddies" if this was not the case. This approach allowed food to be dropped off at a location in the center of the community in need, an advantage over the farmer's market model.

Have you ever considered a partnership with a food hub?

Summary of Response: He thinks his work is too small-scale for an effective partnership with a food hub. His impression of food hubs are that they serve large institutions, as opposed to his work getting food to residences. He identified the "Real Food Challenge" as an effective collaborator for a food hub. This is a program that gets colleges/universities to commit to serving 20% local food.

What resources do you know of that could assist a food hub with a food justice mission?

Summary of Response:
Harry Chapin Foundation
Green Mountain Coffee
Specialty Crop Block Grant
Robert Wood Johnson Foundation
Project Bread

Any other thoughts?

Summary of Response: He is surprised at how many movements with this purpose never actually interact with the community they intend to help. He suggests getting involved with a group that can get us to actually interact with the community.

A.3 Mason Square

Interview with: Wanda Givens, Program Director Mason Square Food Justice Initiative
Conducted on: 2/11/13
Conducted by: Tara Shewchuk

How were you founded/started?

Summary of Response: Baystate Medical Center received federal money for construction of an addition to the hospital. They were required to give a percentage back to the community. One of the communities chosen was the Mason Square neighborhood. The Mason Square Health Task Force was created to use this money effectively. It is a 7-year grant; they are in the 6th year. They are unsure how they are going to proceed when the grant is up, but are thinking of moving from direct programming to more policy advocacy.

What resources did you use? (Financing, grants, etc.)

Summary of Response: The Food Justice Initiative was originally funded by Boston Public Health. The task force was instructed to address a health issue in their community. They chose food issues because so much work had already been done in this area.

Which strategies were effective for serving under-served communities/helping local food movements? Which were not effective?

Summary of Response: Ms. Givens recommended using research that was already done (in her case, choosing food issues to focus on because it was an already developed topic). She has found that most of the strategies have worked and she attributes this to the group's dependence on community feedback. The group tries to stay as grassroots as possible –teamwork is valued and no one assumes a leadership role. She also recommends using education and invitations to participate to address individuals who are initially against food access strategies (in this case, city planners, developers, etc. were against efforts to build a grocery store in the neighborhood).

The one example of a strategy that did not work was a transportation system that they got a grocery store to set up (a bus to get people to and from the grocery store). She is not sure why this initiative failed.

Were you imagining different outcomes than what you got?

Summary of Response: So far, the outcomes have been as expected, although she anticipates more difficulty when more specific decisions need to be made (if they get a grocery store, the specifics of it).

What impact do you think you've had on the community?

Summary of Response: They have worked to extend farmers markets hours, finding different coupons to provide people to access healthy food (including prescriptions from a doctor to go to the farmer's market), and provide education to the community in the form of workshops such as how to read food labels and shop a grocery store for healthy items.

Any last advice to add?

Summary of Response: Ms. Givens advised potential food justice initiatives to have clear objectives. food justice is a big issue that, when broken down, can easily provide distractions. In her case, with the potential of a grocery store coming to the neighborhood, the group got a little side-tracked with work-force development (the community wanted members from that community to be hired for the grocery store). This is an issue that was not in the scope of the initiative's objectives.

A.4 Monadnock Farm and Community Connection

Phone Interview with: Emerald Levick, Program Coordinator, Monadnock Farm and Community Connection

Conducted by: William Frankian

Conducted on: 2/20/2013

How were you founded?

Summary Response: Two Antioch university interns doing a capstone project on the local food system teamed up with Amanda Costello who now oversees the initiative. They also sought guidance from local food conservation district advocates. They learned of studies showing that supporting the viability of farms benefits the environment of the county.

This group worked on getting the community involved, starting a series of forums on different food system topics. The forums had huge community engagement, starting working groups 'accidentally' who were interested in moving the project further. The university interns became AmeriCorps Vista volunteers to run this program, while a GIS mapping professor at Antioch did inventory work for local farms mapping the soil quality in the region. Unless towns know the valuable soil, they cannot protect it.

The GIS project also established a list of all the farms in the county. This list was highly detailed, including the infrastructural needs of the farmers and estimating upper limits for food production in the region.

What financial resources do you use?

Summary Response: The MFCC is grant funded, mostly from the federal level. It also receives support from the New Hampshire Charitable Foundation and a private wealthy individual. There was also an AmeriCorps Vista program offered for two staff members in 2007. The MFCC also takes advantage of a specialty crop block grant, and a USDA grant through the farm bill

What programs do you offer for the less fortunate in your community?

Summary Response: The MFCC organizes EBT and SNAP coupons for farmers markets in the area. Originally, they used WIC coupons, and the Keene farmers market originally used SNAP and EBT, but New Hampshire stopped providing matching funds. MFCC Got an EBT machine and now matches purchases.

Which strategies have been effective for serving underserved communities/helping local food movements? Has anything not been effective?

Summary Response: A successful program is their Farmer's market incentive, which is based on a model used all over the country. The issue addressed by it is the difficulty farmer's markets have in attracting new customers, who may find the market alienating or cannot afford the prices. The MFCC offers these markets money to match up to the first $10 of EBT purchases for every customer. They also connect the markets with growers who offer vegetable plants for sale on the first market day. The plants can be bought with EBT credit, and help connect more families with the source of their food. MFCC is hoping to work with Wholesome Wave in the future to expand this program, since as of now it can only provide about $100 in matching funds to each market. They have also faced the challenge of finding an intern who can run EBT machines.

The MFCC's Farm-to-Restaurant program has been less than successful. The program originally had contracts with restaurants who pledged to buy food from local sources. Essentially this created a food hub out of the program, with the restaurants relying on it to supply them with food from the local farmers. They tried to work with the Windham food and Farm Network in Vermont, which lent them a truck. Unfortunately, they discovered that the farms in both regions did not have the soil quality to supply this added demand. The program was then supplemented by Westminster Organics, but that proved less than ideal due to it being not a local program anymore. The program was a pilot project with insufficient planning. MFCC will try it again in the spring of 2013.

Their Monadnock Matchmaker program has met with mixed success. The concept behind this was to get as many farmers and value added producers together with consumers from institutions and restaurants all under one roof. The original format of the gathering was 'speed dating' where the conversation partners were quickly switched out. This method quickly dissolved into chaos. The new iteration of the program has a booklet of attendees so that everyone can make their own matches. There will also be a

panel of people from all sides. The program is based on the idea that building relationship is the other half of the aggregation and distribution system.

Have you considered using a food hub as a distribution center for your efforts?

Summary Response: A food hub was not included in their original grant applications. Though the possibility for creating a food hub in the region certainly exists, it would require business minded individuals and a solid business plan to take off.

What impact do you think this program has had on the communities you serve?

Summary Response: The primary objective when beginning the project was to understand whether the small communities in the region were willing to shop at farmers markets. "Strip Mall New Hampshire" actually responded very positively towards the concept. Analyzing the impact of the MFCC has proved difficult to accomplish empirically, but there have been several signs that the communities have improved. The MFCC is opening a food co-op in April 2013, which will be a tangible location for people to see the abundance of local food. Additionally the MFCC has seen everyday people offer to volunteer for their association, meaning that the awareness of the movement is growing of its own volition. A Monadnock buy local group has also sprung up. It is trying to fill the space left by the farm-to-restaurant program by getting businesses to advertise that they buy local.

What other programs or businesses exist within your areas of operations?

Summary Response: There is a new for profit business in the region that is providing value added kitchen space to farmers, called Neighbor-Made Kitchen. The MFCC has also begun a tool-sharing program between farmers. With the support of a 'mooseplate' grant, they have bought high-end farm machinery to rent out to farmers. NOFA NH has started a beginning farmer networking program to educate new farmers. Thanks to a farmers market marketing grant, Antioch University and the conservation district are launching a buy local campaign as well as marketing classes for local sellers.

An Agricultural Commission was also established in Monadnock County. There is a need for these commissions because they work to give a political voice to agriculture. The MFCC has supported seven towns in creating Ag Commissions since 2007.

A.5 Regional Environmental Council (REC)

Phone Interview with: Grace Duffy, Coordinator of REC's YouthGROW
Conducted on: 2/14/13
Conducted by: Tara Shewchuk

To what extent have there been discussions in Worcester about the need or opportunities for a food hub?

Summary of Response: YouthGROW is a ten year-old agriculture-based youth employment program with 32 youth participants and two urban farms. Youth can progress from summer program to year-round program to leadership positions. The program grows over 3,000 pounds of food every summer and connects with farmer's market. The program tried to donate food, but they (and other farmers) found it difficult. Also, for the past two years, the youth have been working with value-added products. They make a hot sauce that they sell at the farmer's market. There's a lot of interest in the hot sauce (e.g. Cabot) and they would like to expand, but they (and other farmers who want to do value-added products) find it difficult. Just selling produce is not profitable for most farmers.

There's a lot of talk of a food hub. It is part of the vision for Worcester.

What would it take for a food hub to begin operations in the Worcester area?

Summary of Response: Getting the city government on board.

What groups could be involved?

Summary of Response: Unum, Harvard Pilgrim (health insurance companies) and UMass Memorial.

What do you see as the challenges to creating a viable food hub?

Summary of Response: Worcester gets nervous about big ideas, especially ones that wouldn't immediately generate tax revenue or create jobs. The food hub would have to be marketed to them. Also, the issue of brownfields.

Are there local/regional growers who might have the resources to implement a food hub with the help of other groups, such as the REC?

Summary of Response: No, they don't have the time or resources. They would need an anchor institution.

A.6 Regional Environmental Council (REC)

Interview Conducted With: Steven Fisher, REC Executive Director;
Casey Burns, REC Food Justice Program Director;
Brian Montverd, Clark graduate student and REC employee
Interview Conducted By: Professor Robert Hersh, Brandon Okray, and Tara Shewchuk
Date: 4/1/2013

What is your current status regarding the creation of a food hub?
Summary of Response: The REC has been considering this idea for about a year. They have an idea of a possible location, if they get the funding. They have also talked to a handful of partners and possible customers.

What tenuous partnerships have you set up?
Summary of Response: The REC has talked with NICHE hospitality, which has four or five restaurants in the area. They have gotten Congressman Jim McGovern excited about the idea. They have talked to the food procurement directors of two hospitals—St. Vincent's (Dennis Irish) and UMass Memorial Medical Center. Lastly, they have talked to the food procurement director of the Worcester public school system (Donna Lombardi).

What concerns do you have regarding the food hub?
Summary of Response: The REC is concerned that the food hub won't be able to fulfill their food justice mission. After our discussing with them our Wholesome Wave interview, they are concerned that they lack someone with a business background to make a business plan and analyze the viability of the potential hub.

What questions would be useful to you for us or a group like us to answer?
Summary of Response: The REC was intrigued with the organization Wholesome Wave, which we discussed with them. They would like to know where Wholesome Wave gets its funding, as well as the current Wholesome Wave projects. They would like to know how all the organizations in Worcester could work together. They would like to know what obstacles were encountered or mistakes made by other food hubs. Lastly, they were really concerned with how to make the economics of a food hub work.

Do you have any recommended contacts for our project?

Summary of Response: Throughout the REC meeting, the following organizations were brought up:

- Winrock Foundation
- Let Us Be Local
- Acme Prepack (local distributor)
- Health Foundation of Central Mass.
- Bronx, NY food hub that serves food Justice neighborhood (name unknown)
- Processing plant in Greenfield

A.7 Wholesome Wave

Interview with: Victoria Foster at Wholesome Wave
Conducted by: Brandon Okray, William Frankian, Tara Shewchuk, Bob Mahoney
Conducted on: 3/25/2013

Brief overview of Wholesome Wave:

- National non-profit focusing on access and affordability for food organizations
- Established double value coupon program for consumers on food stamp programs
- Runs programs in 30 different states, hundreds of farmers markets
- Started fruit & vegetable prescription program for
- At risk children/pregnant women
- 30% BMI reduction seen in patients
- Focuses on infrastructure issues related to food hubs
- Most prevalent problem: investors interested, weren't any investment ready businesses
- Interested in providing capital, not grants
- Team born to fill the gap between investors and entrepreneurs
- Business has to address access and affordability
- Lots of partnerships, no clear driver

How to determine if business is investor ready

- First screening
- Analyzing business plan & market opportunity
- food hubs – hard to be self-sustaining on small scale

Are there many opportunities for federal funding or is it generally private investors who fund food hubs?

- There is federal funding, USDA, Farmers credit union, NEWMAC
- USDA resource guide for food hubs

Would you recommend non-profit or for profit business model

- Not a specific structure, important to start with objective
- Identifying how you are going to make money
- Depends on market, business owner, etc.
- USDA Funding Opportunities

What have you seen as good target markets?

- Different categories
    - Food hub that continues chain (cooling, packing, etc.)
    - Connection to markets
    - On larger scale, food hubs can target institutions, hard to do starting off
    - Could have an actual market at the hub
    - Understand what your customer wants

So going along with that, one of the things we've found is that a lot of small scale startup food hubs have failed because they couldn't produce enough profit, so what would you recommend for a business model type for Worcester

- Crucial to understand how business model is financially viable and to
- Use infrastructure that exists already
- Not every hub has to build facility, own truck
- Owning generally not a good strategy
- Food banks can be used as great places to incubate growth
- Example, to serve school market, most markets can't handle whole unprocessed food
- Want them washed, peeled, chopped, etc.
- If those facilities already existed in the area, makes sense to leverage that instead of doing it yourself.

Can you elaborate on the food bank partnership?

- Example: Fresh new London
- Big asset can be renting out storage
- Using existing infrastructure to reduce costs
- Food processing facilities such as cutting and packing so the hub doesn't have to do that themselves initially

How do food hubs approach institutions?

- Based on relationship
- Much more professional focus
- Account managers to manage contacts
- Not just food, value from marketing materials, telling the story of the food
- Traceability of the farm and supplier
- Sell the product as locally grown

Do you think large schools like WPI that currently use Chartwells would ever consider buying from a food hub?

- There are examples of larger food hubs accommodating supply
- But they need to have large enough supply to start this process, starting out it wouldn't be viable for the food hub to try to take on that much volume

Can you think of any successful food hubs best practices you've seen?

- Entrepreneur team is everything
- Relationship between farmer and customer
- Thinking like a business, not simply just to help farmers, you have to make money to stay in business

What are some common pitfalls starting out?

- Most started because farmers needed market, didn't consider demand or business problems
- Hard to switch focus to customer side
- Understanding stages of growth
- Need grant funding or similar investor funding in the beginning

How long does the consulting process you go through usually take?

- 1-2 years to establish track record, varies greatly between hubs
- When do you know a food hub is ready?: pre-investment work to establish debt or equity for investment, no set rule.

Worcester food hub:

- **What point would you look for before you start investing/consulting with a food hub in Worcester?**
- Solid business model, looking for first criteria met
- "Driver" – the entrepreneur or person that's really the driving force keeping it moving
- Initial conversation to get a sense if it's something that makes sense from investment side/investment need/could the enterprise support financing.
- Is it the REC that's actually running hub, who is the entrepreneur, coordination between people on the ground and management

Victoria asked that we send her any quotes we intend to use in our report beforehand so she can sign off on them.

Appendix B: Food Hub Case Studies

B.1 Massachusetts

Food Hub Name	Berkshire Harmony	Berkshire Organics	Red Tomato	Mass Local Food Coop
State/Area	Pittsfield, MA	Dalton, MA	Canton, MA	Sterling, MA
Financing	CSA share purchases	Revenues from sales only, maybe some private investor funding	60% from government and foundation grants and individual donations (list of grants on website), 30% from trade based income, 10% from consulting	"Relies solely on volunteers, donations, and revenue from sales"
Distribution Methods	CSA, farmers' market, farm stands, emergency food services, wholesale, and charity food kitchens.	Store and delivery. Customers can place orders for either delivery or in-store pickup through their website. Website is very easily navigated with an impressive selection.	Direct Store Delivery or Distribution Center type distribution, depending on product. Shipping done by a network of third party truckers	Online shopping cart and delivery system, connects consumers and producers through online marketplace
Business Type (profit vs. non-profit)	Profit	Business is for-profit. They also started a non-profit called Berkshire Organic S.E.E.D.S. (Sustainable Education Every Day for Students) that connects local farms to the Dalton and Pittsfield (a food desert) School Systems.	non-profit, coordinates marketing, sales, and logistics for over 40 farms, not all organic	profit, coop corporation, online ordering, not locked into buying like in a CSA, can order as much each month as you want
Target market	Individuals	Homes and businesses.	individual consumers	Individual consumers
Community interest/links to comm.	Collaborates with Pittsfield Downtown, Inc. (a non-profit)	Distributes a weekly newsletter on agricultural and local food issues, as well as recipes. The store sells other local products besides food, as well.		
Marketing	Maintains a blog and Facebook page. Has a Farmers' Market Jam Band.	Offers a variety of different pre-made baskets (e.g. Berkshire Basket, Bachelor/Bachelorette Basket, and Little Sprouts Baskets). Have weekly specials. Year-round (not local year-round). Does "Price Checks" to ensure price is equal or less than conventional grocery stores.	Products in over 200 stores, website, email alias newsletters.	
Governance /Structure	N/A	Family-owned business	Governance by President advised by Board of Trustees	Governance shared by board of directors, copy of bylaws on website
History & Evolution		Began in 2007 by an individual running the business (originally delivery only) from her home.	Created sustainable link between farmers and consumers to support locally grown food. large community use/interest	Direct farm to consumer model greatly impacts the communities access to local fresh produce

Impact on community	Creating a "farm energy" community (carbon sequestration in the soil using Biochar and distributing electricity to CSA members from clean sources). Has access to NASA Biochar resources on website.	Work with over 50 small, local farms. In addition to wife-husband owners, they employ 3 FT and 10 PT employees. Have over 300 weekly or bi-weekly delivery customers. Are focused on zero waste. Donate to local food pantries. Owner was a consultant for a woman who started South Shore Organics, who she now collaborates with on on-line projects.	Founded 1966 by Micael Rozyne, goal of connecting farmers with consumers, at first small warehouse and dist. operation, with marketing. Ended up closing warehouse, cancelled truck lease, concentrated on managing logistics of farmer network. Now markets for 40 farmers to over 200 stores.	Started from Kelley O'Connor's realization of global oil crisis related to food miles. June 2009, launched first Distribution Day, now over 200 members.

B.2 Vermont

Food Hub Name	Vermont, Burlington	Calais, VT, but serves the Boston area	St Johnsbury, VT	Newport, VT	Brattleborough, VT
State/Area	CSA share purchases, and backed by The Intervale Center	Supported by CSA share purchases	Internet-based, sponsored by NE Grassroots environment fund and the local senior center	Supported by Green Mountain Farm-To-School, Area Agency on Aging for Northeastern VT, Ben and Jerry's foundation, Vermont Agency of Agriculture, food and markets, VT Community foundation, and the USDA Rural business enterprise grants program	Post Oil Solutions manages their efforts
Financing	Hub-To-Consumer CSA model	CSA model, and 'bike-truck' at-home delivery	'internet farmer's market' shows locations of all the local food in the area, conducts transactions between local farms and schools	large single-batch weekly delivery to schools, via truck	multi-farm CSA serving 35 institutions
Distribution Methods	Non-Profit Organization	Profit	Non-profit	non-profit	Non-profit, but searching for financial solvency
Business Type (profit vs. non-profit)	Individuals	Individuals, families	once was individuals, now is institutions	Schools	Institutions
Target market	Strong ties to the Burlington Area with the Intervale Center conducting many farming exhibitions	lots of connections in the Cambridge and Boston areas	Runs a volunteer community farm which grows for community meals and provides gardening experience	supporting local farms	Supports over 15 local farms, not much else.

Community interest/links to comm.	Online, through word of mouth, and print advertising	Internet and word-of-mouth, also has a newsletter	Internet and printed food resource guides	distribution of weekly ordering list, plus easy access website	internet newsletter, website, and local print advertising
Marketing	One manager	Contract between farmers and the families	Volunteer organized		Managed by Post Oil Solutions
Governance /Structure			Began in 2009 by a volunteer group as an internet farmer's market, now coordinates sales between farms and schools		Began in 2009 as a pilot project by a single farm. In 2012 WFFN began to be managed by Post Oil Solutions, a state-wide community organizing initiative.
History & Evolution	supporting many on a locally grown diet	lots of orders, many more people with access to diverse food	Community farm provides agricultural education.		Grown the local market by 400% since its inception and by 30% in 2012 alone
Impact on community	Vermont, Burlington	Calais, VT, but serves the Boston area	St Johnsbury, VT	Newport, VT	Brattleborough, VT

B.3 Connecticut, Maine and RI

Food Hub Name	Market Mobile	Crown of Maine	Farm Fresh Connection LLC	CT Farm Fresh Express	The Farmer's Cow
State/Area	Pawtucket, RI	North Vassalboro, ME	Freeport, ME	East Haddam, CT	Lebanon, CT
Financing	The food hub is a non-profit business that brings together over 40 farmers and producers in order to create a bigger business for farmers. The food hub takes a 15% cut for delivery and services. In the last 4 years the food hub has started pushing out over $1.5 million in product a year	Cooperative	Business	This is a small business hybrid food hub Model that is a privately funded business	The food hub operates as a partnership between 6 farming families that all produce milk and milk derived products.
Distribution Methods	The food hub will send the invoice orders to each farm so they know what has to be harvested. Then a delivery truck assembles all the food in a warehouse and brings the order together and sends them out to the costumer	Delivery to buyers	CSA	This food hub operates in the form of trucks that make weekly deliveries to homes or restaurants	The distribution method isn't definitively known but it can be implied they have trucks to transport the finish milk cartoons and products to grocery stores all over Connecticut
Business Type (profit vs. non-profit)	Non-Profit	Co-op	Profit	Profit	Profit

Target market	Individuals, restaurants and institutions the food hub deliveries twice a week to anyone who orders over $100 and $60 if the costumer choices to pick up their order	Buying clubs, restaurants, and retailers.	Individuals, restaurants, retail, institutions, farm stands, buying clubs, and processing operations.	This food hub targets individuals and restaurants, with being able to produce "meals to go" to appeal to modern day Americans on the go	Grocery Stores and Large Restaurants and Institutions
Community interest/links to comm.	The food hub is a non-profit and brings in a lot of volunteers to help staff the food hub and help fill the orders.	Part of the "Maine Feeds Maine Movement"		This food hub has a huge diversity in the farms it gets food from and even will get food from Artisans that will process locally grown food. It will also service almost anywhere in Connecticut which is a large range and operation	This milk food hub has a very large impact on the community and has served as an inspiration to show that even local farmers can make it on the shelves in grocery stores. The food hub has gained so much interest that they started a local cafe, hallmarking their products
Marketing	The market of this food hub seems like it is through social media, and their website which is where costumer can order there weekly orders	Maintains a blog.	Weekly updates an availability and price list, available on-line.	There is a newsletter that is sent out weekly with the new foods and what is on sale that week. They also have an active website where the ordering is done.	This milk food hub is able to market itself through its website, local events and tours, local news articles, on the milk cartoon itself.
Governance /Structure	Non-Profit staffed by both salary employees and volunteer staff	Co-op	Business	Small apartment unit that deals with the distribution and trucks and drivers are free-lanced	The farm is a partnership with 6 other farmer families and has been this way since its start
History & Evolution	The Market Mobile food hub only started 4 years ago and has rapidly growing in size and incorporates over 40 different producers and farmers. They started with some help from the RI Department of Agriculture. They started in the Providence area and have now expanded to RI, and parts of MA and CT	Began in 1995.	Began in 2001.	This was a consumer always looking for the freshest products and joined a CSA but couldn't maintain the strict structure they had so decided to develop this distribution business to deliver fresh food to people's doorstep	Began 8 years ago and had 6 farmer families join the food hub and since then has become a huge success in just a very years and sells to over 100 locations that include a large number of large grocery stores include two in my small hometown
Impact on community		Deliver regularly to 55 buying clubs.	Serves over 150 establishments.	Large impact on the general Connecticut community because of the vast network of costumer and suppliers	

Appendix C: Food Justice Case Studies

C.1 Massachusetts

Movement name	Regional Environmental Council (REC) Food Justice Program	New Entry Sustainable Farming Project	Mason Square Food Justice Initiative
State	Massachusetts	Lowell, MA	Massachusetts
Year Founded	1998	1998	2009
Serving Strategy (what they do with the food once they get it)	The REC offers a wide variety of different serving methods including a mobile farmers market that unloads a small farmer's stand on various street corners. Additionally, they operate a small community garden and local farmers market in order to promote locally grown food	Has provided access to information, resources, training, and technical assistance to would-be farmers. Then newly trained farmers have access to CSAs and a farmers' market	Partners with the Pioneer Valley NE Growers Co-op to help lead farmers markets around the community and runs a mobile farmers market to help distribute food. Also partners with Wholesome to get double SNAP points
Supporters (grants, federal programs, etc.)	REC membership donations, volunteers, and a lot of organizations, including: City of Worcester, Fallon Community Health Plan, Greater Worcester Community Foundation, Massachusetts Department of Agricultural Resources, Price Chopper's Golub Foundation, United Way of Central Massachusetts	Co-op with the goal of assisting people with limited resources (e.g. Beginning farmers, immigrants, and refugees) begin small-scale farming. food access in underserved areas is also a goal. The project is sponsored by the Gerald J. and Dorothy R. Friedman School of Nutrition Science and Policy at Tufts University and by Community Teamwork, Inc. The project also has several funders and partners. It is part of the National Immigrant Farming Initiative (NIFI) and Northeast Network of Immigrant Farming Projects (NNIFP	Partners for a Healthier Community, Gardening the Community, the State Street Corridor Alliance, Rebuild Springfield, MassMutual, Baystate Health
Community served	Worcester	Individuals, institutional food services/restaurants	Springfield

Other Programs/Services They Provide (That may not involve food distribution)	a community gardens network (UGROW), youth development through urban agriculture (YouthGROW), healthy cooking education project (Share our Strength's Cooking Matters), events such as a Slow food Gala and Spring Garden Festival	Students at Tufts are very involved with the project through their coursework.	Runs a "Just Food" campaign to get a grocery store in Mason Square Food Desert, which collects data from the community to so the need and buying power of the residents. Helps run community gardens in vacant and abandoned lots.
Website	www.recworcester.org	Provides culturally-appropriate produce such as Southeast Asian vegetables.	www.masonsquarehealthtaskforce.org

C.2 New Hampshire and Maine

Movement name	Monadnock Farm and Community Connection	New Hampshire Healthy Corner Stores	Cultivating Community
State	New Hampshire	NH	ME
Year Founded	2006	2012	2010
Serving Strategy (what they do with the food once they get it)	As part of the Cheshire county Conservation district, it is a series of programs focused on strengthening the connection between the public and the agricultural community. They recently orchestrated the creation of a food co-op in Monadnock county, as well as a local food-to-restaurant menu program called Monadnock Menus.	Sells healthy food from corner stores and Bodegas to encourage better eating habits among underprivileged people	Farms stands that accept SNAP and WIC; vegetable incentives for SNAP and WIC customers to double the value of their benefits; develop systems for low-income customers to commit to a CSA share; assist refugee farmers in enrolling as SNAP, WIC, and Senior Farm Share vendors and connect them with benefits recipients; facilitate deliveries to emergency food system; assist farmers markets interested in serving low-income customers
Supporters (grants, federal programs, etc.)	Non-profit, sponsored by USDA Farm Service Agency, Monadnock Economic Development Corporation, Monadnock Localvore Project, and the Monadnock Sustainability Network.	Non-profit, an offshoot of the nationwide Healthy Corner Stores Network. The local movement was an initiative of the Manchester Health Department.	Business sponsors (mostly local), including a law practice, financial advisers, a radio station, and Whole Foods Market

Community served	Monadnock County	Manchester	Greater Portland and Greater Lewiston.
Other Programs/Services They Provide (That may not involve food distribution)	Building a food co-op, farm-to-local restaurant program, they are also apparently something like an action committee for local food in the area; they have a long list of goals for improving the food system of Monadnock county on their website.	The program provides a trained supermarket sales consultant to the participating corner store to show where to place the healthy food, as well as provide some training in how to maintain the supply.	Youth programs, partnerships with schools, farmer training project (primarily immigrants). Additionally: Plans for the upcoming year: Produce Prescription Program, mobile farm stand, cookbook/storybook
Website	http://www.cheshireconservation.org/MFCC	http://www.healthycornerstores.org/?s=manchester&cat=0	www.cultivatingcommunity.org

C.3 Vermont

Movement name	Central Vermont Food Systems Council	Vermont Feed	NOFA - Vermont
State	VT	VT	VT
Year Founded	N/A	2000	1971
Serving Strategy (what they do with the food once they get it)	Runs farmers markets, potluck lunches, seed swaps, and supports local farmers in an attempt to "ensure that all our community has access to affordable quality food"	Works with schools and communities to raise awareness about healthy food, the role of Vermont farms, and good nutrition. Tries to establish possible links between local farms and school institutions	The goal of this food justice organization is to create programs supporting local organic food and to increase the acreage of certified organic land in Vermont while also increasing the access of local organic food to all Vermont
Supporters (grants, federal programs, etc.)	Funded by Americrops Vista (a non-profit government organization run by volunteers)	Non-profit collaboration of Food Works, NOFA VT, and Shelbourne Farms	Over ten program grants listen on 2011 Annual Report (on website)

Community served	Serves the Montpelier, VT area	One third of schools in Vermont, works with F.A.R.M.S in Maine cosponsoring National Farm to School Network"	All of Vermont (see above)
Other Programs/Services They Provide (That may not involve food distribution)	"Growing Local Fest": community event supporting their "localvore" movement, last year raised $5000 for gardens in local schools	They will offer courses, consults and college student to come to work with a school system on how to establish connections with local food outlets and farmers	Educational programs, Community/consumer local food access programs
Website	http://cvfsc.wordpress.com/	http://www.vtfeed.org/	http://nofavt.org/

C.4 Connecticut

Movement name	Buy CT Grown	CT Food Bank	Wholesome Wave
State	Connecticut	Connecticut	Connecticut (Headquarters)
Year Founded	N/A	1981	2007
Serving Strategy (what they do with the food once they get it)	Informational Services: to provide information on marketing, funding and best practices for running farmer's markets or CSAs Financial Services: They also co-sponsors several Farmer's Markets	The Connecticut Food Bank has provides food for families that have trouble affording food and are generally located in low-income communities. One of the programs they started is call the Mobile Food Pantry, which will deliver food to low-income neighborhoods	They have several major programs that help small and mid-scale farmers while trying to help some of the serious food Justice issues.
Supporters (grants, federal programs, etc.)	Receives sponsorship and funding from several important CT Agricultural players, such as UConn, CT Department of Agriculture, City Seed and American Farmland Trust	The Connecticut Food Bank receives most of its support from Food Donations, but other important factors for their funding include fundraising (16%), government grants (3%) and program revenue (5%). One interesting thing is that 93% of their expenses consists of just distributing the food, which means there is a lot of room for important and maybe in the form of partnering up with a food hub	Wholesome Wave is a non-profit business that receives donations from business and several other nonprofits. Some of the companies that support are Kashi, Organic Valley, Stonyfield and Whole Foods
Community served	Anywhere in CT	In the New Haven Area mostly	28 States, 300 Farm to Retail Venues and 2,500 Farmers

Other Programs/Services They Provide (That may not involve food distribution)	They provide information and paid staff to help run your farmer's market or help start a farmer's market	They also have a program that's called Kids BackPack which is a program where teachers help distribute food to low-income students so they have healthy food over the weekend	Healthy Food Commerce Investments helps companies respond to increased demand for local and healthy food by matching them with farmers in their area. Double Value Coupon Program partners 300 farm-to-retail venues that help low-income individuals receive twice for their coupons. Fruit and Vegetable Prescription Program that consists of healthcare companies working with overweight, obesity or pregnant women to make sure they have fresh produce
Website	http://buyctgrown.com/	http://www.ctfoodbank.org/	http://wholesomewave.org

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