The Relationships between Local Food and Food Security in Maine

Erin Love
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The Relationships between Local Food and Food Security in Maine

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May 9, 2014

A thesis submitted to the faculty of the Environmental Studies Program in partial fulfillment of the graduation requirements for the Degree of Bachelor of Arts with honors in Environmental Studies.

________________________    __________________    ___________________
Travis W. Reynolds, Advisor     F. Russell Cole, Reader    Loren McClenachan, Reader
ABSTRACT

There is a food systems paradox in Maine: the State has one of the highest levels of food insecurity in the nation, while simultaneously experiencing a local agriculture boom. Maine has some of the largest percentages of young farmers and women farmers in the country and is home to the second highest number of artisan cheese makers of any state in the country. Amidst this exciting, sometimes quirky, agricultural activity there is a critical need for food systems development in the state, especially in the context of serving vulnerable populations. This thesis explores the ways in which Mainers are working to reconnect with their state’s robust agricultural tradition in an effort to benefit both Maine farmers who form the backbone of the local food system and Maine communities and households who have struggled to maintain food secure lifestyles. While there is substantial room to improve the relationships between local food and food security, there are already many promising community-level initiatives at work that provide hope for the future of Maine food systems.
ACKNOWLEDGMENTS

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CHAPTER 1. THE CURRENT STATE OF FOOD SECURITY AND LOCAL FOOD SYSTEMS IN MAINE: A REVIEW OF EXISTING LITERATURE.

Introduction

At a time of severe political polarization in the United States, millions of impoverished Americans have seen their Supplemental Nutrition Assistance Program (SNAP) benefits caught in a fierce political crossfire over the renewal of the Farm Bill (National Sustainable Agriculture Coalition 2013b). But the Farm Bill debate is only one piece of the story in America’s increasingly centralized, unequal food system. It is true that large industrialized farms have received millions of dollars in subsidies through the Farm Bill while many small, local farms have struggled to stay afloat (National Sustainable Agriculture Coalition 2013a). But it is also true that over the course of the past century, many Americans have become less in touch with the sources of their food – including where their food comes from and the process it went through before arriving on their plates (Jemison Jr. and Beal 2011). This growing distance between the consumers of food and the producers of food has had major implications for the types of food that are grown, the way those foods are grown, and the lives of food growers and consumers alike (Jemison Jr. and Beal 2011).

For starters, an increasing quantity of food from ever-larger U.S. farms has not been accompanied by an increasing quality of food (Mills 2004). On the contrary, today many of the nation’s most severe health issues are closely linked to the poor quality of the American diet (Mills 2011). As compared to the food insecurity of half a century ago that was signaled by a low body weight, food insecurity now goes hand in hand with obesity because many cheap foods contain large amounts of empty calories (Mills 2011). Obesity and type 2 diabetes cost taxpayers $250 billion in healthcare dollars every year (Schumacher et al. 2011). This change is often attributed to the change in the typical American diet in the past century from fresh foods to processed foods with lots of fat and sugar (Jemison Jr. and Beal 2011, Mills 2011, Schumacher 2011).

Part of the problem is that unhealthy food is now cheaper than healthy food. Many patients with chronic diseases linked to diet cite cost as the main barrier to consuming more fresh produce (Cousins 2010b). Studies have shown that there is a strong association between income and diet, with high-income people consistently having
a more nutritious diet than low-income people (Mills 2011). Only 22.7% of low-income people (<$15,000 annually) eat at least the recommended five servings of fruits and vegetables daily, while 31% of higher-income people (>=$50,000) eat the recommended amount (Eaton et al. 2008, Maine 1995-2011 Results 2011). Education also impacts nutrition, with 22% of people with less than a high school diploma eating the recommended daily serving of fruits and vegetables and 35% of people with a college diploma eating enough produce (Eaton et al. 2008, Maine 1995-2011 Results 2011).

Moving beyond fruit and vegetable consumption to the more serious issue of severe overweight, obesity rates of low-income people (as defined above) are 34% compared to 25% of higher-income people (Mills 2011). Levels of childhood obesity can be linked to household income and the head of household’s level of education, with obesity increasing with decreasing income and education (Ogden et al. 2010). These statistics show that people who have greater financial means and education use those tools to improve their diet and well-being. On the other hand, people who do not have access to as much money or education are left without as many healthy food options. America’s socioeconomic inequality has a profound impact on the way the country eats and by extension on Americans’ health.

Maine is not immune to the national problems of inadequate access to nutritious food for lower-income populations. Over the past two decades (1990-2010) Maine’s obesity rates have at least doubled in every adult age category (USDA ERS 2011). The problem of obesity, which continues to become more prevalent, costs Mainers between half a billion and a billion dollars in medical expenses every year (Mills 2004). In other words, Mainers are spending $400-$800 per capita per year on obesity alone, a preventable health condition (Mills 2004).

Maine also has high rates of food insecurity. In 2009 15% of households in the state were food-insecure (USDA ERS 2011). Maine is the most food insecure state in New England and comes in second in the country for the category of “very low food security” (Yellen et al. 2011, Preble Street 2013). The new United States Department of Agriculture (USDA) “very low food security” category is equivalent to the “food insecurity with hunger” category in the old USDA guidelines for household food security assessment (USDA ERS 2013a). The old category for “food insecurity without hunger”
is now called “low food security” (USDA ERS 2013a). With low food security the quality or type of food may be decreased while eating patterns remain regular, whereas with very low food security eating patterns are disrupted and food intake is decreased (USDA ERS 2013a).

The development of chronic dietary issues and high rates of food insecurity in Maine is especially painful when considering Maine’s strong farming past (Maine Hunger Initiative Staff 2010, Field 2013, Thompson 2013). Maine has a rich agricultural history, specializing in corn, hay, dairy, blueberries, and potatoes at various points throughout its history (Maine Historical Society 2010). As more people have come to realize there is a problem with the structure of current food systems, more programs to combat the problems of food insecurity have been developed (Yellen et al. 2011). The most significant hunger safety net for individuals in Maine is the Supplemental Nutrition Assistance Program (SNAP), the national program formerly known as the Food Stamp program (Yellen et al. 2011). SNAP allows its users independence, choice, and flexibility, which makes it a popular program throughout the state (Yellen et al. 2011). In fact, Maine has the highest rate of SNAP participation in the country, with 94% of the eligible population enrolled in the program (Schumacher et al. 2011). SNAP is one example of the innovative programs that policymakers and non-governmental organizations (NGOs) are rolling out to combat the issue of food insecurity. This thesis explores the ways in which Mainers are working to reconnect with their state’s robust agricultural tradition in an effort to benefit both Maine farmers who form the backbone of the local food system and Maine communities and households who have struggled to maintain food secure lifestyles.

Food Insecurity in Maine

“Food security,” as defined by the USDA, is access by all people at all times to enough food for an active, healthy lifestyle” (Maine Department of Agriculture, Food, and Rural Resources 2012a). “Food insecurity” is defined by the USDA as “a household-level economic and social condition of limited or uncertain access to adequate food” (USDA ERS 2013a). Maine’s food insecurity rate was slightly higher than the nation’s 2008-2010 average of 14.6% of households being food insecure with 15.4% of Maine
households facing food insecurity in that same time period (Coleman-Jensen et al. 2011). Maine ranks second in the nation in the USDA’s “very low food security” category (Campaign to Promote Food Security in Cumberland County 2010). Several factors that may contribute to Maine’s high level of very low food security are a shortage of livable-wage jobs, high housing and heating costs, an elderly population with expensive healthcare needs, a harsh climate and short growing season, and a location at the end of the U.S. trucking routes (Yellen et al. 2011).

The definitions of food security that the USDA provides are useful for standardization, but some data suggest that these definitions may be conservative. Although the USDA’s food security definitions may be difficult to grasp at first, a list of very low food security indicators compiled by the USDA helps to flesh out and distinguish the concepts of low food insecurity and very low food security (Table 1).

While “food insecurity with hunger” is no longer a USDA food security category, hunger is a consequence of very low food security. In fact, the extremely high percentage of households that were worried food would run out or could not buy enough food to last until more could be bought (99% and 97% respectively) suggests that the very low food security category may be a conservative indicator of hunger: if so many households labeled as having very low food security are experiencing the issues listed in Table 1.1, then it is likely that many households labeled as having low food security are also experiencing hunger conditions. For example, the USDA states that low food security households do not experience reduced food intake. But if 96% of very low food security houses cut the size of a meal or skipped a meal, it is likely that some low food security households (that the USDA classifies as not experiencing reduced food intake) also do this on some occasions. The classification of food security levels is difficult because food security can change within a month and from one month to the next. However, close scrutiny of the USDA food security definitions reveals that the food security situation in the United States may be more severe than the food security definitions suggest (USDA ERS 2013a).

A relatively more recent term in the food security and insecurity discourse is “food desert.” Food deserts are defined as “urban neighborhoods and rural towns without access to fresh, healthy, and affordable food” (USDA AMS 2010). The literature
suggests that northern Maine may have less consistent access to fresh food and social safety net programs than southern Maine because the population in the northern part of the state is less dense, making transportation of food more difficult and expensive (Yellen et al. 2011). Examples of such safety net programs include the Summer Food Assistance Program (SFAP), which supplies free or reduced-price meals to school-age children when school is not in session (Yellen et al. 2011).

Table 1.1. Characteristics of very low food security and their occurrence in households that are in the USDA’s very low food security category. Source: USDA Economic Research Service.

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<tr>
<th>Characteristic of Very Low Food Security</th>
<th>Percentage of Very Low Food Security Households Reporting Characteristic</th>
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<tbody>
<tr>
<td>Worried food would run out</td>
<td>99</td>
</tr>
<tr>
<td>Food bought did not last</td>
<td>97</td>
</tr>
<tr>
<td>Could not afford balanced meal</td>
<td>94</td>
</tr>
<tr>
<td>Cut size of meal or skipped meal</td>
<td>96</td>
</tr>
<tr>
<td>Cut or skipped meal in 3+ months</td>
<td>89</td>
</tr>
<tr>
<td>Ate less than felt should</td>
<td>95</td>
</tr>
<tr>
<td>Hungry but did not eat</td>
<td>68</td>
</tr>
<tr>
<td>Lost weight</td>
<td>47</td>
</tr>
<tr>
<td>Did not eat whole day</td>
<td>29</td>
</tr>
<tr>
<td>Did not eat whole day in 3 or more months</td>
<td>23</td>
</tr>
</tbody>
</table>

Maine has numerous other programs that aim to combat food insecurity, and more people have been taking advantage of these programs recently (Maine Department of Agriculture, Food, and Rural Resources 2012a, Maine Department of Agriculture, Food, and Rural Resources 2012b). In fact, approximately 25% of the food pantries in southern Maine have opened in the past five years, and in 2010 alone Cumberland County food pantries served 42% more people than they did in 2009 (Preble Street 2013 and Preble Street 2010). As Maine’s rates of severe food insecurity increase, more Mainers are seeking help to put food on the table.

Maine now has the highest rate of SNAP participation in the country (Schumacher et al. 2011). While there appears to be some participation throughout the state, the
highest levels of participation are concentrated in the central and northern regions of the state (Figure 1.1).

In addition to providing nutrition benefits to almost 245,000 Mainers, the program also provides substantial economic benefits (USDA 2013a). For every SNAP dollar that is spent, $1.79 of economic activity (measured in GDP) is stimulated (USDA, ERS 2013b). In addition, it is estimated that a $1-billion increase in SNAP benefits would stimulate enough economic activity to create 9,000 full-time-equivalent jobs (USDA, ERS 2013b). If the impacts of SNAP spending are that significant when SNAP credits are spent in a national or global food system, they could stimulate an extraordinary level of activity in a local economy if spent exclusively there (Schumacher et al. 2011).

Today, however, billions of dollars of SNAP money are going to major food processors and distributors, with a very small portion of SNAP dollars going to small farmers who interact directly with the consumer (Schumacher et al. 2011). Critics of the policy note that SNAP, which was originally implemented in 1939 under the name the Food Stamp Plan to serve the dual purposes of providing low-income people with fresh, healthy food options and supporting individual farmers by providing them with a profitable outlet for their surpluses, is now a source of income for large agribusinesses that already benefit from government subsidies (Perkins 1939, Partners for a Hunger-Free Oregon 2013). When doctors realized that SNAP beneficiaries were spending their credits on cheap, processed foods, they urged Congress to create a second nutrition program that focused on providing high-nutrient foods to families with children (Schumacher et al. 2011). Thus the Supplemental Nutrition Assistance for Women, Infants, and Children program (WIC) was born (Oliveira et al. 2002).

The creation of a new food security program in WIC could be seen as a response to the inadequacies of SNAP at encouraging participants to buy fresh, nutritious food. However, the root of the issue is that unhealthy foods are cheaper, and people who are worried about feeding their families want to economize and spend their limited money on high-calorie, energy-rich foods (Townsend et al. 2009). One dollar buys 1,200 calories of potato chips, 875 calories of soda, 250 calories of vegetables, or 170 calories of fresh
Figure 1.1. SNAP participation rates (% of population participating) in census tracts throughout Maine. Source: U.S. Census Bureau.
fruit (Townsend et al. 2009). SNAP does not eliminate budget constraints, since SNAP benefits only amount to approximately $4.45 per person per day. When faced with the decision of how to buy the most food for their families on a limited budget, heads of household may make the cost-effective but nutritionally empty choice (Schumacher et al. 2011).

The Local Food Movement in Maine

Although Maine’s food security situation is currently less than ideal, its situation as an agricultural state seems to be improving recently. Maine has experienced fluctuations in agricultural activity ever since it became a state. Maine per capita production and sales of food in the 18th and 19th centuries was similar to that of other states, but when refrigerated rail cars began to allow the transportation of agricultural products between states and regions, Maine found itself competing with Midwestern farms that had advantages of large-scale production (Higbee 1957, Day 1963). Although the railroads brought low-priced Western foods to Maine, they also allowed Maine farmers to sell their produce in larger regional cities such as Boston (Day 1963). Despite this new market access, Maine farmers steadily left the trade for other occupations in the second half of the 20th century (Piotti 2013). Currently Maine has 700,000 acres of agricultural land, as opposed to 6.5 million acres 120 years ago (Piotti 2013). The general trend over the past century has been a declining interest in the farming lifestyle in Maine.

In recent years, however, Maine has seen a renaissance of the farming movement, as has the rest of the United States (Piotti 2013). More people are participating in farmers markets and community supported agriculture programs across the nation. According to DeLind (2010) in 1994 there were 1755 registered farmers’ markets in the United States, and by 2008 that number had grown to 4685 markets. As of August 2013 the 2008 number had almost doubled to reach 8144 markets, a 3.6% increase since 2012 (USDA AMS 2013). The demand-driven increase in farmers’ markets sends a clear signal that consumers want fresh produce and are willing to participate in a new kind of food distribution system to get it.
In Maine alone there has been a 13% increase in the number of farms in the past five years (Piotti 2013). The number of farmed acres has also increased in this same window of time (Piotti 2013). There is enormous potential for agricultural re-expansion in the state. There are approximately 20 million acres of land in the state, 1 million of which are categorized as USDA “prime soils” (Piotti 2013). Considering that all of the fruits and vegetables grown in the state are grown on 1 million acres, there is considerable room for expansion (Piotti 2013). Historically the amount of land used for farming in the state was tenfold what it is today (Piotti 2013). Some of this historic farmland may be permanently lost due to its relative inefficiency compared to the fertile soils of out-of-state farms, but much of it could likely be used for agriculture again. Additionally, one-third to one-half of the current farmland in Maine will change hands in this decade due to an aging population (Piotti 2013). This demographic shift will allow new people and ideas to permeate the Maine farming culture. There are abundant opportunities for a re-investment in farming in the state, but a revitalization of the farming infrastructure also needs to occur for there to be statewide success (Piotti 2013).

There are several Maine institutions that are working toward a revival of farming in the state. The Maine Organic Farmers and Gardeners Association (MOFGA) is one of the most well-known of these. It was established in 1970, and its popularity has grown substantially in the past four decades (Maine Organic Farmers and Gardeners Association 2013). Approximately 25,000 people now attend its annual Common Ground Country Fair on each weekend day that the fair is open (Ohm 2013). The increasing popularity of MOFGA signals an increase in statewide consciousness about Maine farming culture and support for Maine farmers. MOFGA is also one of the major forums for conversations and cooperation among farmers in the state, so it could be a big part of stabilizing the necessary farming infrastructure for the state in the coming years.

As consciousness of the challenges and benefits of local and organic agriculture have surfaced, people have become more interested in a local food lifestyle. Attempts to quantify the environmental advantages of local food over industrial agriculture in terms of greenhouse gas emissions and transportation efficiency have produced mixed results (Edwards-Jones 2010, Martinez et al. 2010). However, many proponents of local food point out that local food systems embody the values of smaller-scale, socially just, and

**The National Policy Context of SNAP**

Historically, the Supplemental Nutrition Assistance Program, originally the Food Stamp Plan, was one of the most successful initiatives in the nation to provide a greater income to small farmers who participate in local food systems and to increase levels of food security. In 1939 Congress passed the Food Stamp Plan into law (Partners for a Hunger-Free Oregon 2013). The plan accomplished two goals at once: by using government funds to decrease the cost of agricultural surplus goods for people who qualified for the program, it effectively gave a boost to Depression-era families in need while simultaneously supporting America’s farmers (Partners for a Hunger-Free Oregon 2013). The program went through several stages, including a pilot phase, its adoption as a permanent program, and several other transitions, including a name change and updates of which items could be bought with SNAP credits (Schumacher et al. 2011). SNAP has changed as much as America’s food system in the time since the first version of the program was implemented. American agriculture in particular has changed drastically in that time. The number of farms and farmers has shrunk substantially, and the average farm size has skyrocketed (Jemison Jr. and Beal 2011). The federal government has supported this transition by subsidizing the commercial production of commodity crops, such as corn and wheat (Schumacher et al. 2011). While the government defends large agricultural interests through subsidy programs, many small farmers are left to their own devices to make ends meet. Now, most of SNAP’s $80 billion budget eventually makes its way into the hands of large agribusinesses that sell heavily processed commodity crop products (Schumacher et al. 2011).

While SNAP has its flaws, it does provide critical assistance to about one in seven Americans, or approximately 47 million people (Supplemental Nutrition Assistance Program: Number of Persons Participating 2013, Stanglin 2013). And although many SNAP users are accustomed to buying cheap, processed foods with low nutritional values because that is what they can afford, there is increasing access – including among SNAP beneficiaries – to healthy options, such as fresh fruits and vegetables. The number of
farmers’ markets accepting SNAP benefits has risen from 750 to 3800 in the past five years (Hoyer 2013). SNAP and related programs, such as Double Dollars, have significantly improved the ability of SNAP participants to buy fresh, healthy, responsibly grown produce. However, the recent drawn-out Farm Bill debate in Congress and subsequent cuts to SNAP reveal the instability of the program.

On New Year’s Eve last year Congress narrowly avoided the fiscal cliff crisis by passing a blanket legislative package that extended existing programs and bought them time to hash out some of the more divisive budgetary issues (National Sustainable Agriculture Coalition 2013a). Included in this hastily passed bundle of new laws was the 2008 Farm Bill, a large agricultural law that contained SNAP (National Sustainable Agriculture Coalition 2013a). In September of this year, time ran out to renew the old bill, which would have easily passed due to its inclusion of measures dear to both Republicans and Democrats. However, it was held back due to political brinkmanship. Because Congress was forced to rewrite the bill from scratch, SNAP fell under fierce scrutiny.

The majority Democrat Senate proposal cut funding by approximately $4 billion, while the Republican-controlled House proposal cut SNAP funding by as much as half, from $80 billion to $40 billion per year (Rosenbaum et al. 2013, Stanglin 2013). The final law cut $8 billion from the program, and while this compromise did not jeopardize the program as much as the more significant cuts would have, it demonstrates the need for alternative solutions to the problem of food insecurity in the United States. If Congress cannot be counted upon for consistent emergency food assistance, then that food must come from elsewhere.

**Bridging the Gaps between Food Insecurity and Local Food Systems in Maine**

The future of SNAP is uncertain, but if continued it would be one of several policy options relating to food insecurity and local food systems in Maine. The high rates of food insecurity and great potential for farming activity in Maine provide some other interesting opportunities for mutually beneficial solutions to food insecure households and small to medium-scale farmers trying to make a living in agriculture. Some current initiatives suggest that local food systems provide opportunities to increase food security
in the state (Cousins 2010a, Brogan 2013, McCrea 2013, and Pillsbury 2013). Programs such as Double Dollars, which doubles the value of SNAP credits at farmers markets, and Veggie Prescription, which allows doctors to write prescriptions for vegetables, have become immensely popular in the last few years (Cousins 2010a).

These creative programs seem to be accomplishing their goals. One Skowhegan farmers market customer, Wayne Bessette, reported using the Double Dollars program to buy fresh produce since he was diagnosed with diabetes eight months before an interview with Bangor Daily News reporter Christopher Cousins (Cousins 2010b). From the time of his diabetes diagnosis to the time of his interview he had lost more than 100 pounds and shifted his blood sugar from more than 600 milligrams per deciliter to within the healthy range of 70 to 120 milligrams per deciliter (Cousins 2010b). Bessette is just one of many farmers’ market customers across the state who are taking advantage of the Double Dollars program to increase their daily intake of fresh produce (Morning Sentinel Staff 2013, Pillsbury 2013).

Despite SNAP’s success and its status as the most significant hunger safety net in the state of Maine, as explained in the previous section, it may be cut significantly in the near future. Reducing SNAP benefits for millions of American would only decrease food security for that many more people. The continuation of SNAP at current benefit levels or higher would provide valuable capital for programs and organizations focused on local food and food security. However, some programs are not dependent on SNAP to function. Food pantries, for example, are springing up at a fast rate in southern Maine (Preble Street 2013). Food pantries would be less strained if people had more SNAP credits to spend at grocery stores and markets, but they continue to serve to public even at times when benefits are stretched thin (Cumberland County Food Pantry 2010). If the link between food pantries and farmers could be strengthened and food pantries could tap into a source of funding with which to pay local farmers to grow produce, access to fresh produce for low-income people could be dramatically increased (Cumberland County Food Pantry 2010). Improving infrastructure is also necessary to help food pantries provide more fresh produce. Twenty percent of food pantries in southern Maine do not have refrigerators or freezers on site, and 36% of pantries say their operation needs more space (Cumberland County Food Pantry 2010). Increasing storage capacity of facilities
could be a target for local food security programs. Yet another challenge is the labor shortage in food pantries. Ninety-eight percent of southern Maine food pantries, which likely reflect the situation of food pantries statewide, rely on volunteers in some capacity, while 79% rely solely on volunteers (Cumberland County Food Pantry 2010). Stretching volunteer labor too thin can lead to future problems for pantries.

In addition to expanding social safety net capacity, working toward the goal of food sovereignty would be a productive goal for the state of Maine. Food sovereignty is defined as:

> “the right of peoples, communities, and countries to define their own agricultural, labor, fishing, food and land policies, which are ecologically, socially, economically and culturally appropriate to their unique circumstances. It includes the true right to food and to produce food, which means that all people have the right to safe, nutritious and culturally appropriate food and to food-producing resources and the ability to sustain themselves and their societies” (Grassroots International 2013).

The concept of food sovereignty is complex and multi-faceted, but it would provide some direction to policy makers as they make decisions about the Maine food system and food security in the state. At least one group, New England Food Vision, has already formed to discuss the state of New England’s food system and ways that the region might work toward food sovereignty (Donahue et al. 2013). Maine policy makers might be able to ask this group for recommendations or collaborate on a long-term, regional project that is in Maine’s best interest.

A number of non-government organizations (NGOs) in the southern Maine area are already working on strengthening the link between local food systems and food security, which is one component of food sovereignty. Details about each organization’s specific initiatives will be explored later in this thesis, but an overview of their work to date demonstrates that there are efforts in Maine to bridge the gaps between local food systems and food security issues. Cultivating Community, an NGO based in Portland, works with international refugee farmers to start farms (Campaign to Promote Food Security 2010). Another NGO Preble Street works with many organizations in the
Portland area to coordinate efforts to reduce food security and promote social justice (Preble Street 2013). The Maine Farmland Trust works with new farmers on a statewide basis to get them access to the land they need to work and grow produce for local markets (Piotti 2013). These efforts and others will be explored in Chapter 3. Recently developed programs and new initiatives appear to be bringing the issues of local food and food security closer together in the state of Maine.

Conclusion

Food insecurity is a serious problem in the state of Maine, but local farming is becoming increasingly popular at a time when there is a thriving national program that allows low-income people to use government-funded credits to buy fresh produce at farmers’ markets (Cousins 2010a). Federal food assistance programs such as SNAP are in a precarious position right now, but NGOs and private-public partnerships are drawing inspiration from the successes that program has recently had in encouraging healthy consumer habits in low-income populations (Cousins 2010b). The future of Maine will depend on its citizens’ ability to find creative solutions to complex, multi-faceted problems involving many stakeholders. While existing programs, such as SNAP, do much to address emergency food insecurity, alternative initiatives are necessary. The form and function of SNAP depends on Congress’ ability to maintain the program, and even if the program remains in effect, Maine is one of the national leaders in very low food security as the situation currently stands. A more diverse array of initiatives that draw support from various sources will strengthen the link between local food systems and food security in Maine.
Literature Cited


DeLind, L. 2011. Are local food and the local food movement taking us where we want to go? Or are we hitching our wagons to the wrong stars? Agriculture and Human Values 28: 273-283.


USDA, ERS. 2013a. Definitions of food security.

USDA, ERS. 2013b. SNAP: economic linkages.

CHAPTER 2. SPATIAL ANALYSIS OF LOCAL FOOD ACCESS POINTS AND SOCIO-DEMOGRAPHIC DATA IN MAINE.

Introduction

At a time when the state of Maine is simultaneously experiencing a boom in local agriculture and alarmingly high levels of food insecurity, this research asks the question: what is the relationship between local food and food security? Can we improve the situation of food insecure people by boosting local food production and awareness; can we improve the situation of farmers who sell their products locally by making those products accessible to a greater number of people? The relationship between local food and food security is complex, especially in a state that has a rich agricultural history and a widespread food insecurity problem. This chapter uses Geographic Information Systems (GIS) to examine the relationships between Maine food access and activity points and socioeconomic data.

To tease apart the paradox of Maine food, I broke my research question down into two major components: access to local food and the impacts of local food access on food security. To address the local food question, I mapped the presence of local food access points, such as farmers’ markets and school gardens, throughout Maine. Addressing the food security question required a more creative approach because the issue is so multi-faceted, and I am not aware of any databases that contain information on direct metrics of food security in the state of Maine. Drawing on the existing food security literature, I elected to use socioeconomic indicators that have been linked to food security as an indirect measure of food security throughout the state (Holzmann and Hinz 2005, Eaton et al. 2008, Miller 2009, USDA Economic Research Service 2009, Ogden et al. 2010, Cousins 2011, Maine 1995-2011 Results 2011, Mills 2011, The Reinvestment Fund 2012, Ver Ploeg et al. 2012, Associated Press 2013).

Just as the relationship between local food and food security is not the same across the United States, it is not uniform across the state of Maine. I identified geographic variances by comparing areas with high or low concentrations of local food points to areas with high or low levels of food security, as indicated by socioeconomic factors. Because SNAP is a widely known mainstream response to the food security problem, and research indicates that it is encouraging more local food purchases among
low-income people, I also included it in my spatial analysis to study the relationship this popular nutrition program has with local food access points (Cousins 2010, Yellen et al. 2011, Hoyer 2013, Morning Sentinel Staff 2013, Pillsbury 2013).

To accomplish the goal of teasing apart the local food and food security components of my research question in a way that allowed me to quantitatively compare them, I created several maps that display local food activity in the state relative to demographic information aggregated at the census block group level (or county level in the case of SNAP). Additionally, I used these maps to compare theoretical expectations about the potential links between local food and food security, as outlined in Chapter 1, with data that reflects the current state of food systems in Maine.

**Background**

The food access points used in this analysis were chosen for their value in representing conventional food access points, local food access points, and local food activity more broadly. Hannaford grocery stores are used as a proxy for conventionally grown food because the majority of the products that the grocery chain offers are from conventional food sources that are part of the global food system (Products 2014). Farmers’ markets are used as a proxy for local food access because they are one of the fastest-growing local food access points in the country (DeLind 2010, Piotti 2013, USDA AMS 2013). School gardens are also used as a local food access point because they too are gaining popularity quickly in Maine (Libby 2014). Of course, both farmers’ markets and school gardens are more than just access points. They can be seen as local food activity centers. Farmers’ markets serve as a point around which people can interact around the issue of food, especially food that is grown by their fellow community members (USDA 2013). School gardens are used as a proxy for local food activity because they are major agricultural education hubs where students can learn about growing food in their yards or neighborhoods (Dirks and Orvis 2005, Klemmer et al. 2005, Smith and Motsenbocker 2005, Maine School Garden Network 2014). For these reasons, it is logical that communities that have farmers’ markets or school gardens are more likely to interact with local food issues and understand why they are important (USDA 2013). Farmers’ markets and school gardens serve not only as a proxy for local
food access but also as a proxy for local food awareness and support. Because the farmers’ market and school garden point types share important characteristics, I sometimes bundle them together into the phrase “local food activity” for the sake of simplicity.

The demographic variables used in this analysis were chosen for their value in assessing the state of local food activity or food security of an area. Population density is important to include because inherently there will be more food activity in areas with more people. Distance to nearest road, vehicle access, and commute time are all measures of isolation and transportation access, which has been recognized as a significant factor in ability to access food (USDA Economic Research Service 2009, The Reinvestment Fund 2012, Ver Ploeg et al. 2012, Sage et al. 2013). Income, educational attainment, and employment have been shown to increase food security and participation in local food activity (Powell et al. 2007, Eaton et al. 2008, Ogden et al. 2010, Maine 1995-2011 Results 2011, Mills 2011, Sage et al. 2013). Because Maine’s population is the oldest in the nation and people who are elderly often have lower incomes than their middle-aged counterparts, age is another important variable to take into account (Holzmann and Hinz 2005, Miller 2009, Cousins 2011, Associated Press 2013). Finally, the Supplemental Nutrition Assistance Program (SNAP) participation rate is a key variable to consider because its goal is to alleviate food insecurity, a high percentage of Maine’s eligible population participates in it, and an increasing number of farmers’ markets are accepting SNAP credits (Schumacher et al. 2011, Yellen et al. 2011, Hoyer 2013).

Based on the literature and theory described in Chapter 1, I have developed hypotheses about the relationships between each variable, local food activity, and relationship to food security (Table 2.1).

**Methods**

Data for locations of Hannaford stores, farmers’ markets, and school gardens were obtained from online address compilations from various sources. I used the Hannaford locations as a proxy for the presence of conventionally grown, non-local food, although Hannaford does carry a limited selection of organic and local food. Farmers’ markets and school gardens, while not representing a comprehensive expression of all
### Table 2.1. Summary of variable relationships to local food and food security.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Relationship to Local Food Activity</th>
<th>Relationship to Food Security</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hannaford stores</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Farmers’ markets</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>School gardens</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Population density</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Distance to nearest road</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Vehicle access</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Commute time</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Income</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Education</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Employment</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Age</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SNAP</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Local food activity in the state, are a way of showing where there is substantial local food activity. The Hannaford store locations were available on the Hannaford website (Hannaford Locations in Maine 2014). The Maine Federation of Farmers’ Markets listed location information for all registered farmers’ markets in the state (Maine Federation of Farmers’ Markets 2014). This directory is the most comprehensive available dataset on farmers’ market locations in Maine, although some towns may have two markets listed because there is one summer market and one winter market. When the summer and winter markets were in the same location, I chose only one market to add to the map. The Maine School Garden Network website listed location information for all registered school gardens (Maine School Garden Network 2014). There are likely many more school gardens than are registered on the website, so the list provided there serves as a conservative estimate of school garden activity (Coriell 2014). Four years ago, there were four registered school gardens, and now there are at least 107. The reality is not that there were only four gardens four years ago; it is that only four gardens had been registered four years ago. Kat Coriell, the chair of the Maine School Garden Network, estimates that they have likely registered half to two-thirds of the school gardens in the state.

Data layers were created for the following socioeconomic variables that were meant to act as a proxy for food security: median household income (dollars), educational
attainment of the population aged 25 and over (% of population that has completed an associate or bachelor’s degree or higher), population density (population/km²), SNAP participation rates (% of population that participates in SNAP), median age (years), mean commute time to work (minutes), employment (% of civilian labor force that is employed), and vehicle access (% of households with access to at least one vehicle). These layers were calculated in ArcGIS 10.1 using data from the American Community Survey (ACS) 5-year dataset from 2012 aggregated at the census block group level (census tract level for SNAP participation rate layer). To calculate the population density, I divided population by the land area, which I calculated for each census block group polygon in ArcGIS and then converted to km². To calculate vehicle access I summed the number of households that had access to at least one vehicle and divided that number by the total number of households. To calculate commute time, I took a weighted average of each time category provided by ACS (e.g., 0-10 min, 10-14 min, 15-19 min etc.) by multiplying the median time length of each category (e.g., 17.5 min for the 15-19 min category) by the number of commutes that fell into that category, adding together those values for each category, and dividing by the total number of commutes in all categories. I used the median household income data that were directly available through ACS. To calculate education level, I added the number of individuals who had completed an associate or bachelor’s degree or an advanced or graduate degree and divided by the total number of people in that block group. To calculate employment I divided the number of people who were employed in the civilian labor force by the total number of people who were in the civilian labor force. I used the median age and SNAP data provided by ACS.

Data were analyzed using Esri ArcGIS 10.2 and a UTM NAD 1983 Zone 19N projected coordinate system. To transform the addresses listed on the three source websites into GIS points representing farmers’ markets, school gardens, and Hannaford grocery stores in the state of Maine, I manually entered address data into an Excel spreadsheet for all 319 data points and loaded the addresses into ArcGIS in three separate spreadsheets, each containing an address, city, state, and zip code column. I then used a geocoding directory based off of emergency response system address data points used by Maine emergency response planners to geocode the addresses. This directory contained
many more street addresses than any other directory available to me. It used the address, city, and state fields from the Excel spreadsheet. The initial address match rates were approximately 80% for both the set of 107 school gardens and 83 Hannaford supermarkets and approximately 50% for the set of 129 farmers’ markets. After the addresses had been matched, I matched any remaining unmatched addresses manually using the address or qualitative description (e.g., “downtown Lubec” or “Town Hill, next to the bank and fire station”) provided by the source site to locate the unmatched point in Google Maps. Google Maps has labeled landmarks and buildings, as well as a more flexible address locator than ArcGIS. These characteristics made it a suitable tool for locating unmatched points through a combination of automated address searching and personal observation.

Because my system of matching points was based on the use of landmarks that could not always be identified, inexact qualitative descriptions, and street addresses that could not be verified, my points should be seen as estimates of the locations of Hannaford stores, farmers’ markets, and school gardens. In reality, the points on my maps may be several blocks away from the actual locations of Hannaford stores, markets, or gardens they represent. For the purposes of this analysis, this level of accuracy is acceptable because in most cases the margin of error of a few city blocks will not change findings from the census block-level data that were used to calculate the demographic information for each point.

I categorized the ACS data into quintiles and symbolized it so that more saturated colors represented higher values. The only exception to this method was the distance to

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1 A typical location of an unmatched point using Google Maps might follow these steps: 1) enter street name and town information into Google maps 2) use Google Map’s labels to locate landmarks, such as a specific bank, church, or store that are close to the unmatched point 3) identify the unmatched point’s location based on website description and the landmarks and street names Google Maps provides. Once I had identified the location of the point in Google Maps, I switched to satellite view and zoomed out to view the full extent of Maine. I zoomed out to the same extent in my GIS map with the satellite imagery layer turned on. I then zoomed into the unmatched point on my GIS map by cross-checking the satellite imagery view on the GIS map with satellite Google Maps view of the unmatched point. When I had identified the location of the unmatched point in my GIS map, I picked the emergency response system directory GIS point that was closest to this location. If there were no directory points nearby, I created a new point to add to my data layer.
the nearest road layer. For this layer, I used the Euclidean Distance tool in the Spatial Analyst toolbox to create a raster layer that displayed the distance to the nearest road.

**Analysis**

To analyze the relationship between these layers and the three types of food access points, I created a 10 km buffer around each point (Hannaford stores, farmers’ markets, gardens) and used the intersect tool to extract the values for each type of demographic information from the polygons that fell inside the buffer (Figure 2.1). I used a buffer with a radius of 10 km based on a study that cited 2.7 miles as the highest distance traveled by survey respondents from home to any supermarket they used (Handy and Clifton 2001). The study was conducted in several suburbs of Austin, Texas, so I doubled the mileage they found (which gave me 5.4 miles), since Maine has a lower population density than Texas and might have fewer urban centers per capita, converted to km (which gave me 8.6 km) and rounded to the nearest ten for simplicity (American Fact Finder 2014). I normalized these values by the area of the polygons so that the data from polygons that took up more of the buffered area was weighted more heavily than data from polygons that took up a small portion of the buffered area (Figure 2.1).

For each demographic variable, I averaged the weighted means for each buffered area for each point type (Hannaford stores, markets, gardens), and created box plots in R Studio (Appendix I). These means were compared with state means obtained directly from the United States Census Bureau’s online database (denoted as red lines in the box plots below) (Table 2.2). One-sample t-tests were conducted between the averaged weighted means and the statewide mean for each demographic variable of each point type (24 tests total) (Appendix I). One-sample t-tests were also conducted between the aggregation of types of food access points and the statewide means for each demographic variable (eight tests total). A p-value of less than 0.05 was considered significant for all statistical tests.
Table 2.2. Summary statistics and sources for each variable. Sources for data layer information and statewide summary statistics are separate in many cases, so both sources are listed. For the summary statistic column, 1 signifies a count summary statistic, 2 signifies a mean, and 3 signifies a median.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Summary Statistic</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hannaford Stores</td>
<td>83$^1$</td>
<td>Hannaford Locations in Maine 2014</td>
</tr>
<tr>
<td>Farmers’ Markets</td>
<td>129$^1$</td>
<td>Farmers’ Markets 2014</td>
</tr>
<tr>
<td>School Gardens</td>
<td>107$^1$</td>
<td>Maine School Garden Network 2014</td>
</tr>
<tr>
<td>Population density</td>
<td>16.6 persons/sq. km$^1$</td>
<td>Social Explorer 2014, United States Census Bureau 2014b</td>
</tr>
<tr>
<td>Distance to nearest road</td>
<td>7,106.4 m$^2$</td>
<td>Esri (Euclidean Distance tool calculation statistic)</td>
</tr>
<tr>
<td>Vehicle access</td>
<td>92.8%$^1$</td>
<td>Social Explorer 2014, United States Census Bureau 2014a</td>
</tr>
<tr>
<td>Commute time</td>
<td>23.3 minutes$^2$</td>
<td>Social Explorer 2014, United States Census Bureau 2014a</td>
</tr>
<tr>
<td>Income</td>
<td>$48,219$^3</td>
<td>Social Explorer 2014, United States Census Bureau 2014a</td>
</tr>
<tr>
<td>Education</td>
<td>36.4%$^1$</td>
<td>Social Explorer 2014, United States Census Bureau 2014a</td>
</tr>
<tr>
<td>Employment</td>
<td>92.3%$^1$</td>
<td>Social Explorer 2014, United States Census Bureau 2014a</td>
</tr>
<tr>
<td>Age</td>
<td>43.5 years$^3$</td>
<td>Social Explorer 2014, United States Census Bureau 2014a</td>
</tr>
<tr>
<td>SNAP</td>
<td>19%$^1$</td>
<td>Center on Budget and Policy Priorities 2013, Social Explorer 2014</td>
</tr>
</tbody>
</table>

Results

The results of the spatial analysis of food access points and demographic information that may be related to food security in Maine follow. Hannaford stores appear to be dispersed throughout the state most uniformly (Figure 2.2a). Farmers’ markets are less widely and uniformly dispersed than Hannaford stores but more widely and regularly dispersed than school garden locations (Figure 2.2a-c). In general, school gardens have not spread as far north as farmers’ markets and Hannaford stores have (Figure 2.2a-c). And farmers’ markets have not spread as far north as Hannaford stores have (Figure 2.2b-c). All three point types can be seen on one map below (Figure 2.3).
Figure 2.1. Images of buffered Hannaford store locations and all block groups that intersect with those buffers. Insets of a single Hannaford store after it has been buffered and the buffer has been intersected with the block groups.
Figures 2.2a-c. Locations of Hannaford grocery stores (2.2a), farmers’ markets (2.2b), and school gardens (2.2c) along with the three largest cities in Maine, Portland, Lewiston, and Bangor from south to north.
Figure 2.3. Map of all food access and activity points in this study (Hannaford stores, farmers’ markets, and school gardens).
Figure 2.4. Population density (people/km²) compared to locations of Hannaford stores, farmers’ markets, and school gardens.
Adding population density values to the map show that the three food access point types are generally clustered around more populated areas (Figure 2.4). The Portland and Bangor areas appear to have some of the highest concentrations of Hannaford stores, markets, and gardens. In the northern part of the state, the few pockets that have higher population densities than the surrounding area also contain some of northern Maine’s only Hannaford stores, markets, and gardens. The difference between population density in areas near Hannaford stores, near farmers’ markets, and near school gardens was significantly higher than the statewide average (Hannaford: t(80) = 6.474, p < 0.001; Market: t(127) = 7.158, p < 0.001; Garden: t(106) = 7.022, p < 0.001; Figure 2.5). The difference between population density in areas near all food access points combined was also significantly higher than the statewide average (t(315) = 11.911, p < 0.001).

![Figure 2.5. Box plot comparing statewide mean population density (16.63 people/km²) to that in areas near Hannaford stores, markets, and gardens (Social Explorer 2014, United States Census Bureau 2014b). An asterisk (*) indicates significant difference.](image)

Access to transportation was represented in three different ways in this analysis. The first was distance to the nearest road (Figure 2.6a). The second was mean commute time to work (Figure 2.6b). The third was mean number of households that had at least one vehicle available (Figure 2.8). Food access points appear to be located near roads, in
Figures 2.6a-b. Maps of distance to nearest road and commute time compared to locations of Hannaford stores, farmers’ markets, and school gardens.
areas where an intermediate number of households own at least one vehicle, and in areas that have low commute times. The difference between commute time in areas near Hannaford stores, near farmers’ markets, and near school gardens was not significantly different from the statewide average (Hannaford: t(80) = -0.036, p = 0.972; Market: t(127) = -0.869, p = 0.387; Garden: t(106) = -0.412, p = 0.681; Figure 2.7). The difference between commute time in areas near all food access points combined was also not significantly different from the statewide average (t(315) = -0.823, p = 0.411). The difference between vehicle access in areas near Hannaford stores, near farmers’ markets, and near school gardens was significantly higher than the statewide average (Hannaford: t(80) = -2.252, p = .027; Market: t(127) = -3.087, p = .002; Garden: t(106) = -3.212, p = .002; Figure 2.7). The difference between commute time in areas near all food access points combined was also significantly higher than the statewide average (t(315) = -5.000, p < .001).

Figure 2.7. Box plot comparing statewide mean commute time (23.3 minutes) to that in areas near Hannaford stores, markets, and gardens (Social Explorer 2014, United States Census Bureau 2014a).
Figure 2.8. Map of household vehicle access compared to locations of Hannaford stores, farmers’ markets, and school gardens.
Income appears to be related to food access point location, but school gardens seem more sensitive to income than Hannaford stores and farmers’ markets (Figure 2.10a). In addition, Hannaford stores and farmers’ markets appear to be located across areas with a wide variety of education levels, but school gardens appear to be located in areas with a higher educational attainment (Figure 2.10b). Income in areas near Hannaford stores, near farmers’ markets, and near school gardens was significantly higher than the statewide average (Hannaford: t(80) = 2.183, p = 0.032; Market: t(127) = 2.393, p = 0.018; Garden: t(106) = 3.350, p = 0.001; Figure 2.11a). The difference between income in areas near all food access points combined was also significantly higher than the statewide average (t(315) = 4.623, p < 0.001). The difference between education level in areas near Hannaford stores, near farmers’ markets, and near school gardens was not significantly different from the statewide average (Hannaford: t(80) = -1.345, p = 0.182; Market: t(127) = -0.439, p = 0.661; Garden: t(106) = 0.616, p = 0.539); nor was the difference between education level in areas near all food access points combined (t(315) = -0.554, p = 0.580) (Figure 2.11b).
Figure 2.10a. Median household income compared to locations of Hannaford stores, farmers’ markets, and school gardens.
Figures 2.10b. Educational attainment compared to locations of Hannaford stores, farmers’ markets, and school gardens.
Figure 2.11a. Box plot comparing statewide mean income ($48,219) to that in areas near Hannaford stores, markets, and gardens (Social Explorer 2014, United States Census Bureau 2014a).

Figure 2.11b. Box plot comparing statewide educational attainment (0.364 proportion of population over age 25 that has completed a bachelor, associate, or advanced degree) to that in areas near Hannaford stores, markets, and gardens (Social Explorer 2014, United States Census Bureau 2014a).
Food access points appear to be almost absent in areas within the highest age quintile but are otherwise spread throughout areas with a wide range of ages (Figure 2.12a). They also seem to be concentrated in areas with higher employment levels (Figure 2.12b). The difference between age in areas near Hannaford stores and near school gardens was significantly higher the statewide average, while the difference between age in areas near farmers’ markets was not significantly different from the statewide average (Hannaford: t(80) = -2.098, p = 0.039; Market: t(127) = -1.478, p = 0.142; Garden: t(106) = -2.971, p = 0.004; Figure 2.13a). The difference between age in areas near all food access points combined was also significantly higher than the statewide average (t(315) = -3.784, p < 0.001). Employment level in areas near Hannaford stores, near farmers’ markets, and near school gardens were significantly lower than the statewide average (Hannaford: t(80) = -3.570, p < 0.001; Market: t(127) = -4.684, p < 0.001; Garden: t(106) = -4.210, p < 0.001; Figure 2.13b), as were employment level in areas near all food access points combined (t(315) = -7.245, p < 0.001).

Areas with fewer food access points appear to have a higher rate of SNAP participation than areas with more food access points (Figure 2.14). Groupings of food access points seem to be surrounded by different levels of SNAP participation: generally low or intermediate levels of participation with a few block groups that have high levels of participation. SNAP participation rates in areas near Hannaford stores, near farmers’ market, and near school gardens was dramatically lower than the statewide average (Hannaford: t(80) = -7.571, p < 0.001; Market: t(127) = -12.714, p < 0.001; Garden: t(106) = -15.171, p < 0.001; Figure 2.15). SNAP participation rates in areas near all food access points combined was also significantly lower than the statewide average (t(315) = -20.199, p < 0.001).
Figure 2.12a. Median age (years) compared to locations of Hannaford stores, farmers’ markets, and school gardens.
Figure 2.12b. Employment levels (% population employed) compared to locations of Hannaford stores, farmers’ markets, and school gardens.
Figure 2.13a. Box plot comparing statewide mean age (43.5 years) to those in areas near Hannaford stores, farmers’ markets, and school gardens (Social Explorer 2014, United States Census Bureau 2014a).

Figure 2.13b. Box plot comparing statewide mean employment level (0.9257 as a proportion of population) to those in areas near Hannaford stores, farmers’ markets, and school gardens (Social Explorer 2014, United States Census Bureau 2014a).
Figure 2.14. SNAP participation rates in Maine compared to locations of Hannaford stores, farmers’ markets, and school gardens.
Overall, the variables that were significantly different from the statewide averages in areas near food access points were population density, vehicle access, income, employment, age, and SNAP participation rate (Table 2.3). The education and employment results differ in the opposite direction the literature predicts (Mills 2011).

Table 2.3. Summary of t-test results for combined food access points versus the statewide average for all eight variables.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Significant difference?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population density</td>
<td>Yes (higher)</td>
</tr>
<tr>
<td>Distance to road</td>
<td>-</td>
</tr>
<tr>
<td>Vehicle access</td>
<td>Yes (higher)</td>
</tr>
<tr>
<td>Commute time</td>
<td>No</td>
</tr>
<tr>
<td>Income</td>
<td>Yes (higher)</td>
</tr>
<tr>
<td>Education</td>
<td>No</td>
</tr>
<tr>
<td>Employment</td>
<td>Yes (lower)</td>
</tr>
<tr>
<td>Age</td>
<td>Yes (higher)</td>
</tr>
<tr>
<td>SNAP</td>
<td>Yes (lower)</td>
</tr>
</tbody>
</table>
Discussion

The results of the analysis were largely consistent with hypotheses from the literature, with some exceptions. I predicted that distance to nearest road and commute time would have an inverse relationship with food activity, as represented by the point layers I mapped (Campbell 1996). The data suggest that this relationship is indeed the case, as points were concentrated near roads and in areas with low commute times. This finding indicates that isolated areas may experience less food activity than areas that are closer to roads and areas with high population densities. I predicted a direct relationship between vehicle access and food activity, and this appears to be this case as most food access points are located in areas with intermediate or higher vehicle access (Campbell 1996). The analysis of these three variables demonstrates that transportation is a key factor in determining a household’s level of food security and ability to participate in local food activity.

Areas with higher income did show direct relationships to food activity, as predicted based on past research, but areas with higher educational attainment and employment levels did not show direct relationships to food activity, which contradicts the literature (Powell et al. 2007, Eaton et al. 2008, Ogden et al. 2010, Maine 1995-2011 Results 2011, Mills 2011, Sage et al. 2013). This mixed result could be due to flaws in experimental design or the use of the t-test as a descriptive test even when the assumptions are not necessarily met. The income result supports the theory that greater economic security (which is often associated with higher levels of education, although that is not the case in this particular analysis) can be tied to better access to food in general, and especially local food. Boosting this variable, and other closely linked variables such as education and employment, in areas with low food activity could increase activity in those areas.

Areas with the highest median ages were largely without food access points. This result may be due to the generally lower incomes of elderly, retired populations as compared to young adult and middle-aged populations (Holzmann and Hinz 2005). Large grocery chains, such as Hannaford, might not think it worth investing in a store in an area with a large elderly population because of the generalization of older people being lower-income than other sectors of the population. In addition, if there is a large
retired population in an area, there is a lower chance of there being a large, working farmer population, which would contribute to a low number of farmers’ markets. With a large elderly population, there would likely be fewer schools, and therefore fewer school gardens as well.

Finally, my hypothesis about SNAP having an inverse relationship to food activity matched the results of this analysis as well. While SNAP does serve an important role in providing emergency assistance to those in need, areas with high rates of SNAP participation had low numbers of farmers’ markets and school gardens, indicating that the program may not be the best long-term solution to alleviating food insecurity and increasing local food activity in an area. The areas that had the lowest SNAP participation rates along the coast and in southern Maine also had some of the highest concentration of local food activity points relative to the rest of the state. These results show the importance of locally driven initiatives, such as farmers’ markets and school gardens, that have deep roots in the communities that they serve. SNAP does serve a critical need, but these maps suggest that areas with many local food access and activity points have relatively low rates of participation in this program.

This spatial analysis supports the hypothesis of a direct relationship between many variables associated with food security and economic development and the presence of local food activity. It is unclear from this static analysis of the demographics of Maine’s population whether economic stability begets food activity or vice versa. Delving into the details of specific community situations would provide more information about the relationship between local food activity and food security, which are tightly linked to economic factors.
Literature Cited


DeLind, L. B. 2011. Are local food and the local food movement taking us where we want to go? Or are we hitching our wagons to the wrong stars? Agriculture and Human Values 28: 273-283.


Hoyer, M. 2013. Closing SNAP’s food-voucher gap at farmers markets. USA Today. 


Libby, E. 2014. Personal interview.


http://www.mainefarmersmarkets.org/markets/

Maine School Garden Network. 2014. Why school gardens? 


http://www.cdc.gov/nchs/data/databriefs/db51.pdf


CHAPTER 3. QUALITATIVE ANALYSIS OF MAINE LOCAL FOOD ACCESS CONSTRAINTS AND PROMISING INITIATIVES TO ADDRESS THESE BARRIERS.

Introduction

There is a flurry of food-centric initiatives sweeping the country, from rooftop gardens in Boston to the South Bronx mobile veggie market run out of a school bus in New York City (Kahn 2013, Hu 2014). But not all food systems or local foods projects work everywhere. This chapter aims to examine the food systems of the state of Maine and specifically the relationship between local food and food security in those systems. This relationship is interesting due to recent efforts to increase Supplemental Nutrition Assistance Program (SNAP) credit use at stores and markets that carry local food (Cousins 2010, Yellen et al. 2011, Hoyer 2013, Morning Sentinel Staff 2013, Pillsbury 2013). It is especially interesting in Maine due to the state’s high food insecurity ranking and, as evidenced by the increased presence of farmers’ markets and Community Supported Agriculture (CSA) programs, simultaneous boom in the local agricultural economy (DeMuth 1993, USDA ERS 2011, Yellen et al. 2011, Preble Street 2013, Ohm 2013, Piotti 2013, Maine Organic Farmers and Gardeners Association 2013). CSA programs allow consumers to purchase a share of produce from a farmer before the start of the growing season; the consumer then receives a share of the farmer’s crop throughout the season, and the farmer can use the up-front payment to buy equipment and supplies for the busiest part of the year (DeMuth 1993). This kind of innovative program, along with farmers’ markets and school gardens, represents an increased effort and creativity on the part of both producers and consumers of local food. More information about the relationship between local food, as embodied in these new initiatives, and food security in Maine and potential synergies between those two areas would provide valuable insights to policy makers as they try to move forward on both of these increasingly intertwined issues.

Due to the locally oriented and continuously evolving nature of food systems research, detailed and up-to-date documentation of the state of the relationship between local food and food security in Maine is scarce. In an effort to gather more information, this chapter uses interviews with key informants in the local food and food security
movements in Maine to explore Maine’s food landscape, which includes Maine-specific challenges and successful initiatives at the intersection of local food and food security. Each interviewee provides unique insights and abundant new information on local food and food security in Maine. Of course this chapter should not be considered to exhaustively address all of the challenges to Maine food systems nor all of the work that is being done to improve Maine’s local food and food security situation to date. Rather, this pool of interviewees should be thought of as a panel of experts who spend a great deal of time thinking about the issue of local food and/or the issue of food security in the State.

The following analysis of the interviewees’ responses to a set of interview questions aims to clearly define some of the major obstacles to participation in the local food systems that many Mainers face. It will describe expert opinion on the severity and importance of these obstacles and situate them in the context of the existing food system. It will also describe some approaches that stakeholders around the State are taking to address those barriers and improve access to local food for all Mainers. The points of view of many experts are described and synthesized in order to generate a unique, narrative-rich picture of the Maine food system.

Background

Maine’s unique character is appealing to many citizens of the state (Bradford 2011, Hamlin 2014, Maine Public Broadcasting Network 2014). Many Mainers take pride in their state’s history of ruggedness and independent spirit (Frary 2014, Huus 2014). But at the same time several of Maine’s signature traits, such as the long winters and the remoteness of some parts of the state, pose problems to equal food access for all citizens (Widener et al. 2011). The long, harsh winters lead to a short growing season and a lacking supply of produce at some times during the year. The remoteness of some regions of the state lead to long commutes to deliver and purchase fresh food, for producers and consumers respectively (Wilbur Smith Associates 2003, Conservation Law Foundation 2012, Crown O’Maine Organic Co-Op 2012, Maine Energy, Inc. 2012, Maine Department of Transportation 2014a, Wickenheiser 2014). Lack of access to transportation and more convenient shopping methods comprise a subset of the barriers
caused by the state’s geography (Campbell 1996, McConnon 2008, American Society of Civil Engineers 2012, Bankrate, Inc. 2014, Maine Department of Transportation 2014b, Maine Department of Transportation 2014c).

Other barriers to access are held in common with many other parts of the United States. One of the chief complaints about local food is that it is too expensive or inconvenient to buy or cook (Cummins and Macintyre 2002, Fitch 2004, Jabs et al. 2007, Pirog and McCann 2009, Alfnes and Sharma 2010, Williams et al. 2012). Another is educating the public and the farming community about the important implications local food has for community and environmental health (Cummins and Macintyre 2002, Morland et al. 2006, Seyfang 2006, Story et al. 2008, Kato 2013). Finally, cultural constraints can pose a problem for farmers who are new to American culture and the English language or to younger people who have been brought up in a culture in which basic cooking skills are often glossed over in educational contexts (Asp 1999, Lang and Caraher 1999, Beck 2007, Wrieden et al. 2007, Cultivating Community 2013, Cultivating Community 2014).

This combination of obstacles presents people with quite an array of challenges to overcome if they wish to obtain local food in an environment in which any of these barriers are at play. The obstacles are prevalent to different degrees in different parts of the state and in different types of communities and farming operations. Interviews with major actors in the development and promotion of local food systems in Maine can help sort out which problems people seem to be paying the most attention to currently, which problems deserve more or less attention, and which initiatives to address barriers seem most promising moving forward.

**Barriers to Local Food Systems**

Based on a comprehensive review of literature, supplemented by analysis of pilot interview data, I have outlined a list of barriers to local food system participation and a list of promising initiatives that attack various pitfalls of the current local food system. Barriers to participation in the local food system are summarized in Table 3.1.
Table 3.1. Brief description of constraints to participation in the local food system.

<table>
<thead>
<tr>
<th>Barrier</th>
<th>Description</th>
<th>Sources</th>
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One of the most basic barriers to local food access can be a dearth of available local food (Food and Agriculture Organization 2008, Natural Resources Defense Council 2014). If food is not produced or sold in certain areas or at certain times of year, then people cannot purchase it, whether or not they could afford to do so. Due to Maine’s cold climate, the growing season in this part of the country is contracted in comparison to many other regions. This means that producers cannot always supply all stores with enough fresh produce year-round. Stores that do choose to sell local produce may be bursting with produce in the summer months but have a meager selection come winter. A parallel issue is the lack of winter farmers’ markets. There are approximately 129 registered farmers’ markets in the state of Maine, but there are only 15 registered winter markets (Maine Federation of Farmers’ Markets 2014). This barrier could be due to an insufficient supply of produce to stock winter farmers’ markets or it could be due to consumers’ unwillingness to face the harsh conditions or go out of their way to a separate winter market. A separate constraint to availability that is unrelated to climate is the ability of producers to sell produce in certain stores (Chapman 2011). Natural food stores and farmers’ markets usually welcome small-scale producers to sell at their locations. But many larger stores require producers that provide goods to their stores to become Good Agricultural Practices (GAP) certified or obtain liability insurance (Rejesus 2009, Whole Foods Market 2014). These processes can be costly. Together these barriers comprise the availability constraints on local food.

Another common complaint about local food from the consumer perspective is that it is inconvenient (Fitch 2004, Jabs et al. 2007). People who do not have personal vehicles or access to public transportation may not have a way to travel to food access points (Brunett and Pothukuchi 2002, Treuhaft and Karpyn 2010, Conservation Law Foundation 2012). Maine’s spread-out geography, especially in rural areas, exacerbates the problem: even among those who do have a way to get to food access points, it is easier to go to a conventional supermarket to get everything one needs for the week all in one place than to shop at several different location, possibly including a conventional grocery store, a local foods store, and a farmers’ market, to purchase food that is local to varying degrees. From the producer’s standpoint, the relatively long distances in between cities and the fact that northern Maine contains the end of United States trucking routes...
can contribute to a lack of incentive to provide out-of-the-way towns with food. Fewer stores in remote areas and lack of access to transportation in those areas can lead to food deserts, which are areas without access to a steady supply of affordable, nutritious food (Coveney and O’Dwyer 2009, USDA Economic Research Service 2009, Martín 2010, Treuhaft and Karpyn 2010, Lucan et al. 2012). This lack of motivation can affect both large producers, who have to pay a large truck to transport their goods, and small producers, who have to pay for fuel and take time out of their work schedules (or a valuable employee’s work schedule) to drive the food over themselves (Crown O’Maine Organic Co-Op 2012).

Another constraint is cost. Food is subject to market pressures, so to be a viable commodity its cost must be low enough for the consumer to want to purchase it and high enough for the producer to be able to cover his or her costs. Pinpointing this cost constitutes one of the major challenges of the local food movement. Many American consumers have become accustomed to cheap food due to the efficiency that the Green Revolution brought to farming and agricultural subsidies backed by the United States government (Lappé et al. 1998, Hazell 2002, DeWeerdt 2011, Lynch and Bjerga 2013, Yale Rudd Center for Food Policy & Obesity 2013). But when food is produced on a small scale and using organic principles, it may cost more than conventionally produced food. The cost discrepancy between consumer expectations and farmer needs drives the stereotype of local food as prohibitively expensive, highbrow fare (Williams et al. 2012).

Yet another constraint is education and knowledge of the value of local food. People who understand the food system are more likely to value local food for its importance to the environment, personal health, and the community (Cummins and Macintyre 2002, Morland et al. 2006, Seyfang 2006, Story et al. 2008, Kato 2013). Consumers who are aware of the implications of food sourcing, processing, and labeling can make more informed decisions about the products they buy (LaFave and Cobb 2012). Meanwhile producers who are aware of various processing and marketing techniques can communicate the nature of their products to the consumer more effectively (Wisconsin Department of Agriculture 2011). There is significant potential for improvement in food education on both the supply and demand sides of the equation.
A niche constraint in select regions of Maine is a cultural barrier between producers and consumers. There is a substantial population of immigrants in southern Maine, many originally farmers in their native countries and now learning to farm in a new environment and culture. In some cases, immigrant farmers may lack the language skills and business experience that their American-born counterparts have. Consumers may expect to be able to communicate quickly and efficiently with their farmer about the growing or packing process that a certain item went through. A farmer that cannot meet these expectations may not be able to sell as much produce as a farmer with comparable farming skills but more polished business skills (Wisconsin Department of Agriculture 2011). On the consumer side, the food that is available to immigrants through markets of food pantries may not be what they are used to eating (Salinas 2013). Learning to prepare and cook new foods is a valuable skill (Asp 1999, Lang and Caraher 1999, Beck 2007, Wrieden et al. 2007). Even those accustomed to United States cooking and culture may be unaccustomed to preparing produce and cooking from scratch (Asp 1999, Lang and Caraher 1999, Beck 2007, Wrieden et al. 2007). More Americans than ever rely on pre-prepared foods on a regular basis (Asp 1999, Lang and Caraher 1999, Beck 2007, Wrieden et al. 2007). Taken together, these constraints impact the accessibility of local food in Maine (Figure 3.1).

Methods

To collect detailed qualitative information about the state of Maine’s food system, I conducted semi-structured interviews with 24 participants (Table 3.2). The participants were chosen using a snowball sampling technique in which I collected a starting list of food systems experts from a web search and knowledge of my local food system and each successive interviewee recommended others who had a similar level of interest, experience, or expertise in local food or food security issues. Due to time and resource constraints I could not interview every person who was recommended by another participant. The sample used in this analysis is a cross-section of all types of experts on Maine local food and food security and is useful less as a representation of the view of Mainers as a whole than as an expert perception of the constraints facing the Maine local food system and widespread food security in the state.
I interviewed eight participants in pairs to minimize interview and travel time. All pairings were suggested by interviewees and contained two people who had an established professional relationship related to food system work. I interviewed the other participants on an individual basis.

The participants lived or worked in central and southern Maine locations, including Portland, Lewiston, Auburn, Augusta, Waterville, Palmyra, Unity, Brunswick, China, Skowhegan, Waterville, Yarmouth, and Waldo, although some respondents did travel more widely throughout the state to conduct their work. Seven interviewees were male and the remaining seventeen were female. Eleven of the 24 participants discussed having some experience growing food, while seven of those 11 identified themselves as farmers. Some of these participants also participated in organizing efforts around local food or food security initiatives. The remaining participants’ roles in local food or food security activity were related to organizing, education, or business.

The interview questions were designed to allow each participant to share personal experiences and insights into Maine’s food system landscape, while also stating their views of the major constraints and solutions that are part of Maine’s local food system.
and efforts toward greater food security (Appendix II). The questions were tailored to either growers or non-growers and asked the respondents to describe their relationship to and experience with Maine local food and/or food security issues.

Using the model of constraints to local food activity or food security developed in the previous section, I listened to an audio recording of each interview and recorded whether or not each respondent mentioned each specific constraint in the model (Appendix III). At least one mention was indicated by a 1, while no mentions was represented by a 0. Simultaneously, I transcribed important quotes and annotated important facts or information provided by the respondent (Appendix IV). This process resulted in a rich database of local knowledge about local food and food security in Maine.

Findings

The interview process and subsequent coding process yielded a database containing counts of mentions of five major categories of constraints to food access, with an emphasis on local food access (Table 3.3 and Figure 3.1).

Availability Constraints

Growing season is one of the most straightforward reasons for low availability of year-round local food in Maine. It is logical that if the weather is too cold, certain plants cannot grow, and there is a dearth of crop. However, this constraint may not be as widespread as commonly thought. Nancy Perry and Clara Whitney of Good Shepherd Food Bank, by far the largest food bank in the state, agree that there have been great strides toward getting fresh produce into food pantries year-round in recent years. Whitney says, “I think if we had been having this conversation three years ago, we would have said “yeah, growing season is still an issue.” But we’re coming up with solutions with our farm partners.” Perry adds, “You’ve got to get creative to stretch it out throughout the year. So that’s our goal is to continue looking for those ways. We’re there faster than we anticipated for sure.” Perry lists potatoes, winter squash, turnips, and carrots as common vegetables that the food bank receives throughout most of the winter now that it has been able to count on its farm partners to do some cold storage. She goes
Table 3.2. Interview participants and their relationships to local food or food security.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stephanie Aquilina</td>
<td>Cultivating Community Project Manager of Growing Access, Growing Communities</td>
</tr>
<tr>
<td>Dotty Blanchette</td>
<td>Yarmouth Food Pantry Director</td>
</tr>
<tr>
<td>Sarah Bostick</td>
<td>Cultivating Community Refugee Farmer Specialist</td>
</tr>
<tr>
<td>Tim Christensen</td>
<td>Vegetable Farmer and Retired Colby College Biology Teaching Assistant</td>
</tr>
<tr>
<td>Dave Colson</td>
<td>Maine Organic Farmers and Gardeners Association Agricultural Services Director</td>
</tr>
<tr>
<td>Kat Coriell</td>
<td>Maine School Garden Network Chair</td>
</tr>
<tr>
<td>Jamie Curley</td>
<td>AmeriCorps VISTA at Preble Street</td>
</tr>
<tr>
<td>Ryan Fahey</td>
<td>Maine School Garden Network Coordinator</td>
</tr>
<tr>
<td>Lisa Fernandes</td>
<td>Resilience Hub Director</td>
</tr>
<tr>
<td>Laura Fraelich</td>
<td>FoodCorps Volunteer</td>
</tr>
<tr>
<td>Caitlyn Frame</td>
<td>Dairy Farmer</td>
</tr>
<tr>
<td>Mike Gold</td>
<td>Maine Farmland Trust Farm Viability Program Manager</td>
</tr>
<tr>
<td>Willie Grenier</td>
<td>Maine Ag in the Classroom Executive Director</td>
</tr>
<tr>
<td>Melissa Hackett</td>
<td>Barrels Community Market Manager</td>
</tr>
<tr>
<td>John Harker</td>
<td>Director of Market Development for the Department of Agriculture, Conservation, and Forestry</td>
</tr>
<tr>
<td>Amber Lambke</td>
<td>Pick-up Café and Maine Grains Owner</td>
</tr>
<tr>
<td>Ellen Libby</td>
<td>Maine Farm to School Work Group Member, Maine School Garden Network Member, State Lead for National Farm to School, FoodCorps Host Site Supervisor</td>
</tr>
<tr>
<td>Viña Lindley</td>
<td>Food Systems and Youth Development Coordinator in University of Maine Cooperative Extension Waldo County Office</td>
</tr>
<tr>
<td>Tim McLain</td>
<td>Portland Food Co-Op Board of Directors</td>
</tr>
<tr>
<td>Ken Morse</td>
<td>Maine Network of Community Food Councils Coordinator, Maine Farm to School Network Coordinator, Farm to Institute New England Leadership Team Member, Healthy Maine Partnerships Activist</td>
</tr>
<tr>
<td>Nancy Perry</td>
<td>Good Shepherd Food Bank Mainers Feeding Mainers Program Coordinator</td>
</tr>
<tr>
<td>Andy Smith</td>
<td>Dairy Farmer</td>
</tr>
<tr>
<td>Hanne Tierney</td>
<td>Hog and Vegetable Farmer</td>
</tr>
<tr>
<td>Clara Whitney</td>
<td>Good Shepherd Food Bank Communications and Advocacy Manager</td>
</tr>
</tbody>
</table>
Table 3.3. Summary findings from the interviews broken down by major constraint category.

<table>
<thead>
<tr>
<th>Constraint Category</th>
<th>Mentions</th>
<th>Producer Constraint</th>
<th>Consumer Constraint</th>
<th>General Constraint</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability constraints</td>
<td>26</td>
<td>19</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Proximity/Convenience constraints</td>
<td>43</td>
<td>12</td>
<td>18</td>
<td>13</td>
</tr>
<tr>
<td>Cost constraints</td>
<td>20</td>
<td>8</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>Education/Knowledge constraints</td>
<td>97</td>
<td>48</td>
<td>35</td>
<td>14</td>
</tr>
<tr>
<td>Cultural constraints</td>
<td>43</td>
<td>3</td>
<td>39</td>
<td>1</td>
</tr>
</tbody>
</table>

Figure 3.2. Visual breakdown of interview findings by constraint category.
on to say that the bank is looking to have farmers do some light processing, such as freezing two-pound bags of broccoli and cauliflower, to increase the amount of produce available over the winter even more. She also notes that trading services with partner organizations can help everyone meet their goals in a place with a climate as harsh as Maine’s. The example she gives is of Good Shepherd Food Bank storing frozen green beans for a company in Topsham; in exchange, the company will take the food bank’s strawberries, wash them, and freeze them. Melissa Hackett, Barrels Community Market Manager, explains that creativity in food preparation can also stretch local food availability throughout the winter months.

It works really well for us to have produce and then use it in the kitchen. And it’s a great education tool to say to people, “This is what you can do with these things.” We have all these recipes and it’s March and we’re still making new things and making great [tasty] things.

Another challenge food pantries in particular face with regards to seasonality is storage capacity. As Clara Whitney says, “These are small, small organizations in church basements and staffed almost entirely by volunteers. I would say the majority of our partner food pantries have extremely small budgets every year, [we’re] talking $1000. I’m just throwing that out…so they can’t afford a lot of capacity building and a lot of infrastructure.” She says the storage issue is extremely widespread, to the point where Good Shepherd Food Bank works with partner agencies to give out refrigerator and freezer grants. Because pantries with low storage capacities cannot hold onto a lot of produce for very long, they cannot bring large quantities of produce to their clients, even if the produce is being grown throughout the year.

Lisa Fernandes, executive director of the Resilience Hub in Portland, Maine, describes her personal permaculture operation and shares her experience growing food year-round.

We have a very large season extension program, so we use quick hoops as well as portable hoop houses over all the garden beds on an ad hoc basis to extend the season and grow food through the winter…In September we convert to all winter unheated winter greenhouse salad production, and our goal there was to be able to provide enough winter greens for our family and
up to four or five other families to have two to three salads a week…. I’m also creating a system that operates as an ecosystem so that as it matures most of the food will eventually come from the perennial food sources, which are a lot less work…. No, [growing season is] not an issue at all.

Fernandes goes on to cite techniques such as root cellaring, outdoor clamping, storing certain food items in the ground until they are ready to be consumed, canning, drying, and freezing, growing season can be extended considerably. It is true that as a permaculture pioneer, Fernandes may have more experience than most producers with growing food throughout the winter. But others, such as Nancy Perry and Clara Whitney of Good Shepherd Food Bank, agree that the cold Maine winters are not as much of a restraint as they used to be even five or ten years ago.

A different type of seasonal constraint is that of access to labor. A general seasonal constraint that may come as a surprise is the challenge of finding people to tend to school gardens in the summer. Ryan Fahey, Coordinator of the Maine School Garden Network, cites this obstacle as the biggest challenge that many programs face. With over 100 school gardens in the state, finding committed people to tend to them in the summer requires substantial effort.

Another facet of the availability constraint is producer ability to properly process their goods before delivering them to the consumer. If producers do not have access to the tools they need on a local scale, the local food system is weakened. MOFGA’S Agricultural Services Director Dave Colson provides a bit of Maine agricultural history and explains the critical need for processing infrastructure in the state.

We’ve basically spent [the] last hundred years in the state of Maine dismantling whatever local food system we had fifty to a hundred years ago. So there was a much more vibrant local foods community fifty, sixty to a hundred years ago in the state than we see right now. Pretty much that mirrors what we’ve seen around the country in terms of specialization of agriculture, moving to distinct areas of the country to provide commodities into a larger food distribution system. So for instance, sixty to a hundred years ago there were about eleven different processing companies in the state of Maine that would process and can primarily vegetable and season products. And pretty
much all of those canneries that were existing then have disappeared. We have the beginnings of two or three of those potentially coming back. But the loss of that infrastructure created a loss of year-round access to food. So obviously during the growing season access is a little easier in terms of local food because that’s when they’re being grown. The rest of the year, there is need for storage facilities or canning and processing facilities during the time of the year when those local foods are available to be available in the off-season.

Melissa Hackett, Manager of Barrels Community Market Co-Op, points to storage as a key concern for small retail operations that are trying to operate on the local level. If those operations cannot store produce, they cannot make it available to the consumer.

The storage is the issue for us here [at Barrels], that we can’t make it easier for farmers to self-distribute. That’s the way we have it set up now is that farmers deliver to us, and we store it. And we definitely could move more food if we could hold more food. We could make it more cost-effective to the farmer if we could say “Bring me twice as much as you’re bringing me, and I can hold onto it instead of you coming again next week.” Lack of storage makes it more expensive to the farmer and less convenient for us.

Even when producers can provide storage space that allows producers and consumers to exchange goods, not all consumers frequent stores that sell a large quantity of local food. When looking at availability specifically to people who may be experiencing food insecurity, it is important to take into account the details of their situation. John Harker, the Director of Market Development for the Department of Agriculture, Conservation, and Forestry in Augusta, explains some common shopping behaviors he has studied (Maine Department of Agriculture 2008). “The majority of the lower-income folks, folks who are lacking food security are not necessarily going to go to farmers’ markets and not going to go to farm stands. They really do go to the supermarkets. And then they go to the food banks…They will also tend to use what limited dollars they have, and they’ll go to convenience stores. They’ll go to the Walmarts.” Andy Smith, a dairy farmer in South China, Maine, adds a bit more nuance
to this generalization when discussing the constraints on the locations where local farmers often sell their goods.

There are a lot of people who just aren’t going to go to Barrels and Uncle Dean’s and the Belfast Co-Op. They’re just going to go to Hannaford. And you know, that’s fine. So we should start selling these products at those stores and give the consumers options in those stores.

Further evidence that selling local produce in well-established grocery stores would increase sales comes from Stephanie Aquilina of Cultivating Community. She works with immigrant and refugee farmers and helps them sell their goods at farm stands throughout Portland. One farm stand is located in the parking lot of a Whole Foods in Portland. “That’s the most profitable farm stand, hands down,” she says. Exposing farm stands to a wider range of consumers, who can be found at more well-known markets with a larger variety of goods, is a critical step toward increasing the customer base for local farmers.

Unfortunately, as Smith explains, it is sometimes difficult for smaller producers to sell their goods in large stores because of greater certification and insurance requirements. Sarah Bostick of Cultivating Community recalls when Whole Foods first came to Portland. “Whole Foods—I think—was requiring a 5 million dollar liability [insurance] policy. And it didn’t exist in Maine. There wasn’t an insurer who would insure a Maine farmer at 5 million [dollars].” Larger insurance plans have since become available, but situations such as this demonstrate why aggregating into a group such as a food hub can be an important step for farmers toward completing the requirements for selling to larger markets. And not having a Good Agricultural Practices (GAP) certification, which is one of the most commonly required certifications by grocery stores, does not mean that selling at larger stores is impossible. Local hog farmer Hanne Tierney of Palmyra agrees that GAP certification is a barrier but points out that not all grocery stores require it. She makes a distinction between grocery stores and convenience stores, saying that it can be more difficult to sell at convenience stores because the turnover rate of produce is so low there, so it is more challenging to keep produce fresh than at grocery stores where customers are more likely to buy produce.
Hackett recommends using several strategies at once when asked about local producers selling their goods in large stores. There’s only so much of a market, and if [small stores are] competing with each other, it’s not productive in my mind. But I think also reaching out to the bigger stores and encouraging them that if they carry these products and pay the farmers a reasonable price, people will shop there and will buy those products.

Smith also references efficiency and economies of scale as a producer constraint to producing cheaper local food. [We are] trying not only to increase the efficiency of our operation so we can reduce the price so that hopefully more people will be able to afford our products but also increase the efficiency of our distribution so that we’re actually using less energy to distribute our local products because a lot of people especially on a small scale aren’t necessarily having a smaller carbon footprint with their operations.

Growing season, processing infrastructure, storage capacity, ability to sell in larger stores that reach a wider range of consumers, and economies of scale of local operations are all part of the availability constraint of local food in Maine. Conversations with producers and distributors all over the state demonstrate that these components of availability are in flux and are not as rigid as they may appear.

**Proximity and Convenience Constraints**

Maine’s spread-out and varied geography poses challenges to both consumers and producers. Proximity and convenience constraints contain sub-categories such as transportation and convenience for the consumer. John Harker breaks Maine’s agricultural geography into three categories, urban, suburban fringe, and rural, each with its own challenges. Urban areas, such as Portland and Lewiston, have markets that attract many similar producers of local vegetables and some animal products because it is well known throughout the state that these markets are the largest and most lucrative. The competition among producers in these areas is intense. In suburban areas growers face at least two distinct challenges. The first is that while there is more agricultural land
available in suburban areas, the residents in those areas may not want the land to be used for agriculture. A pig farming operation, for example, could detract from the aesthetics of a neighborhood. The second challenge producers face in these areas is the small populations and small local markets. If farmers expand their operations much, there likely will not be enough of a local market to sustain them. In rural areas larger farms that have to transport products to wholesale markets or distant markets are common. Efficiency is a major challenge for farmers in these areas.

But farmers with larger operations are not the only ones who have to transport their goods long distances to market. Andy Smith, a dairy farmer from South China, describes the challenge of Maine’s geography for local producers who make their own deliveries.

One of the huge issues that those of us who are [farming] talk about is the fact that here we are, we’re surrounded—we’re in a state of like 1.4 million people—we’re surrounded by people here and yet we’re driving our goods to the coast.

He suggests that a solution to this challenge is to infiltrate larger, more widespread markets, such as Hannaford and Wal-Mart. Melissa Hackett, Manager of Barrels Community Market in Waterville, and Tim Christensen, a vegetable farmer in Unity, agree that if producers sell to a more diverse array of markets, such as independent grocery stores and larger supermarket chains, they may be able to reach a wider consumer base. The advantage of larger markets is that people can find more products in one place, which makes their shopping routines more convenient. Convenience for the consumer is one of the most important components of the proximity and convenience constraint category.

Melissa Hackett calls convenience the biggest challenge to local food access because people are busy.

I think convenience is the biggest challenge…I think that’s our biggest challenge in Barrels, and I think it’s also probably indicative of a challenge of local food too. That unless you can get big box stores to carry local produce and local foods, it’s very hard to convince people that it’s worthwhile, unless they already really believe that, to make a second or third stop in their errands
that they need to do…Because people only have so much time and resources and energy, and we live in a society where people are used to getting what they want, when they want it, where they want it.

Because of the convenience factor, one of the fastest growing aspects of Barrels is its kitchen. Hackett says that customers often come into the store to pick up a healthful premade dish prepared with local ingredients that they can take home to serve their families for dinner. Hackett sees the greater utilization of the Barrels kitchen as one way to work around the issue of people not having the time to cook from scratch with local produce. She also points out that the kitchen is a great way to minimize waste. If Barrels cannot sell all of a certain product in its raw form, it goes into the kitchen and the volunteers there create convenient readymade dishes out of it.

Others in the state are aware of the convenience issue too. Amber Lambke is the owner of the Pick-up Café in Skowhegan, Maine, a combination restaurant and CSA program that focuses on increasing access to local food for all members of the Skowhegan community. Lambke says that her business is in the process of thinking about how to minimize the convenience constraint for its customers.

I feel like we’re only scratching the surface. If the population here is 9,000 people, the way we’ve looked at it is that, on a good day at the market you might get 500 people, but out of a population of 9,000 people will say that’s good for farmers’ markets, but it’s still not everyone. And so this business was created as a way to try to serve the customer who is not shopping at the farmer’s market. There are teachers and nurses and professionals who work in town, their shift ends at 3, they go home, they don’t come back in on a Saturday morning. And so how do we help serve them with local food in a way that’s convenient? The CSA developed around that notion…this business [the Pick-up Café] is actively considering how to do some home delivery of food, which would benefit not only the busy family that can afford to buy a CSA share but the low-income family that might not have the means to get here to pick up their CSA share. We’re still tinkering with how to make that business model at least break even.
She goes on to say that her business is willing to deliver food to areas of Maine, such as Jackman, that are lacking fresh produce but that coordinating transportation proves difficult.

It would require a certain number of shares to even pay for the trip up there. And that just hasn’t gotten coordinated yet…it does appear to be a real need, it’s just that for us it’s going to require partners that can help us connect with those populations up there because we are not well-connected up there. We can certainly rally the food and get it there. This business supports over 40 area farms by purchasing from a multitude of farms, aggregating the food here, and making sure there’s enough to serve the need.

The Pick-up Café operation demonstrates some of the challenges of addressing the convenience constraint to local food access. Viña Lindley of the University of Maine Cooperative Extension adds that vehicle access is a major challenge for many consumers, especially in Waldo County where she is based. Many people she works with on a regular basis only go shopping once a month because they have to take a taxi to the grocery store. These people do not buy many fresh fruits and vegetables because they will not last for the whole month until they can go to the store again. The same issue of shelf life within the home occurs with produce from food pantries that are only open once a month. Proximity and convenience constraints are an issue in a large state, such as Maine, with many rural pockets. Both the producer and the consumer are constrained by geography and time, and the potential for food deserts is high.

Cost Constraints

Local food has developed a reputation for being expensive, elitist fare. However, several interviewees point out that food from the globalized system of agriculture does not reflect the true cost of production, processing, and distribution due to economic externalities. One is example is direct agricultural subsidies that make industrialized agriculture cheaper for producers who are involved in it. Others are indirect subsidies, such as the financial and social burdens carried by society (e.g. taxpayers financing a war centered around resource access, pollution, environmental degradation) so that we can maintain access to cheap fossil fuels. Lisa Fernandes, Director of the Resilience Hub in
Portland, elaborates on the economic externalities at play in the pricing difference between globally produced and locally produced food.

These are all costs that result in a pricing message to consumers that unfortunately reinforces the fact that food that you produce yourself or in the neighborhood or local farms, it appears to be expensive and out of reach, when actually it’s probably more accurately the real price of producing food. And what we’re bringing in from a global and national scale, because of this complex economic system and all of those subsidies and externalities, is perceived as what things should cost. But cheap food isn’t cheap.

Ellen Libby, a University of Maine Cooperative Extension Educator and State Lead for FoodCorps and the Farm-to-School Network in Knox and Lincoln counties, echoes this sentiment. “We don’t know the true cost of food in our country.” As Fernandes explains, the price difference between local food and conventionally produced fare is misleading because real costs are not taken into account in global food production. This reality means that consumers generally pay more money out of pocket for local food because the externalities of producing it have been internalized in the supply chain, whereas those externalities are not the consumer’s financial burden in the global food production system. As Fernandes explains, the difference in cost between the two types of food production makes it difficult for people who do not have much money to spare to invest in local food.

I also have to have an enormous amount of compassion for people who are literally just trying to feed their kids and keep a roof over their heads. And I totally get that. And it’s complicated because we are in a system where there are not a lot of options for people who don’t have access to cash.

She goes on to say that in the current economic system, proponents of local food are forced to work even harder to explain the merits of a local system.

I do think that the economic model that we have is creating market messages that perpetuate this system [national, global] and put this system [household, neighborhood, regional] at a disadvantage. So we really have to work harder to strengthen this system [local].
Many producers and distributors are aware of consumer cost constraints and are working to overcome them. Amber Lambke’s work on the Pick-up Café is an example of the more active role select producers and distributors are increasingly taking in considering the needs of all their clientele.

I have been on the Board and continue to participate with Maine Street Skowhegan, which is a non-profit that aims to revitalize Skowhegan’s downtown, which by the nature of the work means that we are considering everybody’s needs in the community…Just the fact that 51% of the population here in Skowhegan qualifies for SNAP means that we are often trying to figure out “who do our programs serve?” and “how do we involve low-income families?”

Programs such as Double Dollars and Veggies Prescription, both of which were implemented by Massachusetts-based NGO Wholesome Wave, have become popular ways for farmers’ markets and other retail operations to reach low-income consumers. But these programs are not free. Lambke explains the challenges of continuing to attract customers that were originally drawn in by such programs.

Some of these programs require money, and some of them don’t. If funding dries up for some of these programs, I’m sure this market group will stay committed to reaching out, but funding is disappearing a little bit through Wholesome Wave as Wholesome Wave has enough data to show that these programs are effective. They wanted to fund these programs and get them off the ground as a way to drive policy change, so with enough data in hand now, they’re less committed to fundraising for themselves to continue to fund these partners, and they’re more invested in really trying to create some policy change to find pots of money that already exist…We all knew that the aim of these programs [was] to stimulate new shopping behavior among low-income families. So if the grants don’t exist or the incentives don’t exist, will people still come back to spend their money here? I think some will. And I think some won’t.

If local food is relatively more expensive compared to global food, then why would producers not lower their prices to be able to compete in the global market? It is
important to recognize that local food that is too expensive for consumers represents only one side of the local food price point issue. Many local farmers live near the poverty line and cannot afford to lower their prices because they have to bear relatively more of the production expense than their large-scale, global counterparts. Dave Colson, MOFGA’s Agricultural Services Director, discusses farmers’ need for prices that are high enough for them to earn a living wage in the context of Maine’s agricultural history. Farms used to pass from generation to generation in families, which meant that young farmers did not usually have large debt burdens. Now, with many beginning farmers buying land from non-family members and land prices being based on development value instead of purely agricultural value, farmers have to pay more to start farming. It can be very difficult for farmers who do not have access to capital from off-farm income or family background to make a living if they launch their farming enterprise themselves. Colson elaborates on the challenges of farmers serving low-income populations when they themselves are barely making a marginal income.

What I see for a lot of the young farmers is that the desire is that farmers feed into the food insecurity system to help provide food for folks that are living at…a poverty level. But often these young farmers themselves are living at the poverty level and really don’t have much choice in terms of how they market their crops. They’re looking at going to high-end restaurants and direct sales to an affluent consumer in order to capture as much of that income potential as they can in order to survive themselves.

Mike Gold, the Maine Farmland Trust Farm Viability Program Manager, uses survey data to confirm that many farmers do not have the financial flexibility to serve the low-income community, a goal that is very much in line with many of their personal missions for farming. Many of these farmers wish they could rely more on local markets in central Maine rather than driving to southern Maine or the coast to make the bulk of their sales, but many markets in the southern Maine area do not have an ample number of customers that can afford to pay the price needed for the farmer to make a living. Farmers themselves living at the poverty line is not something that many people may think about. But it is a widespread phenomenon, as evidenced by yet other interviewee comments. “Farmers quite often are the ones that might be standing in line at the food
pantry themselves if they have had a challenging year with their crops,” says Nancy Perry of Good Shepherd Food Bank. Viña Lindley adds, “They’re [farmers] just living by the skin of their teeth, which isn’t a good place to be. And where they’re just getting the bare minimum for what they can afford to get for what they’re growing is already so far above what a lot of folks’ reality are able to afford. And there’s a problem there…Supporting local farms can’t just be those of us who are privileged enough to have that as an option.”

Even farmers who do not live at the poverty line are still in a business with the goal of turning a profit. As Palmyra hog farmer Hanne Tierney says, “We are there [at market] to make our living, so it’s really hard to mark our prices really low.” She also points out about the produce at farmers’ markets that “most of it is not more expensive than it is at the grocery store, but it’s not what they’re [many customers] buying at the grocery store.” By this she means that many consumers buy cheap highly processed foods at the grocery store and then compare those prices to the prices of fresh goods being sold at farmers’ markets.

It is clear that if local farmers are expected to provide produce to the food insecure demographic in Maine that they will have to be compensated in a fair manner. The cost constraint is both a producer and a consumer issue. People on both sides of local food—those growing it and those eating it—are struggling with money, so respondents indicated that there is a critical need for creative solutions to the issue of finding a price for local food that is affordable for both food insecure consumers and the farmers who produce the food.

*Education and Knowledge Constraints*

Education and knowledge constraints were perhaps the most widespread barriers cited by respondents in the study. They came up in every interview in one form or another. Both farmers and NGO staff said that raising the awareness of consumers and producers about the importance of local food for the environment and communities should be a priority. Willie Grenier, Executive Director of Maine Ag in the Classroom, believes education is one of the most important approaches to addressing food insecurity in Maine.
I think, because of who I am and where I come from, that education is a major answer to food insecurity. I just think that’s the most important. But when you talk to someone else, they’re going to give you a different perspective. It’s going to be transportation or—you know what I mean?....The kids definitely take the lessons home and apply them at home, which makes parents...start thinking about where their food comes from. I think that an agriculturally literate society is going to make better choices. It’s going to help people that are having troubles with food security learn...how to grow their own food, how to get their own food, how to use their cash dollars for the best choices that they can make nutritionally and economically.

Although Grenier is correct that there is a multitude of perspectives on which barrier to local food access is most severe, she is by no means the only one who believes in the importance of food and agriculture education. Laura Fraelich, a FoodCorps volunteer in Portland, Maine, explains that part of her job is to educate school children about the merits of eating local food.

Laura and I [We] are...(kind of)...pioneers on the ground trying to promote some of the dishes they [the Portland Public School system] are trying out that are kind of like not as familiar to a lot of kids and not as appealing to a lot of kids....We try to promote some of the recipes they are trying out....We’re trying to work with them to promote as much local food and local recipes as possible....And this might be some of their [the] only meals that they get or some of the only healthy meals they get during the day....We’re really trying to promote that they’re healthy meals and local meals.

Ellen Libby, who is the supervisor of the Maine FoodCorps program, enumerates the benefits of childhood agricultural education. “In a broader sense we’re planting seeds for better food security in the future because a lot of these kids are going to...grow up to have home gardens, be more aware of local farmers and accessing local food, and maybe even go into the agriculture field as a career.”

Viña Lindley, who works at the Waldo County Cooperative Extension Office of the University of Maine, believes that early childhood education is the most important. She believes that by the time children get to kindergarten, it is too late to instill healthy
habits because children have already become accustomed to eating processed food. On the other end of the childhood education spectrum is John Harker, who believes that elementary school programs, such as Maine Ag in the Classroom, Maine School Garden Network, and FoodCorps, are all wonderful programs but that “middle school is where they’re going to establish their values for their life. And I think we’re missing the bulk of getting good nutrition education at the middle school level.” As Grenier said, everyone has their own opinion about what priorities should be. It is important to recognize the merits of education at all stages of development and develop specific education goals at each.

Melissa Hackett says customers who use EBT/SNAP at Barrels generally buy processed food instead of fresh produce. Her sense of why this is from talking to those customers is as follows.

I think a lot of it’s a lack of education about what to do with raw, fresh food…I think it’s very much an educational, generational gap of “This is how you cook.” And so it’s a very big hurdle in my mind. Hackett says that people who do not have a background in basic cooking often have no idea where to begin with the process, so rather than learning a new skill set and thinking about food in a different way, buying a premade meal is easier. She believes there is a lot of work to be done helping people become more self-sufficient and healthy in the cooking process.

Amber Lambke, whose socially responsible business, has a mission of serving all members of the Skowhegan community, similarly feels that education is a barrier to local food access.

It just still feels like we have more education to do. In more urban areas you say the word “CSA,” and everyone knows what you’re talking about. But that’s not true up here. You have to constantly explain what that means. In fact, we try to not use that acronym. It doesn’t say anything to people, so we will often say it’s a weekly share of produce that you pick up or it’s an assortment of fresh produce from local farms that is made available to you in a convenient way for pick-up…It’s a new model. So we find ourselves having to say “well here’s how you can trust that your up-front payment will actually
result in food available to you.” It’s relationship building and trust building, and that takes time.

She goes on to enumerate the community benefits of programs such as Double Dollars and Veggie Prescription, that encourage community interactions.

One of the secondary effects of those programs that I think is really important is the socioeconomic mixing that happens at the market by bringing folks there. You don’t know who’s who. The same machine that processes EBT processes credit cards. So lots of people use that table, not just the low-income families. Through that mixing, we have come to meet folks that need employment, and we’ve come to understand their skills and we’ve been able to hire some of these people into food-related jobs in the hub of businesses here… I don’t know how else those groups mix, like in other arenas. Like if we’re not talking about food, how do those groups mix to meet each other and find opportunities.

Lambke’s point is that local food can serve as a unique unifier and community-builder that benefits the community in multiple ways.

Dave Colson, who interacts with farmers in his everyday work, believes a greater societal consciousness of the work that goes into producing food and an awareness of the “ridiculousness” of the current expectation of cosmetic perfection are keys to a healthier food system. He cites one representative example of how this expectation can lead to large quantities of food waste since there is no market for blemished produce.

A [hollow core potato is] basically a potato that’s either growing too quickly during the season or perhaps got too much water at some point. But it didn’t develop solidly in the middle, but it has a hollow middle to the potato tuber. And sometimes it will actually create what looks like a skin on the inside of the potato on this hollow core. And there’s nothing wrong with that potato, but if you bake it and cut it open then you obviously have this kind of open middle within there, so it’s not really desirable. And I was visiting a farm last week where they had actually purchased a very expensive piece of machinery with an infrared reader that could kind of look into the center of the potato and
determine whether there was enough density there, whether it was hollow or not. They were picking the hollow potatoes out into a separate bin...I ended up going over and cutting open some potatoes in that bin and two out of the three that I cut open, there was nothing wrong with them. But at that point they were considered seconds, and I said “Well, what happens to all this?” And they said, “Well, we have no markets for them. And even when we offer them to the food banks they look at us like, “What, we get your bad stuff? How come we don’t get the good stuff?”

The issue of food banks or pantries receiving lower quality produce is widespread. It has to do with the need of many farmers to maximize their income by selling their most aesthetically pleasing produce to high-paying consumers. In Colson’s mind, the popular phenomenon of farmers donating lower-grade produce to food pantries is not the fault of the farmers but rather a reflection on our definition of “lower-grade” and our expectations as a society of the cosmetic quality of the food we purchase.

I think there’s a real problem there with our whole view—cosmetic need within our food system…. When you grow your own garden, you’re willing to accept a whole lot more blemish on that food than you are if you’re making that decision as to whether to buy that within the store…It’s endemic within the whole food system that we have this expectation not only of cost but of quality…Just that kind of local consciousness there. I think once that begins to develop and you get interest around that, then there [become] all kinds of more potentials for greater food distribution.

Producer awareness about the environmental and societal benefits of local food is more effective at transforming public opinion when farmers and distributors can communicate those advantages clearly. Ellen Libby explains the difficulties of strengthening this communication link. “It’s marketing. Because there’s this perceived notion that local food is higher cost, and it can be. But there’s also gleaning opportunities. There’s also fresh produce going into pantries that could be accessed. There’s the Double Dollars [program]. So there are programs that would help with that. It’s a matter of do people know about them? Are they in the local Laundromat where people go to wash their clothes?...and word of mouth is a big part of it.”
The gold standard of food security is growing one’s own food. When factors such as lack of access to transportation or high cost make it difficult for a consumer to buy food, she can grow some of her own food if she has the knowledge, skills, and tools to do so. Hanne Tierney suggests that in some communities that are labeled as food deserts, people actually have decent access to fresh produce because “everyone and his brother has a kitchen garden.” This reality of empowered community members is only possible with the proper agricultural education and training, which, as Dave Colson points out, is not as widespread as it was a century ago when a majority of Americans participated in agriculture.

Cultural Constraints

Cultural constraints are difficult to define narrowly. They could be anything from a language barrier between a farmer and a customer at a farmers’ market to a cultural shift away from scratch cooking. A few examples from interviews with people who work closely with local food and food security issues help to provide some specific evidence of the types of barriers people face in this state.

Cooking skills are a barrier that often came up in interviews. This obstacle could be grouped into education and knowledge constraints, but because the lack of cooking skills in America seems to be a cultural phenomenon, it may more appropriately be considered a cultural constraint on local food systems.

Melissa Hackett states the problem bluntly.

Kids don’t know how to cook at all. I went to a farmers’ market…in Orono, and there was a college student there who came up with some potatoes, and he didn’t know how to boil potatoes. That’s pretty basic. And he just had no idea where to begin with these potatoes. And I think that’s pervasive. And crippling to a local food economy that’s scratch food based. If people don’t know what to do with food, then it doesn’t matter how much you’re offering it to them. If they don’t know what to do with it, then they’re not going to choose it.

Ryan Fahey agrees with Hackett’s perception of decline in cooking skills.
I think we’ve lost a lot of skills in the kitchen, and I find—I sell whole chickens at the farmers’ market, and it requires so much education—people will be like “I don’t know, my family’s never had bone-in chicken before. I don’t know how they’re going to deal with a whole chicken.” But the fact that you can make your own stock and you can make multiple meals cooking the food once and then preparing it in different ways--[Kat: Yeah, it seems like there’s a gap there.] Yeah, I feel like families used to know how to get by with beans and making the most out of food, and they don’t any longer.

Mike Gold points out that in addition to a generation gap being the cause of lack of cooking skills in younger generations, the cooking ability of older generations, in which a lot of people are on fixed incomes, may be affected by their age. He goes on to say that many farmers see the cooking skills challenge as their own challenge as well. Many growers find recipes for their customers and engage in dialogue about how to prepare the produce they grow.

While most respondents said that cooking skills were a major challenge, especially among younger generations, it is important to recognize that not everyone faces this constraint. Jamie Curley, an AmeriCorps VISTA with Preble Street in Portland Maine, says that we have to be careful about generalizing when it comes to cooking skills as a barrier to local food consumption.

I don’t think it’s that folks don’t actually know how to cook; it’s that they don’t have the time or the resources or the olive oil in their kitchens because that’s expensive and food pantries don’t carry it, or they don’t have the spices. Or they have three kids and three dogs, and they just don’t have time.

Programs like Cooking Matters are great, and I think Farm to Pantry is amazing too. But I really think it’s more that people just don’t have the resources and the time…[Some of them] really know their stuff. They’re creative, talented cooks. I don’t think that’s their particular limitation, but for some people it is. So you can’t generalize it.

While it is important to recognize the nuances of people’s abilities as Curley does, most survey respondents cited cooking skills as a major barrier to local food consumption, so it
is likely that lack of cooking skills plays a significant role in local food access for food insecure populations.

The barriers to local food access for food insecure members of society are considerable, both from the producer and consumer standpoints. These barriers have different levels of importance, as expressed by interviewee focus on some constraint categories more than others (Figure 3.3-3.4). It is notable that education is consistently ranked as the most important constraint and cost as the lowest. Cost is one of the most frequently cited barriers to local food access, so it is surprising that more interviewees did not mention it (Cummins and Macintyre 2002, Pirog and McCann 2009).

Although the barriers to local food access in Maine are diverse and challenging, the severity and reach of food insecurity in Maine has prompted a lot of activity surrounding issues of local food and food security.
Discussion: Overcoming Barriers to Maine Local Foods

Results of interviews suggest that education and knowledge, cooking skills, and cost are key barriers to the expansion and long-term viability of local food systems in Maine. The education and knowledge constraint category contained many of highest totals for mentions of a specific constraint. Producer methods of marketing received 16 mentions, the highest of any specific constraint in the study, while general awareness, importance of local food for personal health and nutrition, methods of processing, and importance of local food for communities received 14, 14, 12, and 11 mentions respectively. The cultural constraint category contained the second most mentioned specific constraint, cooking skills, with 15 mentions. It also contained consumer gardening skills, which received 11 mentions. Of the remaining constraint categories, cost and proximity and convenience tied for containing the specific constraint with the most mentions. Cost too high for consumers tied with distance to markets and consumers at 12 mentions.
There are few programs that target the time and money expense of producers trying to overcome long distances to consumers or market, which indicates that this might be an area for further research to examine. Instead I focus on the constraint of high cost of local food to consumers, as there are many references to that issue in the literature, which suggests that the issue may be more important than the interview data suggest (Cummins and Macintyre 2002, Pirog and McCann 2009). There is a plethora of promising initiatives that addresses many of the barriers discussed in this paper, but I will highlight one example of an especially effective or creative solution to each of the three constraint categories highlighted above, education and knowledge, cultural, and cost constraints, to give the reader an idea of what is possible.

**Overcoming the Education Barrier: Troy Howard Middle School Garden Operation**

Educating all sectors of the population, but especially young people, about agriculture and food issues is vital to increasing food security and support for local food systems in the state. Ellen Libby and Viña Lindley mentioned one youth education model that stands out as particularly creative and powerful: Troy Howard Middle School’s garden program. Through this program middle school students write business plans and grow produce to sell at the Belfast Co-Op. When the program was starting out, the students did market research by surveying local farmers to find gaps in crop production and avoid competing with farmers and undercutting the local food economy. Instead they found that not many growers were producing spinach and chard, so they were able to fill that niche and meet a need in the community. The program is now almost entirely supported through student vegetable sales. The school also has the first paid agricultural coordinator in a Maine school. The lessons these students learn about food system function and community involvement are invaluable. An engaging educational experience of that level of involvement and caliber undoubtedly contribute to a lifelong heightened consciousness of agricultural issues. The students now understand the processes of growing, marketing, and selling local food in a community-supported marketplace and are more likely to personally support local agriculture in the future. Their gardening skills and business experience make them less likely to experience food
insecurity themselves by providing them with marketable job skills and the ability to grow some of their own food.

*Overcoming the Cooking Skills Barrier: Good Shepherd Food Bank’s Cooking Matters Program*

Inadequate cooking skills often came up as a cultural constraint to fresh food access. Nancy Perry and Clara Whitney explained how Good Shepherd Food Bank’s Cooking Matters Program is an attempt to reclaim the kitchen skill knowledge base that was common a century ago. Skills, such as steaming vegetables, are taught to adults. The program puts together packets of recipes and groceries that help the class participants replicate what they learned in class in their own homes. Sometimes even farmers participate in the program by giving helpful hints about food preparation. They may point out to an elderly person with arthritis that if you bake a squash, you can just scoop it out of the skin without having to peel it. Assisting people with becoming more familiar with the foods that local farmers commonly grow and donate or sell is a giant step toward accomplishing greater food security in Maine.

*Overcoming the Cost Barrier: Maine Farmland Trust’s Veggies for All Program*

A great example of a program that is working toward a solution to the cost issue is the Veggies for All Program that Mike Gold of Maine Farmland Trust is spearheading. The program started out as a non-profit in Unity that grew vegetables to donate to food pantries. The food bank farm is now under the direction of the Maine Farmland Trust and produces between 16,000 and 20,000 pounds of food annually. Maine Farmland Trust hopes to expand the program and have at least one or two satellite locations for the program elsewhere in the state within a year. In addition to geographically expanding the program, Maine Farmland Trust has aspirations to add a job training component to it. The organization hopes that the people it serves can get some on-farm experience by helping with weeding and harvesting chores, for example. In the agricultural sector, as in most other industries, people who have previous experience and well developed skills have a better chance of landing a job and getting paid higher wages. Providing people with an opportunity to gain valuable skills that can only be developed through experience
in a sector that is growing in Maine seems to be a winning recipe for a successful job training program. Gold sees this potential program as an effort to solve some food insecurity issues in the state in a more systematic way. If the program could get more people working on farms, they would have better access to food just by the nature of their occupation, and they also earn a consistent income.

**Conclusion**

The picture of local food access to all sectors of the Maine population created by stakeholder interviews is quite complicated. Factors as wide-ranging as cooking skills, access to a personal vehicle or public transportation, and cost constraints on consumers contribute to lack of access, as described in the literature (Campbell 1996, Asp 1999, Cummins and Macintyre 2002). The complexity of the issue makes it imperative that local or regional solutions remain in the forefront of people’s minds. While it is important for local groups to communicate with each other so as not to reinvent the wheel, it is also important to recognize that only local groups who are familiar with the dynamic of their community and its specific situation are best-suited to respond to their community’s needs. Outside funding and support from state and national organizations is crucial, but solutions are best devised and implemented at the local level.

One area that would be interesting for future researchers to examine is the role of educational institutions in improving local food access. The combination of Farm to School programs, CSA school pick-up options, agricultural education through groups such as FoodCorps and Maine Ag in the Classroom, and school gardens make schools a hotbed of local food access activity. Understanding the role of schools in the local food movement could make people more aware of their status as food activity hubs and therefore more likely to participate in their programming. Therefore, more information on the role of educational institutions (and a method of sharing that information effectively with the public) is an important step in building momentum for local food activity in schools.

While Maine struggles with access to local food for all members of its population, it also has a lot of promising initiatives and projects going on. People all over the state are dedicating incredible amounts of time and energy to addressing the barriers
outlined in this paper. Well-defined problems are key to creating well-designed solutions. I hope that this paper contributes various perspectives of the problems Maine faces and some potential solutions. What I have learned is that there is no one-size-fits-all solution for any one of these barriers, especially in as large and widespread a state as Maine, and that the best solutions often come from local organizations putting their heads together and coming up with ways to address the specific situation in their communities.
Literature Cited


http://www.maineasce.org/2012ReportCard.htm


http://www.huffingtonpost.com/2011/04/20/10-most-peaceful-states_n_849768.html#s264535title=10_Washington


http://web.ncsu.edu/abstract/science/opening-markets-1/


Cultivating Community. 2014. Our farm stands are at the heart of our food access work. Growing Access, Growing Communities.


APPENDIX I: R SCRIPT FOR SPATIAL AND STATISTICAL ANALYSES

The data for this R script can be accessed on the U.S. Census Bureau website. This R script was created using R version 3.1.0 (2014-04-10) “Spring Dance.” The goal of this script is to create boxplots and run t-tests for the socioeconomic data from Chapter 2. All data files are available upon request from the author.

```r
#Assign summary file of all three point types to "dat"
dat <- read.csv("summary.csv")

#Read aggregated file
dat

#hannaford file
hannaford <- read.csv("summary_han.csv")
hannaford

#market file
market <- read.csv("summary_market.csv")
market

#garden file
garden <- read.csv("summary_garden.csv")
garden

#Boxplots for each variable (all 8) broken down by factor
boxplot(dat$Income ~ dat$Factor)

#add red line for statewide average
abline(h = 48219, col = "red")

boxplot(dat$Education ~ dat$Factor)

#add red line for statewide average
abline(h = .364, col = "red")
```

97
boxplot(dat$Snap ~ dat$Factor)
#add red line for statewide average
abline(h = .19, col = "red")

boxplot(dat$Population ~ dat$Factor)
#add red line for statewide average
abline(h = 16.63, col = "red")

boxplot(dat$Age ~ dat$Factor)
#add red line for statewide average
abline(h = 43.5, col = "red")

boxplot(dat$Commute ~ dat$Factor)
#add red line for statewide average
abline(h = 23.3, col = "red")

boxplot(dat$Employment ~ dat$Factor)
#add red line for statewide average
abline(h = .9257, col = "red")

boxplot(dat$Vehicle_Norm ~ dat$Factor)
#add red line for statewide average
abline(h = .928, col = "red")

#---------------------------------------

#T-tests

#Income

#Hannaford vs. Statewide
t.test(hannaford$Income, mu=48219)
# Market vs. Statewide
```
t.test(market$Income, mu=48219)
```

# Garden vs. Statewide
```
t.test(garden$Income, mu=48219)
```

# All points vs. Statewide
```
t.test(dat$Income, mu=48219)
```

# Education

# Hannaford vs. Statewide
```
t.test(hannaford$Education, mu=.364)
```

# Market vs. Statewide
```
t.test(market$Education, mu=.364)
```

# Garden vs. Statewide
```
t.test(garden$Education, mu=.364)
```

# All points vs. Statewide
```
t.test(dat$Education, mu=.364)
```

# Snap

# Hannaford vs. Statewide
```
t.test(hannaford$Snap, mu=.19)
```

# Market vs. Statewide
```
t.test(market$Snap, mu=.19)
```

# Garden vs. Statewide
```
t.test(garden$Snap, mu=.19)
```

# All points vs. Statewide
```
t.test(dat$Snap, mu=.19)
```

# Population density

# Hannaford vs. Statewide
```
t.test(hannaford$Population, mu=16.63)
```

# Market vs. Statewide
```
t.test(market$Population, mu=16.63)
```

# Garden vs. Statewide
t.test(garden$Population, mu=16.63)

#All points vs. Statewide
t.test(dat$Population, mu=16.63)

#Age
#Hannaford vs. Statewide
t.test(hannaford$Age, mu=43.5)

#Market vs. Statewide
t.test(market$Age, mu=43.5)

#Garden vs. Statewide
t.test(garden$Age, mu=43.5)

#All points vs. Statewide
t.test(dat$Age, mu=43.5)

#Commute
#Hannaford vs. Statewide
t.test(hannaford$Commute, mu=23.3)

#Market vs. Statewide
t.test(market$Commute, mu=23.3)

#Garden vs. Statewide
t.test(garden$Commute, mu=23.3)

#All points vs. Statewide
t.test(dat$Commute, mu=23.3)

#Employment
#Hannaford vs. Statewide
t.test(hannaford$Employment, mu=.9257)

#Market vs. Statewide
t.test(market$Employment, mu=.9257)

#Garden vs. Statewide
t.test(garden$Employment, mu=.9257)

#All points vs. Statewide
t.test(dat$Employment, mu=.9257)

#Vehicle
#Hannaford vs. Statewide
t.test(hannaford$Vehicle_Norm, mu=.928)

#Market vs. Statewide
t.test(market$Vehicle_Norm, mu=.928)

#Garden vs. Statewide
t.test(garden$Vehicle_Norm, mu=.928)

#All points vs. Statewide
t.test(dat$Vehicle_Norm, mu=.928)
APPENDIX II: INTERVIEW QUESTIONNAIRE

Questions for Farmers

1. Briefly describe your farming operation (name, history, etc.).
2. Which crops/animals do you grow?
3. How much of each type of product do you grow? Quantify if possible.
4. If you are a fruit/vegetable farm, how many acres do you use? (Specify fallow vs. productive, especially with organic methods.)
5. Would you say that your operation falls squarely into either the retail-oriented or subsistence categories or is it a mix of both? Elaborate.
6. Do you use organic methods? For how many of your products?
7. Do you use any methods other than conventional agriculture? For how many of your products?
8. Where do you sell your produce? List/quantify if possible.
9. Does your operation have any social or environmental goals?
10. If you have leftover products that you cannot sell or consume, what do you do with them?
11. Would you be interested in participating in a program that would allow you to donate this surplus to a food pantry or other similar program?
12. What obstacles do you foresee for such a program?
13. Do you think Maine would benefit from a local foods atlas?
14. Do you have any favorite local food or food security initiative initiatives? Any projects you would like to see happen?
15. Can you think of other ways that agriculture or the local food movement could increase food security in Maine?
16. Is there any information or analysis that might be helpful to you, especially in the realm of expanding low-income markets?
17. Do you know of anyone else who might be interested in participating in this study? How can I contact him or her?
Questions for NGO/Food Pantry/Social Safety Net Staff

1. Could you tell me a little about the organization you work for and your position there? (Mission statement, organization history, recent activity, etc.)

2. Does your organization’s mission relate to the local food movement or to food security in the state of Maine? If so, how?

3. Regarding your organization’s mission, how does it address place-based solutions specific to Maine’s issues? (And what do you think those issues are?)

4. Does your organization distribute food as part of its mission? If so, how do you source your food, and who receives it? (Only for food pantries, restaurants, community gardens, other food distributors)

5. Are you interested in sourcing more food locally? If so, what are the barriers to this objective? (Only for food pantries, restaurants, other food processors)

6. Are there any obstacles to finding, buying, or storing fresh produce or other agricultural products at your organization? If so, please describe them. (Only for food pantries, restaurants, community gardens, other food distributors)

7. If not already covered, are there any possibilities for waste reduction practices here or at similar organizations?

8. What is the greatest challenge your organization faces, and how will it address this challenge going forward?

9. Do you work with any other organizations or programs? If so, which ones, and how do you collaborate? (SNAP, Wholesome Wave, MOFGA, etc.)

10. Can you think of other ways that your organization or similar organizations can work more closely with farmers, in particular farmers that focus on local distribution and marketing?

11. Do you have any favorite Maine food initiatives (projects, bills, NGOs) that you think are particularly promising?

12. Do you think a local food atlas would be a useful tool for Mainers to have access to?

13. Do you know of anyone else who might be interested in participating in this study? How can I contact him or her?
APPENDIX III: INTERVIEW COUNT DATABASE

Spreadsheet of tallies of specific constraints mentioned in interviews grouped into constraint categories.

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APPENDIX IV: SELECTED INTERVIEW EXCERPTS

Interview excerpts listed by interviewee in alphabetical order of last names.

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